

HEALTHCARE IT MANAGEMENT

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THE OFFICIAL JOURNAL OF THE EUROPEAN ASSOCIATION OF HEALTHCARE IT MANAGERS

DATA PRIVACY

Capital Equipment Investment

HIMSS 2012

Digital Radiography

Country Focus: Spain

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MY FUNDAMENTAL RIGHT TO CROSS-BORDER HEALTHCARE

Dear Reader,

Properly working cross-border healthcare is a fundamental right of every European citizen. This goes hand in hand with the free movement of persons.

The European Union has its main focus on IT collaboration with the USA. But HITM feels that this is too narrow. Therefore we have taken the decision to closely collaborate with the Middle East, Africa and Asia. To administer this goal we had to relocate from Belgium to Cyprus, the ideal place to access these emerging areas. The recent Chinese investments into Cyprus prove that we have made the right decision.

Our relocation has highlighted just how difficult it is for citizens to cross borders and ensure their basic rights. There are failings at both a national and European level. Honestly, calculating the obstacles to overcome and the time spent sorting out basic administrative issues underlines that (easy) free movement and cross-border healthcare is still far from being a reality.

Obstacles include not only language barriers but also administrative issues. Europe as much as national governments are still not up to scratch with basics. Boasting electronic passports and even health cards does not help and it is quite disappointing how difficult it is to change country in our digital age.

This experience has strengthened my belief that healthcare IT stakeholders have to do all we can to improve this situation. We must consolidate pilots, projects and other efforts to achieve a functioning, interoperable healthcare system. Not only because it is our basic right but also as it will boost our public healthcare understanding and economy. Let us make the pilots fly!

Pessimists might ask just how many people are crossing borders but this is not the proper argument. Allowing Europeans to freely move countries without bureaucratic obstacles is highly connected

to the idea of independent living of the older generation. This should be a core priority.

This brings me to the content of this issue. In our cover story we discuss Data Security, a serious concern in a borderless electronic world. We highlight privacy within the wider perspective of risk management and deal with the legal implications of data security.

Then we look into ownership and protection of data in the use of cloud computing. Cloud, a logic development of the Internet, is not a lawless area but must be secure and safe. We also cover managed service models for IT system purchases and highlight a way to optimise your capital investment.

Our country focus highlights healthcare IT in Spain. Shattered with an unemployment rate of almost 25 percent, we introduce the Spanish Healthcare System and analyse the state of healthcare in Spain. An interview with the President of our Association, Prof. Josep Picas from the University Clinic Sant Pau in Barcelona, completes this Spanish Country Profile.

Last but not least I urge you to support the efforts within the European Association of Healthcare IT Managers to unify healthcare IT in Europe and beyond. Please enjoy reading this latest issue of Healthcare IT Management.

For comments, suggestions and criticism, please contact me at any time.

Christian Marolt
Secretary General and Editor-in-Chief
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**Healthcare IT Management is the official voice
of the European Association of Healthcare IT Managers**

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References

References are available upon request to: editor@hitm.eu.



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HIMSS 2012

HITM was fortunate enough to attend this year's HIMSS conference in Las Vegas, Nevada. This article takes a look at the main themes of the conference and highlights some areas in which we could learn from our American counterparts.

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Capital Equipment Investment

If you are a hospital executive or department manager, you know the “joys” of annual budgeting and capital planning. With the rapid advancement of healthcare technologies, people are seeing this yearly task morph into an even more complex maze of unknowns and endless requests for big-ticket items. That is why healthcare systems are adopting Capital Equipment Strategic Plans (CESP). Such plans provide an unbiased framework for evaluating and prioritising a hospital's capital equipment needs.



HEALTHCARE IT MANAGEMENT

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DATA PRIVACY

Data privacy awareness has increased significantly within the health sector over the last few years; this is mainly due to EU and national legislation. Another reason is the adoption of new technologies, such as the electronic patient file and electronic prescriptions. Our cover story delves into the topics of data privacy and risk management and the strengths and weaknesses of data protection in cloud computing.



Pages 40 – 47
COUNTRY FOCUS: SPAIN

This issue we look at the healthcare IT in Spain. Who better to introduce us to the topic than Dr. Josep Manel Picas, President of HITM. Based in Barcelona at the Hospital Sant Pau, Dr. Picas took some time to answer our questions on healthcare IT in Spain and where he thinks things will develop in the future. Our country focus also includes a wider look into the state of the HIS market in Iberia.

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, and
- To promote the efficient, cost effective use of IT.

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

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Spain

SCIENTISTS DEVELOP A SOFTWARE TOOL FOR ESTIMATING HEART DISEASE RISK

University of Granada researchers have developed a software tool that makes an accurate estimation of the risk that a person has to suffer a heart disease. In addition, this software tool allows the performance of massive risk estimations, i.e. it helps to estimate the risk that a specific population group has of suffering a heart condition. The researchers employed a sample including 3,000 patients.

Understanding the risk for heart conditions by simultaneously using different equations is a key factor in heart disease prevention, which would reduce health spending in the short-and long-term.

According to the researchers, "during the last decade, the approaches to cardiovascular disease prevention have evolved from isolated interventions on modifiable risk factors to an integral model of intervention strategies based on previous risk quantification and stratification."

One of the factors enabling this change is the increasing availability of tools for the quantification and stratification of the risk of suffering a cardiovascular disease; these tools evaluate a set of individual characteristics, the so-called risk factors. This is the framework of the study conducted at the University of Granada and recently published in the Journal of Evaluation in Clinical Practice.

In the field of epidemiologic studies aimed at predicting cardiovascular risk, a set of mathematical models was developed in previous studies in the USA. The purpose of these models was to provide an estimation of the risk of suffering a cardiovascular event in the short term, i.e. 5-10 years, by assessing exposure to risk factors. University of Granada researchers used this model in their study.

The researchers performed a comparative study of the behaviour of different equations applied to a group of "at-risk" patients who were referred to an Endocrinology Service from a primary care center in Granada, Spain. Risk factors were obesity, high blood pressure, diabetes and lipid profile alterations.

The authors of this study are University of Granada professors Jesús María Ramírez Rodrigo, José Antonio Moreno Vázquez, Alberto Ruiz Villaverde, María de los Ángeles Sánchez Caravaca, Martín López de la Torre Casares and Carmen Villaverde Gutiérrez.

For more information, please visit: www.ugr.es

TELECARE IN ANDALUSIA

The University Hospital Virgen Macarena of Seville and the Superior Engineering School of Seville University are jointly carrying out a new research project for the implementation of a complete telecare system for kidney patients.

"Modular customisable architecture for complete kidney patient telecare" will study the implementation of a telemedicine system for the monitoring of pre-dialysis patients or patients under substitutive treatment (peritoneal dialysis), with the aim of improving their quality of life and healthcare. Funded by the Health Institute Carlos III, the project will run for three years.

Engineers believe that the current state of development of ICT, as well as that of sensing devices, makes it possible to study new devices for patients with special needs, in particular pre-dialysis or peritoneal dialysis patients.

The researchers propose to create a decentralised and personalised model that is based on a system customisable to different needs. It is thus envisaged to provide user access, complete services, and the follow-up of kidney patients. Planned features include:

- Universal and low-cost solutions;
- Non-Invasive and ubiquitous monitoring; and
- Secure, reliable, easy-to-use and accessible user interfaces.

Project participants include the Biomedical Engineering specialists of the Superior Engineering School of Seville University and a team of nephrologists from the University Hospital Virgen Macarena. The project coordinator is the head of the nephrology clinical management unit of the hospital, Jose Antonio Milán. The researchers will also receive support from three other hospitals, namely: Hospital del Sureste (Madrid), the University Hospital Nuestra Señora de Candelaria in Tenerife and the Hospital of Gran Canaria (Canary Islands).

(Adapted from original article on epractice.eu)

For more information, please visit:

www.juntadeandalucia.es

UK

FOUR MILLION POUNDS FOR INNOVATIVE SOLUTIONS TO TACKLE HEALTHCARE PROBLEMS

The UK government has announced £4 million of funding for businesses to develop cutting-edge ideas to address some of the biggest health problems of our time.

The Department of Health has opened two new com-

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petitions with up to £2 million of funding each to develop technological and innovative solutions that can:

- Change people's behaviour in order to reduce the impact of obesity and alcohol related diseases; and
- Improve the number of patients taking their medication as prescribed.

Obesity and Alcohol related diseases and patients not taking their medication as prescribed are major health challenges. Alcohol and Obesity related diseases cost the NHS over £7 billion each year and between 6-10 percent of all hospital admissions could be preventable if prescription medication was taken correctly. Businesses are invited to come up with innovative solutions to these challenges. This could be anything from a device which helps people monitor what they eat or drink or a personalised care package to help people take their medication as prescribed.

Health Minister, Lord Howe said:

"Technology and innovation have an important role to play in helping to address the healthcare challenges facing the NHS. That is why we are investing £20 million in new and creative ideas and projects which can make a difference to patients' lives.

"Today's competitions provide an opportunity to develop highly innovative solutions for some of the biggest health problems of our time and we look forward to seeing the results."

Sir David Nicholson, Chief Executive of the NHS commented:

"Investing in innovation is vital for a modern and efficient NHS- it will benefit the patient, the taxpayer and UK plc. The Small Business Research Initiative (SBRI) is a key part of the Innovation, Health and Wealth agenda, which aims to spread innovation throughout the NHS.

"These competitions provide vital funding for businesses to explore, develop and test new technology before it becomes commercially available. Organisations are invited to submit their ideas, which could have a real impact on patients and the NHS."

Iain Gray, Chief Executive of the Technology Strategy Board remarked:

"The SBRI process enables government to engage with innovative ideas from industry, acting as a lead customer to address intractable challenges. It is really positive to see DH and the NHS, building on their experience of previous successful SBRI competitions, using this approach to address new areas and drive innovation."

The competitions will be run through the SBRI process and are open to all organisations, not just those in the health sector. Recent competition winners include Eykona Technologies Ltd. which has developed a novel 3D wound imaging system, that allows healthcare professionals to monitor chronic wounds more effectively and tailor treatment accordingly. This system is currently being sold to the NHS.

The competitions will be managed by NHS London and NHS Midlands and East. Businesses can find out more about the competitions by attending a briefing session, which will be held in London on 12th April. More details are available at the SBRI website.

For more information, please visit:

www.innovateuk.org

Poland

POLISH PORTAL FOR INFORMATION ON MEDICINE REIMBURSEMENT

The Polish Ministry of Health has recently launched 'Dlapacjenta.mz.gov.pl', a portal providing practical information on the reimbursement of medicines.

Designed as an easy-to-use and convenient information source on medicines reimbursed by the National Health fund, patients are the first target group.

Through the new portal, patients have access to information on all procedures and conditions for the reimbursement of prescribed drugs.

Information includes:

- The formal requirements pertaining to the prescriptions issued by their doctor; and
- The treatment of their prescription at the pharmacy and the applicable options in this respect.

An online search service allows patients to check whether their prescribed medicines qualify for reimbursement as well as the amount or percentage that will be refunded. With the search tool they can look up medicines by active ingredient name or by brand name.

The portal is not just for patients; doctors and pharmacists can also make use of this source of information. They can find information on the proper way of filling out and handling a prescription according to the regulations in force. Doctors can also find the list of reimbursed medicines in PDF format, and pharmacists can access the same online search service as patients.

For more information, please visit:

www.dlapacjenta.mz.gov.pl

(Adapted from original article on epractice.eu)

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AGFA

AGFA HEALTHCARE INTRODUCES TURN-KEY MIGRATION SERVICES FOR CARDIOLOGY IMAGING DATA

A new agreement with DataFirst will deliver automated migration services for cardiology, significantly increasing efficiency and quality of the migration process. The companies will provide data migration service capabilities and archival storage solutions, enabling healthcare facilities to benefit from a rapid data migration process from aged media and end of life archive devices.

Cardiology data migration often places a substantial demand on legacy technology (i.e. jukebox technology, DVD, MOD, etc.) as well as the often limited IT resource pool in today's hospital environment. Risks include failure to migrate due to legacy technology obsolescence, resulting in clinical downtime, costly service calls, and indefinite or permanent migration failure. Utilising DataFirst's Hyper-Migration solution, Agfa HealthCare can significantly speed the process for facilities in contrast to standard DICOM query migrations. Now a large migration can be fully complete in days, making patient information available when and where it is needed. This complete, seamless and rapid realignment of data storage is done on the back end without an impact on the clinical workflow, while meeting the current and future business and clinical needs of the facility.

"By simplifying the migration process with a modern alternative, Agfa HealthCare and DataFirst are enabling healthcare facilities to enhance their clinical capabilities by not only having quick online access to necessary data, but by also enabling them to more easily upgrade or switch to a newer software system." said Charles Wickens, Global General Manager, Cardiovascular Business, Agfa HealthCare.

In addition to providing migration services, Agfa HealthCare will also provide end-to-end support, upgrading the archive hardware to fully-supported, industry standard technology, eliminating obsolete media, and improving archive performance, ultimately resulting in improved efficiencies. Also unique to Agfa HealthCare's solution is that although data migration is primarily focused on just cardiology imaging data, now non-imaging data sets

like HL7 reports can be migrated as well.

For more information, please visit:

www.agfahealthcare.com

CARESTREAM

CARESTREAM CLOUD PACS IN THE LOIRE REGION OF FRANCE

One of the first medical imaging data archiving and sharing projects in France using CARESTREAM Vue Cloud PACS and Vue Cloud Archive is now operational. Data is hosted at the Roanne Numeri-Parc secure data centre (ISO27001 certified) in the Loire Region (south-east of France), and built around the Axione high-speed telecommunications network.

The Saint Etienne University Hospital led the group coordination of this ambitious territorial PACS project, which involved all major economic, political, technical and health players of the Loire. The group aims to share the purchase of services and equipment, enabling medical image archiving, communication and diagnostic services to meet the needs of group members and aid cooperation between institutions and their partners. The group chose Cloud-based services for the project instead of capital investment as these services enhance productivity and patient care and the fee-per-study structure provides a predictable TCO.

One of the project's initial partners, the Mutualité Française Loire SSAM, is among the first to benefit from this initiative. Institutional stakeholders were also actively involved, including the Conseil Général de la Loire, the Adel42, the Grand Roanne Agglomeration and the Rhône-Alpes Regional Health Authority (ARS).

"At Carestream we provide the application software, hardware and all required services for the provision of various services offered to end customers," said Ludovic d'Apréa, Manager of Carestream in the France-Belgium-Luxembourg Region. "We also support marketing the service to end customers who may choose to optimise the use of bandwidth purchased from Axione, depending on their requirements. Carestream is proud to participate in this innovative project which gives us the opportunity to demonstrate our technology and expertise in the strategic area of archiving, ex-

change and sharing of clinical data across health regions."

Carestream's family of cloud services includes Vue Cloud PACS, Vue Cloud Archive, and Vue Cloud Community, which offers image exchange and access portals. Carestream Health is a proven cloud services provider that manages 30 million studies (1 petabyte of data) in 10 different clouds worldwide.

For more information, please visit:

www.carestream.com

IBM

IBM TO COLLABORATE WITH MEMORIAL SLOAN-KETTERING CANCER CENTER IN APPLYING WATSON TECHNOLOGY TO HELP ONCOLOGISTS

Memorial Sloan-Kettering Cancer Center (MSKCC) and IBM have agreed to collaborate on the development of a powerful tool built upon IBM Watson in order to provide medical professionals with improved access to current and comprehensive cancer data and practices. The resulting decision support tool will help doctors everywhere create individualised cancer diagnostic and treatment recommendations for their patients based on current evidence.

The initiative will combine the computational power of IBM Watson and its natural language processing ability with MSKCC's clinical knowledge, existing molecular and genomic data and vast repository of cancer case histories, in order to create an outcome and evidence-based decision support system. The goal is to give oncologists located anywhere the ability to obtain detailed diagnosis and treatment options based on updated research that will help them decide how best to care for an individual patient.

The IBM Watson system gained fame by beating human contestants on the television quiz show Jeopardy! It can interpret queries in natural language and uses statistical analysis, advanced analytics and a powerful array of processors to search millions of pages in seconds and deliver evidence-based statistically-ranked responses.

MSKCC's world-renowned oncologists will assist in developing IBM Watson to use a patient's medical information and synthesize a vast array of continuously

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updated and vetted treatment guidelines, published research and insights gleaned from the deep experience of MSKCC clinicians to provide an individualised recommendation to physicians. The tool will also provide users with a detailed record of the data and evidence used to reach the recommendations.

The need for such an advanced technology arises from the steadily increasing complexity of oncology treatment. Cancer is not one disease but some hundreds of sub-types, each with a different genetic fingerprint. Significant discoveries in molecular biology and genetics in the past two decades have delivered new insights into cancer biology and strategies for targeting specific molecular alterations in tumours, but these advances have also ratcheted up the complexity of diagnosing and treating each case. Oncologists and physicians who do not specialise in specific sub-types of cancer face a significant challenge in keeping up with the magnitude of rapidly changing information.

"This comprehensive, evidence-based approach will profoundly enhance cancer care by accelerating the dissemination of practice-changing research at an unprecedented pace," said Dr. Mark G. Kris, Chief, Thoracic Oncology Service at MSKCC and one of the clinicians leading the development effort. He noted that 85 percent of patients with cancer are not treated at specialised medical centres and it can take years for the latest developments in oncology to reach all practice settings.

Development work is already underway for the first applications, which include lung, breast and prostate cancers. The objective is to begin piloting the solutions to a select group of oncologists in late 2012, with wider distribution planned for late 2013. This collaboration complements an earlier announcement by IBM and Well-Point that the parties will focus on putting Watson to work on oncology solutions.

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

SECTRA
SWEDISH UNIVERSITIES IMPROVE MEDICAL EDUCATION WITH SECTRA'S VISUALISATION TABLE

The Sahlgrenska Academy at the University of Gothenburg has invested in

the Sectra Visualisation Table. Gothenburg thus becomes the second Swedish University in a short period of time to reinforce its medical training by acquiring Sectra's visualisation table.

The visualisation table at the University of Gothenburg will be used by students in anatomy classes as a complement to dissection exercises. "Today our department has 240 students of medicine each year sharing three bodies for dissection and anatomy training through the full training period," said, Professor Bengt R Johansson. "Bodies are difficult to find but also expensive to handle. Moreover, once dissection is started you can never study what the body would have looked like before starting the dissection. The visualisation table makes a significant contribution to medical education, especially anatomy classes."

The Sectra Visualisation Table is a large, multi-touch medical display with software that facilitates interaction with 3D images of the human body created by modern computer tomography or magnetic resonance cameras. Students are able to intuitively zoom in, rotate or cut into the visualised body without using a scalpel or destroying the subject. This means that the same image can be used repeatedly, and the students are able to study the impact of various illnesses on the anatomy in a manner that was not possible in teaching in the past. The opportunity to interact with virtual bodies provides better understanding for the body's anatomy and functions, which in turn will contribute to better educated medical personnel and thus higher efficiency and safety in healthcare in the long-term.

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

APERIO
APERIO ANNOUNCES STRATEGIC COLLABORATION WITH DELL TO CREATE CLOUD-BASED SERVICES FOR PATHOLOGY

Aperio, provider of digital pathology systems, announced a strategic collaboration with Dell to create the world's first scalable, secure medical cloud network for Pathology. Through its secure cloud-based Unified Clinical Archive solution, Dell manages nearly five billion medical images and studies

for healthcare organisations.

Now, Dell will host the existing suite of Aperio's solutions for digital pathology. Fortified by Dell's standards-based technology and storage capabilities, Aperio's ePathology Network™ solution will provide secure, compliant, worldwide access to pathology consultations via the cloud.

"Our goal is to address the regional and global imbalances of pathology expertise available for patient care by enabling access to pathologists for all types of consultations, regardless of location. With Dell's cloud-based archiving platform, we can make our ePathology Solutions™ more widely available", said David Schlotterbeck, CEO of Aperio.

"This state-of-the-art ePathology Network technology from Aperio will revolutionise the practice of secondary consultations," stated Dr. Jonathan Epstein, Director of Surgical Pathology at Johns Hopkins Hospital. "We fully expect that the time to return an opinion on these cases will be significantly reduced — from multiple days to as a few as a couple of hours in critical cases. This will have a significant positive impact on patient care."

Dell and Aperio are also collaborating to develop the world's leading repository of characterised digital slide images and cases, which will include the Juan Rosai Collection of Surgical Pathology Seminars. This furthers another mission of Aperio to make quality educational and reference materials more readily available to all pathologists around the world. The eSlide Repository™ will be a fulcrum for the healthcare and life sciences industries' focus on personalised medicine and enhanced precision and predictability.

"Dell is excited to work with Aperio to facilitate the archiving and sharing of whole slide pathology images via the cloud," said James Coffin, Ph.D., Vice President and General Manager of Dell Healthcare and Life Sciences. "This is a prime example of how on-premise and cloud-based solutions with application-neutral data management capabilities can break down traditional information silos and allow healthcare organisations to securely manage, store and share data to advance patient care."

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

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UPCOMING EVENTS

DOCTORS 2.0 & YOU 2012

MAY 23-24, PARIS, FRANCE

Doctors 2.0 & You will shed light on strategic issues for all of healthcare. The exciting programme will examine how doctors and other professionals, patients, hospitals, government, pharma, and payers use social media, mobile apps, and Web 2.0 tools to connect and the best practices that emerge for each.

One of the unique features of Doctors 2.0 & You is that its 400+ participants hail from five continents and represent all walks of health and medicine, public and private, government and pharma. Topics include:

- Connecting the ePatient and the 2.0 doctor;
- Online patient communities;
- Online physician communities;
- Social media and personal health records;
- Social media campaigns for government, hospitals, pharma;
- Mobile Apps for chronic patients;
- Mobile MedEd;
- Quantified Self;
- Pharma cases; and
- Regulatory issues.

"The Doctors 2.0 & You conference is supported by followers around the world who like the open spirit with which we present health care social media and collaborative tools. Our website attracted visitors from 76 countries in the past month," noted Denise Silber, President of Basil Strategies, conference founders. Dr Berci Mesko, advisory board member, keynote, and one of the most influential Health Social Media practitioners in Europe, concurs: "Doctors 2.0 & You is THE international health care social

media conference."

Speakers also include: ePatients AfternoonNapper (US) and Kathi Apostolidis (Greece), conference scholarship recipients; Dr Paul Wicks PatientsLikeMe, 2011 MIT Technology Review Humanitarian of the Year, Dutch doctors Bart Brandenburg and Eric Jansen, with their famous tweet-consults, Drs Gao and Li, founders of HaoYisheng and Dxy portals, with one million + Chinese physicians each. Other outstanding speakers include: Ian Talmage (Bayer), Len Starnes pharma digital expert, Drs. Howard Luks, Jennifer Dyer, Lawrence Sherman, Vincent Varlet (Novartis), and Angel Gonzalez.

In true 2.0 style, participants will personalise their workshop selection, choose best campaigns, start-ups and posters, and communicate on TwitterTv.

Recognised by the French Ministry of Health and partnering with the Stanford Medicine X conference whose founder, Dr Larry Chu will speak, Doctors 2.0 and You is THE event for your Health Care Social Media calendar in 2012.

For more information, please visit:

www.doctors20.com

WORLD HEALTH CARE CONGRESS EUROPE: SHARING GLOBAL INNOVATIONS IN HEALTH

MAY 23-24, AMSTERDAM, THE NETHERLANDS

The health systems of Europe are diverse. However, they face many common challenges. These challenges are shared by health systems the world over, many of whom are pioneering innovative solutions. The World Health Care Congress Europe has been designed as a unique forum to present these global innovations in healthcare.

Conveniently located in a key global hub, the 8th Annual World Health Care Congress Europe in Amsterdam is an international forum that convenes leaders from all sectors of healthcare to dis-

cuss and develop actionable strategies to improve care delivery and outcomes. The event has been designed to meet the needs of delegates from Europe. However, with over 60 speakers coming from 16 different countries, the World Health Care Congress is a truly global event that happens to be hosted in Europe. Whatever challenges you face within your health system, you will find solutions to address them with here.

The Congress presents the best and latest ideas in modern healthcare and features the world's leading providers, payers and policy makers:

- Hear leading providers and health systems discuss how they are making tough decisions in the face of rising demand and diminishing resources;
- Acquire an action plan to achieve productivity and efficiency in healthcare delivery;
- Learn about innovations to enable healthcare sustainability being pioneered in emerging economies;
- Explore the global challenge of shifting health systems to a prevention focus;
- Develop strategies to reduce costs through more effective chronic disease management and technology implementation;
- Receive the evidence needed to enable large scale delivery of connected health, remote monitoring and other technological innovations;
- Share the experiences of some of the world's leading integrated Care Organisations from Europe, the USA and beyond; and
- Examine a range of pioneering innovations in healthcare payment systems, reimbursement, funding, commissioning and incentives.

For more information, please visit:

www.worldcongress.com

INTEGRATED IT TO OPTIMISE PATIENT CARE

COCIR SHOWCASES BEST PRACTICE IN HEALTHCARE INNOVATION

In March of this year COCIR - the European trade association for the medical technology industry hosted a meeting with the European Commissioner for Health and Consumer Policy, John Dalli and senior representatives from hospital and healthcare providers. The meeting in Paris showcased how integrated IT and innovative financial partnerships are optimising patient care.

Commissioner Dalli is supporting Member States on national efforts in improving health for millions of patients across Europe. Innovation, technology and smart financial investment are crucial in helping to resolve the increasing financial and demographic pressures common to all healthcare systems in Europe. As part of an ongoing dialogue, Commissioner Dalli accepted COCIR's invitation to spend some time looking in detail at examples of European best practice, including where EU funding is helping transform healthcare delivery.

"I was pleased to see and discuss innovative technologies from different industrial sectors combining with innovative healthcare models as well as financing solutions to enable better patient care and increased efficiency within this care setting," said Commissioner Dalli. "I have no doubt that healthcare systems need to use appropriate new technologies and other innovative solutions, if they are to emerge stronger from the current economic challenges," Dalli added.

Many of Europe's leading hospitals and healthcare providers have recognised the potential of using smart investment in medical technologies and IT to become 'healthcare hubs', forging improved networks with physicians and local clinical services to better manage the needs of patients in local facilities, even in their own homes.

As we are all aware, the European healthcare system is in a period of change, driven by demographic change, evolving skill shortages, rising consumer demands for better health and advances in healthcare technology. In the context of financial austerity, more local and regional hospital-centred networks are being developed to provide improved service to an ever more demanding and informed patient. Public and private partnerships and investments in healthcare technologies and research are driving a steady evolution in healthcare, set to benefit the lives of millions of Europeans and contribute to economic prosperity.

Commissioner Dalli visited the Institut Gustave Roussy, Ile-de-France. The Institut Gustave Roussy oncology hospital is an application service provider, showcasing cloud computing and telehealth. In France today, 75 percent of all public hospitals are still not equipped with an IT system for their imaging examinations. In an effort to save costs by quickly increasing the use of digital technology, the Ile de France Regional Healthcare Agency (ARS) contracted with a consortium to deliver digital, cloud-based PACS and archive services to the Île-de-France, the country's most populous region with over 12 million people.

The goal of this project was to enable regional healthcare professionals to share, analyse, interpret and archive the ava-

lanche of patient information, which has been crucial in driving cost reductions and improved patient experience. This project has the capability to connect and share information from over 90 hospitals and 100 private practices across the region.

Additional presentations were also given on three Spanish hospitals. The Hospital de la Santa Creu I Sant Pau, Barcelona has partnerships for imaging technology and IT management. Multi-year partnership projects enable healthcare providers to reduce their risks and gain affordable access to the latest technologies. In 2009, a ten-year partnership was formed between the Sant Pau Hospital in Barcelona and an industry partner for a fully-managed service of Sant Pau's Imaging department at a fixed monthly fee.

As the first project of its kind in the region, the provider has defined a new imaging system department including technology, improved workflow and processes to handle the future growth and clinical ambitions of the hospital. The provider also renews the technology according to a capital asset plan, taking into account technological advances that occur during the contract period. The managed service includes MR3, CT4, molecular imaging, X-ray and ultrasound.

Also presented was the Hospital Universitari de la Ribera in Valencia, which showcases the public-private partnership management model and is a prime example of a high quality and sustainable healthcare system. Using advanced IT systems (including electronic medical records and telemedicine) in combination with latest diagnostic technologies and comprehensive educational programmes further assures consistent, high-quality and sustainable delivery of healthcare under the programme. The patient benefits from no waiting times, screening programmes, single person rooms, homecare, patient healthcare programmes.

The Santa Lucia University Hospital (Cartagena)/Los Arcos del Mar Menor University Hospital (Murcia) was another excellent example of financing, medical equipment and IT integration as part of a public private partnership presented to the Commissioner. As part of a Public Private Partnership (PPP), these two hospitals in the Spanish Region of Murcia now have more than 100 imaging systems, such as computed tomography (CT) scanners and magnetic resonance imaging (MRI) systems, as well as systems for molecular imaging, mammography and ultrasound.

"Hospitals of tomorrow, and healthcare professionals and administrators working within the healthcare system, need to have the tools and investment to cope with growing healthcare demand," said Heinrich von Wulfen, COCIR President. "Today, many leading hospitals will be critical players in an integrated healthcare delivery system which engages the consumer and understands the patient's disease and patient's biology in order to stratify the treatment. Such a system is digitally accessible in people's homes, community clinics and physicians' offices."

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

KPMG REPORT: TECH-SAVVY BABY BOOMERS TO DRIVE DEMAND FOR E-HEALTH

REPORT PREDICTS 'POWER OF THE CROWD' KEY TO TRANSFORMATION

The report from KPMG together with the Manchester Business School, *Accelerating Innovation: The power of the crowd*, is based on in-depth interviews with e-health executives representing 15 countries, as well as insights from KPMG's global healthcare partners. Due to changing demographics, the need to reduce costs and to increase the quality of care, e-health is seen as a crucial approach to address the global imperative to improve and advance healthcare.

Nearly 60 percent of the healthcare executives interviewed said that the top two drivers of e-health will be patient expectation (61 percent) and an increase in efficiency (58 percent). More than 30 percent of respondents said that the main barrier to sustainable e-health systems is funding (34 percent), while 29 percent believed it to be professional attitudes.

According to Dr. Mark Britnell, KPMG's Global Chair for Health and a partner in the UK firm: "Implementing e-health requires conviction and commitment, but the benefits to patients can be enormous if done well. Our global study offers direction for success and showcases leading examples which can give decision makers the confidence and courage to press on."

"In order for ehealth systems to deliver on the promises of reduced costs and improved quality of care, clinicians will need to be brought on board – either willingly or in response to consumer demand," Britnell added.

"Today's smartphone user is tomorrow's patient who wants greater access and control of their healthcare and their medical records," said Jan De Boer, Global Health IT Lead for KPMG in the Netherlands. "And, along with patients, tech-savvy clinicians need to be seen not as a force to be won over, but as a catalyst for change."

To create real change in the healthcare system, through telehealth or telemedicine, the report cites three conditions essential for success:

- Crowd-accelerated innovation;
- Collaborative alignment; and
- Creative dislocation.

Crowd accelerated innovation denotes the impact and influence of the collective – when many people come together to affect change, such as in the human genome project or the free internet encyclopedia, Wikipedia. Collaborative alignment requires the focused interests and efforts of a wide range of participants. Creative dislocation

proposes that process and systems must be abandoned to move forward, such as digital imaging versus conventional film x-rays.

Successful projects that employ these approaches include the Care Connectivity Consortium (CCC) in the US, Singapore's National Electronic Health Record system (NEHR) and Denmark's e-health portal, www.Sundhed.dk.

Recently the UK Department of Health released its "Headline Findings" on the Whole System Demonstrator project, the largest randomised control trial of its kind in the world. This investigation of telehealth and telecare reveals that "if used correctly, telehealth can deliver a 15 percent reduction in acute and emergency patient visits, a 20 percent reduction in emergency admissions and a 45 percent reduction in mortality rates."

"While there is no single path to e-health transformation, it is too important and too expensive for organisations to repeat the mistakes of their peers," said Britnell. "Indeed, much value will come from sharing lessons between countries, systems, institutions and professionals."

Neelie Kroes, Vice-President of the European Commission responsible for the Digital Agenda eHealth attended the conference and believes, "Building the evidence base is essential to deploying e-Health. Once we have concrete facts and figures, it is much easier to convince others they should take the same road. And it will be easier for them to put their money where their mouth is." Kroes was particularly impressed with one example from the report: "Hong Kong has cut hospital re-admissions by 25 percent! It did this through introducing a basic e-health registration, hospital admission and risk reduction programme for the elderly. No wonder it will now be extended to all seven million citizens in Hong Kong."

One key opportunity for e-health lies in care for the elderly, which is increasingly important in our ageing society. For Kroes the most important thing is getting all stakeholders together: Public and private sectors; finance; industry, carers and physicians. In this context ICT can work to its true potential. She went on to say that talking is not enough: "I do not just want a forum for discussion – I want action and outcomes." Her three proposed actions are innovative solutions to prevent falls, promoting successful integrated care models for chronic diseases among the elderly (e.g. by using remote monitoring) and getting 30 European regions to work together on innovative ways to ensure patients follow their prescriptions.

For more information, please visit:

www.kpmg.com

CALL FOR PAPERS

WEARABLE DEVICES FOR THE MONITORING AND TREATMENT OF CHRONIC DISEASES

Researchers are invited to submit research articles addressing the new research and development of wearable devices, which can be used for the monitoring and treatment of patients suffering from chronic diseases. Of particular interest are papers which consider a set of sensors, algorithms for physiological signal processing, collection of environmental data, data fusion, detection and quantification of symptoms, decision support for the medical doctors, and communication of the patient with the doctor. All systems must be accompanied by a description of their validation and trials on patients in real conditions.

Potential topics include, but are not limited to:

- Body area networks;
- New sensors;
- Signal processing;

- Data fusion;
- Intelligent information systems;
- Integrated monitoring and treatment systems; and
- Best practices.

Before submission authors should carefully read over the journal's Author Guidelines, which are located at <http://www.hindawi.com/journals/ijta/guidelines/>

Prospective authors should submit an electronic copy of their complete manuscript through the journal Manuscript Tracking System at <http://mts.hindawi.com/> according to the following timetable:

Manuscript Due: Friday, 27 July 2012
First Round of Reviews: Friday, 19 October 2012
Publication Date: Friday, 14 December 2012

EUROPEAN INNOVATION PARTNERSHIP ON ACTIVE AND HEALTHY AGEING

THE MARKETPLACE FOR INNOVATIVE IDEAS IS OPEN FOR BUSINESS

A new website, the "Marketplace for Innovative ideas" was recently launched as part of the European Innovation Partnership on Active and Healthy Ageing (EIP on AHA).

The Marketplace is an interactive website designed to help those that are interested and involved in the Partnership to work together and develop their innovative ideas.

It is a platform where stakeholders can:

- Find partners to collaborate with for their initiative/project;
- Find an initiative to participate in;
- Provide and search for information about ageing and innovation;
- Get in touch with stakeholders;
- Participate in discussions in the forum; and

- Promote events related to active and healthy ageing.

The Marketplace will also include an online workspace for the EIP on AHA's Action Groups once they are formed this summer, and will provide more information about the Reference Sites once they are selected in 2013.

Reference Sites provide the EIP on AHA and its stakeholders with examples of a comprehensive, innovation-based approach to active and healthy ageing. They can be regions, cities, integrated hospitals or care organisations that are able to give evidence and concrete illustrations of their impact on the ground. The process enabling you to submit your intention to become a Reference Site is now open.

For more information and how to get involved, please visit: webgate.ec.europa.eu/eipaha



DATA PRIVACY IN A WIDER PERSPECTIVE OF RISK MANAGEMENT

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Data privacy awareness has increased significantly within the health sector over the last few years; this is mainly due to EU and national legislation. Another reason is the adoption of new technologies, such as the electronic patient file and electronic prescriptions. However, data privacy is not limited to Information Technology (IT); the physical protection of paper files, CD ROMs, USB sticks, etc. should be taken into account when tackling data privacy.

Data privacy should be seen in a wider perspective of risk management and governance. Due to recent events (e.g. the financial crisis), governance and risk management are hot topics for media coverage, especially within the financial sector. However, these topics are also high on the agenda in the boardrooms of private companies in the corporate world, due to earlier scandals like Enron and Worldcom. Risk management is still in its infancy in healthcare, even though risks are probably highest, involving human life.

Responsibilities Regarding Risk Management

Regardless of the type of organisation, it is the responsibility of management to manage all risks of the organisation. This is also the case in healthcare and non-profit organisations. Besides, it is not only the responsibility of management to manage risk; it is also the responsibility of the board of directors to supervise whether risks are adequately managed within the organisation.

Worse: If risks are not adequately managed and events (accidents) occur, the directors can be held (legally) liable for this. This is not just theory, but happens in practice. Members of the board of directors often do not realise they hold ultimate responsibility the final responsible and might be held liable in case of serious events. This is also apparent in healthcare, where directors are often appointed in an informal way, and where risks relate to human life.

Many risks, especially in healthcare, cannot be reduced to zero. Even when precautions are taken events could still occur. Precautions reduce the probability or the impact of a risk, however, risks are often not completely eliminated. Therefore, it is important, in case of such an event, to be able to prove that measures were taken to manage the risk and that the management has reflected and taken conscious decisions to manage the risk. Then, if it happens, at least the management took all possible measures and cannot be accused of negligent omission.

Which Risks Should be Managed?

All risks of the organisation should be managed. There is a wide variety of risks, the most common categories are:

- Medical and patient safety risk;
- Operational risk;
- Legal & compliance risk;
- Financial risk; and
- IT risk.

Risks relate to all activities of the organisation, both on the care and on the administrative side. Within the above risk categories, there are many distinct risks that should be managed. For all im-

portant risks, control measures should be taken to prevent them from occurring and very often, IT plays an important role in this.

What Does it Mean to Manage Risks?

Proper risk management implies that:

- All important risks within the organisation are known and assessed; this is typically done in a risk assessment exercise;
- Based on the risk assessment, conscious decisions are taken to address the risks (or not!); and
- Based on these decisions, appropriate actions are taken and measures are implemented to address the risks.

A **risk assessment** is typically performed with the aid of external consultants, preferably with experience in healthcare. The main reason for this is that many of the risks are generic and also present in similar organisations. A good consultant has sector-specific risk models to conduct the risk assessment.

The risk assessment is typically performed in two phases:

- Identification of all risks: This is typically done in workshops with management starting from the generic risk model; and
- Evaluation of all identified risks: There are several methodologies to evaluate risk; in practice both the probability and impact of the risk occurrence (the event) are evaluated.

The risk assessment exercise will provide you with an inventory of all risks and their evaluation. Of course, the highest risks will be addressed first.

In a next stage, decisions are taken on how to address the risks, based on their importance and possible measures. Basically, risks can be addressed in the following ways:

- Reduce the risk by implementing control measures;
- Delegate the risk. In practice this is most often done via insurance;
- Avoid the risk, for example by ending the related activities; and
- Accept the risk and take no action.

Indeed, the decision might be not to take any action. This might be because the risk is low and the cost is high. Most important is that these are conscious decisions, by management or even the board.

The decisions should also be documented, known and supported by all relevant people. Because, if 'an accident' happens, we want to avoid 'finger-pointing' and 'I thought you were taking care of this'. Based on the decisions made, an action plan is defined, which takes into account the priorities defined in the risk assessment.

What About IT Risks?

IT often plays an important role in management of risks, especially operational and financial risks. On the other hand, there are also the specific IT risks. These are typically categorised with the acronym CIA:

- 👉 Confidentiality of information;
- 👉 Integrity of information; and
- 👉 Availability of information and systems.

Confidentiality of information is much related to data privacy. A commonly used definition of the confidentiality principle is: 'Only authorised people should have access to (view) confidential information'. Confidentiality risks are related to the abuse of the information. Typical control measures are related to the secure protection of confidential information.

Integrity of information is related to the correctness of the information. A common definition of the integrity principle is: 'Only authorised people should have access to change information.' Integrity risks are related to unauthorised changes to information. In healthcare these changes might ultimately lead to inappropriate medical decisions and actions, such as wrong medication. Therefore, integrity of information is probably even more important than confidentiality of information (data privacy) from a risk point of view. Fortunately, typical control measures are similar and also related to the secure protection of information.

A lot of information has been digitalised over recent years, and a lot of activities have been automated. New technologies have been adopted, such as the electronic patient file and electronic prescriptions. As a consequence, dependency on IT systems has increased tremendously in the last few years, hence the importance of systems availability. Needless to say what the impact of unavailability of critical systems might be, fortunately also non-IT management easily relates to this, which facilitates decisions on investments to increase systems availability. Examples are systems redundancy, virtualisation of CPU and storage, Disaster Recovery Plans (DRP), etc.

Information Security: Burden or Need?

In many organisations, recently the focus has been on systems availability and infrastructure. Less effort has been made on confidentiality and integrity of information. An important reason for this is that information security is not a popular subject and often associated with passwords. End-users do not always see the benefits of this, especially not in highly operational environments, such as hospitals.

Therefore, it is important to find the equilibrium between operational efficiency and security. Identification via badges or biometrics (eg. finger prints) are examples of efficient and secure solutions.

Awareness creation on information security is not easy, the message should be that not only would an unauthorised person gain access to confidential information (infracting data privacy laws) and be able to modify critical information, but most important, that people would believe it was YOU! Indeed, all actions

performed on IT systems are logged nowadays. In case of malicious events, these logs are investigated and the events will be linked to you personally.

And, as earlier discussed, questions will probably also be raised towards management and the directors on whether all precautions have been taken to prevent this from happening; and whether sufficient efforts were made towards information security.

An Action Plan Towards Information Security

We have seen that information security is an important element of risk management. Therefore, it should be no surprise that the approach to address information security is similar to the approach on risk management.

In a first phase, a risk assessment is performed consisting of:

- 👉 Identification of critical information from a confidentiality and integrity point of view, starting from an inventory of all systems and information; and
- 👉 Evaluation of the identified critical information: The degree of criticality is determined based on the potential impact of confidentiality or integrity breach of the information.

Please note that the aspect of availability can easily be included in this exercise. It should also be noted that in similar organisations, critical information is also similar.

In a next phase, an inventory is made of the information security measures already in place to protect the critical information. These measures include security procedures, access controls, passwords, security settings, access rights, etc.

Based on the criticality and security measures in place, it is determined whether additional measures should be taken. What is sufficient? This is a difficult and subjective discussion. Most organisations refer to information security standards; the most common is the ISO27001 standard. However, this standard consists of 130 security controls to be put in place to comply with the standard. This is not feasible for most organisations.

So even when using standards, subjective decisions need to be taken on what is acceptable and not. These decisions should not be taken by the IT manager alone; other members of the management team and often even the Board should be involved.

Conclusion

Data privacy should be seen in a wider context of information security and risk management. Perfect security protection does not exist; risks can never be completely eliminated. Even in 'Mission Impossible', security was insufficient to keep the hero out of the computer...

The most important thing is that conscious decisions are taken based on analysis and that these are formally documented and appropriate actions are taken. The outcome is that liabilities are limited and no one should say "Ich habe es nicht gewusst ." ("I didn't know about it").



DATA OWNERSHIP & PROTECTION ISSUES

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Strengths and Weaknesses of Using Cloud Computing

Technological advances have created great opportunities for society to develop new products and services, and to communicate and share data. A tremendous amount of ubiquitous computational power and online services are used every day as a normal commodity. These new facilities allow data storage and exchange of information anytime and anywhere, at high speed. In recent years, cloud computing is the new term that has emerged to define these services. The main idea is to merge computational power and storage in a dynamically scalable infrastructure, i.e. the system capability grows as needed, which allows decoupling of the business service from infrastructure. This new buzzword is changing the computing paradigm and has given rise to vendors dedicated to providing this new utility in a pay-as-you-go business model, offering customers huge computational power and storage. The offer is diversified, including virtual operating systems and basic services, for instance, storage, database and signaling.

It is evident that the computing-as-utility business model is becoming prevalent in the electronic world and numerous industries are adopting it. So this new paradigm ought to be of interest to the healthcare industry in various ways and may likely be increasingly adopted in the coming years. The medical imaging sector will not be an exception, despite its special requirements. The main advantages of cloud computing are cost savings, wide availability and high scalability. However, this new technology also brings new challenges regarding data ownership, trust, privacy and interoperability with healthcare standards. In this article, we will stress the applicability of cloud computing solutions to support medical image repositories, addressing the existent problems and point out possible solutions to solve these issues.

Trust and Data Privacy

The outsourcing of data records can be a good solution, depending on the type of information transmitted to the cloud providers. The privacy of medical information is a vital requirement and a very sensitive issue, especially when medical digital images and patient information are stored in third parties and transmitted across public networks. Healthcare institutions often insist on safeguarding the privacy of involved actors to avoid data being tampered with by provider companies (i.e. cloud services suppliers).

Medical image repositories usually deal with outsized data volumes, regularly including an ever-growing list of files. Apart from medical exams, PACS also supports a database with textual information corresponding to those exams. Both are relevant and only authorised parties should access them. Thus, a challenge in outsourcing medical images over the cloud is how to protect the

privacy of patients and physicians, including protection against misuse of data.

A possible way to minimise those risks is the use of a hybrid cloud solution, i.e. a combination of public computing utility with a local infrastructure retained by institutions. The idea is to keep critical mechanisms inside institutions and outsource the heavy computational resources. The hybrid cloud approach allows outsourcing of medical records without losing control, which means that only authorised entities can access the data. The third party entity, located within the institution's control, provides the core element of privacy. This huge amount of medical information is stored across public cloud providers, granting patient privacy through data encryption. Possible unauthorised access to the cloud repository does not jeopardise data privacy, since access to the repositories requires the right key to get medical imaging records. Moreover, an additional strategy of splitting ciphered chunks of the same image across different storage providers could be used to provide an even higher level of privacy.

Data Ownership and Protection

Data protection in the outsourcing of medical images is required because these records are important assets for data holders. Medical institutions need to be aware of legal aspects when storing data in outsourced repositories. The first concern should be the SLAs (Service Level Agreements), giving special attention to the problem of data locking. Another topic to be considered is the permanence of patient data. Data protection laws in several countries, require knowledge of where data is stored. For this reason, storage of patient data in the cloud will be very difficult to use in countries like Spain, France or Italy. However, several cloud providers allow obligatory data



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storage in a specific geographic location. Thus, the problem addressed can be minimised and even countries with higher restriction laws might accept the solution.

Economic Aspects

Healthcare institutions need to reap certain benefits in terms of service quality and financial impact to be motivated to outsource their medical repositories. To analyse if cloud computing is economically viable in the imaging context, the following cost variables of the current solution are crucial:

- ✦ Server hardware;
- ✦ Network equipment;
- ✦ Licenses;
- ✦ Energy;
- ✦ Air conditioning;
- ✦ Maintenance; and
- ✦ Technological obsolescence.

A medical image repository based on the cloud does not require high initial investment compared to traditional archive solutions, which require purchase and maintenance of a data centre. It is well suited to a small centre because it does not require initial investment. However, for medium-to-large image centres there is a point of operation where it is economically more rational to have data centre storage in co-location. It is very difficult to define this tipping point because it is dependent on department workload and processes, and the cloud services market is rapidly changing, providing more resources at lower cost.

Furthermore, the cloud solution can facilitate multi-centre collaborative environments, including the sharing of medical records across medical institutions. So it will reduce duplication of medical exams, on one hand reducing the costs of patient care, and on the other, reducing the dose of exposure to radiation.

Interoperability with Healthcare Standards

There are many standards in the medical community (DICOM, XDS-I, IHE, HL7, etc.) that need to be interoperable with current cloud providers' interfaces. Historically, healthcare communications standards were thought to operate inside an institution's intranet. However, new standards are starting to follow a service-oriented architecture (SOA), which allows inter-institutional communication. Nevertheless, the compatibility with cloud services' interface is not directly supported due to data privacy and confidentiality.

For instance, in medical imaging, communication between medical devices follows the DICOM standard. However, the cloud data store and database interfaces are not DICOM compliant. Most public cloud providers supply access to their services through a proprietary web service interface. Thus, we need a middleware component to provide interoperability between DICOM equipment and

cloud repositories solutions compatible both with medical practice and pre-existing medical information systems (Bastião et al., 2011). To access cloud medical image repositories we need a cloud broker (see fig. 1), which will carry out the communication with healthcare standards (for instance, DICOM), as well as cloud services.

Data Availability

The availability rate of cloud services is very high, which means that services are always ready and reachable. However, availability in the medical imaging scenario is linked to the performance of access to the repository. Due to latency associated with service access and communication with public cloud providers, the retrieval process can be slower. This process is extremely important for the overall quality of the solution because there is real-time interaction with end-users, i.e. the professional is at the computer waiting for images. In order to reduce latency in data transmission, a caching mechanism can be placed on the cloud broker inside the medical institution. This mechanism is a local storage area that temporarily stores studies that are very likely to be requested in future operations. Moreover, the usage of pre-fetching mechanisms associated with the cache is fundamental to the solution's viability.

Conclusion and Future Perspectives

The use of a cloud computing utility has increased significantly in recent years and it appears to be a natural evolution of the data centre to execute computing and storage in a more scalable way. With such a significant increase, the market is growing quickly and more companies are providing new services with better features, including isolated services. We strongly believe that in the near future, cloud computing will be widely used in the healthcare sector. Several companies are already adopting this kind of solution, offering PACS and RIS services in private clouds.

Medical images are very important records, and so the storage repository needs redundancy to be a reliable system. Cloud providers offer this data security and backup system without any worries or additional charges for customers. Medical institutions can reduce the costs of local storage maintenance with PACS archive outsourcing. Moreover, outsourcing is an opportunity for small image centres that purchase modality equipment, despite not having the financial resources to buy software and hardware to keep up a PACS repository as it grants a redundancy/backup system.

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ARE YOU OPTIMISING... YOUR CAPITAL EQUIPMENT INVESTMENT?

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If you are a hospital executive or department manager, you know the “joys” of annual budgeting and capital planning. With the rapid advancement of healthcare technologies, people are seeing this yearly task morph into an even more complex maze of unknowns and endless requests for big-ticket items. That is why healthcare systems are adopting Capital Equipment Strategic Plans (CESP). Such plans provide an unbiased framework for evaluating and prioritising a hospital’s capital equipment needs.

What is CESP?

Capital Equipment Strategic Planning is a proactive approach to cost-effectively prioritising the annual replacement of aging equipment.

Hospitals can no longer afford to let the “squeaky wheel” or departmental politics drive capital equipment decisions. Rather, with CESP, the perils of opinion-based investments are replaced with qualitative and comprehensive analyses. Hospital executives can now make better-informed decisions because the provided data was validated and weighted, most often by an unbiased third party consultant.

Custom Metrics

To develop an optimal CESP, a myriad of metrics are evaluated. The process begins by assessing your current equipment as well as your highest priority needs going forward. The outcome is a multi-year strategic plan that identifies your hospital’s best approach to capital equipment investment.

The transparent process asks, for example: Which strategy would provide the greatest benefit to patients? Which approach best drives operational efficiency? How do you capture the greatest return on investment? What is your risk exposure with phased acquisition? What investment strategy best supports your business objectives?

Bottom line, CESP looks at your options from a multitude of perspectives. The value you place on these different viewpoints ultimately determines the most efficient CESP for your hospital.

Integrated Process

From a high-level perspective, developing a custom CESP involves three major phases:

1. Evaluate existing clinical equipment: This includes compiling vendor-provided equipment lifecycles, documenting active warranties, evaluating

maintenance histories, understanding true lifecycle ownership cost, etc.

- 2. Identify hospital’s equipment needs:** This phase addresses the necessary capital equipment investment to support your business objectives. Which equipment is really needed? At what point do you risk overinvesting? What is the ideal acquisition timing to capture newest and most capable technologies?
- 3. Propose multi-year equipment replacement plan** within your budget, which strikes the ideal balance between adding new equipment technologies to your inventory and the risk of keeping aging assets current. At this point, ways to further capture value are considered (e.g., phased and group purchasing).

Typically consultants are employed to help hospitals walk through the CESP process. These specialists offer an objective perspective as well as a potentially broader grasp of vendor offerings, industry best practices, and new technologies expected to hit the market. Hospital personnel will then implement the approved multi-year plan, making needed modifications due to market shifts, etc.

Data-Driven Solutions

Healthcare executives like the data-driven solution CESP provides. Their business objectives play a direct role in determining how the evaluation criteria are weighted. Factors such as return on investment, equipment lifecycles, maintenance costs over time, exposure to risk, group purchasing opportunities, and more are assessed and incorporated. The result is a strategically weighted equipment acquisition and maintenance plan.



Figure 1. The three steps of CESP

Phased Approach

Given the rising cost of healthcare delivery as well as other marketplace factors, some hospitals have delayed replacing or updating their clinical equipment. Whatever your scenario, CESP can help you accurately understand your present situation and evaluate your highest priority capital equipment needs.

In fact, given group purchasing options and strategic sourcing, CESP can potentially enable you to upgrade equipment sooner than expected.

Conclusion

Medical technologies are one of a hospital's largest capital expenditures. Developing a strategic approach to managing clinical equipment acquisition actually can lower your total capital costs and improve your results.

CESP is a data-driven solution supported by a multi-year acquisition programme based on efficiencies and your business objectives.

Otherwise, without a strategic equipment plan in place, often the "squeaky wheel gets the grease." This expenditure is too costly to leave to chance.

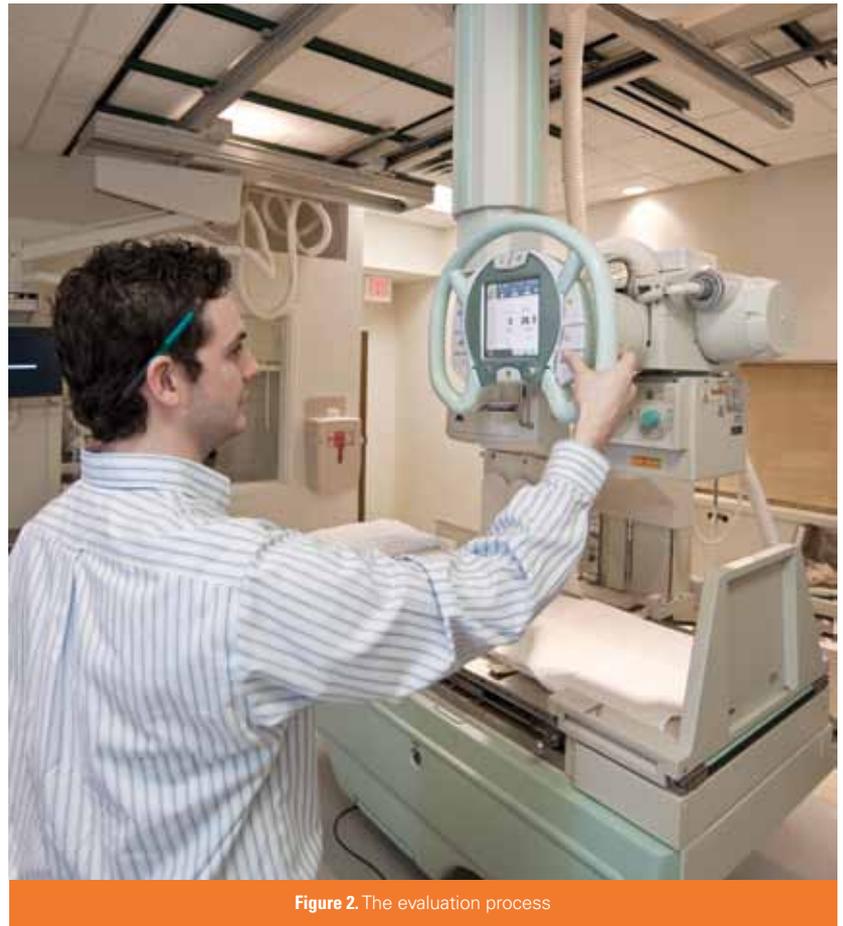


Figure 2. The evaluation process

IS A ZERO CAPITAL EXPENDITURE, MANAGED SERVICE MODEL THE WAY FORWARD?

Trend for Cloud Computing On the Rise

With decreasing healthcare reimbursement and increasing economic uncertainty, there is a growing trend for hospitals to opt for a zero capital expenditure, managed service model with the purchase of IT systems in healthcare. As the application of managed service models emerges in the PACS market, it paves the way for cloud technology to finally have a significant impact in medical imaging.

Managed services refer to a model where the vendor owns the IT infrastructure, with the hospital paying a fixed fee per month based on projected examination volumes. The vendor is also fully responsible for maintaining this infrastructure, pro-

viding data storage and software on a subscription basis. The benefits of managed services include reducing the need for heavy capital investment in PACS, such as costly in-house IT support staff and IT infrastructure investment. It also provides regular access to the latest software upgrades and allows flexible storage capacity to suit end-user's needs.

In any managed service model, the underlying factor is the pay-per-service and third-party hosting or ownership of PACS. There are then different forms of managed services depending on the server location of the two components of PACS - software and storage (see table 1).

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Managed Service Models	Software Location	Storage Location
Remote Managed	End-User	End-User
Software as a Service On-Site	Vendor/Third-party	End-User
Hosted Managed	End-User	Vendor/Third-party
Software as a Service Off-site	Vendor/Third-party	Vendor/Third-party

Table 1. Definitions of Managed Service Models. The terms 'On-Site' and 'Off-Site' refer to the location of storage server relative to the end-user. Source: InMedica

Cloud storage refers to the storage of the client's data resting with the vendor or third party. However, PACS incorporates a viewing component (software), as well as the storage of images; the viewing system is actually what many consider as PACS. Hence, the question is, at which point does one begin to class PACS as being cloud-based?

- Is it the moment the software is at a third-party server, as in SaaS onsite?;
- Is it when the storage is remotely available on the third-party server, as in hosted managed services?, or
- Is it only when both software and storage components are hosted by the third party, whereby the software as a service lies off-site?

Companies offering cloud-based PACS tend to fall into one of these three categories. It therefore depends on whether the system being offered is considered cloud-based from a software or storage point of view. A pure cloud-based PACS

may be described as a system where both software and storage components are vendor-hosted.

More important than definitions, of course, is the adoption of this technology. Both the technology and the business model have to work for suppliers and end-users. On the technology side, one might be more confident that vendors will resolve the technical hurdles, such as the quality of the data when transferred between locations and servers, as well as the quality of the interfacing. On the business model side, however, confidence is much lower and many questions remain. These include:

- Will hospitals be completely comfortable with third-party hosting of patient data, regardless of regulatory compliance?;
- Will patients be comfortable with this arrangement?; and
- What about the cost-savings? Is the total cost of ownership over a product's lifecycle significantly different from traditional PACS models?

“As the UK renews its national PACS programme in 2013, InMedica forecasts that up to 20 percent of revenues will derive from hosted managed models, whereby the storage of images will be cloud-based”
“Despite any technological benefits that cloud technology may provide in medical imaging, what hospitals need to see, and what suppliers need to work on, is an enhanced return on investment”

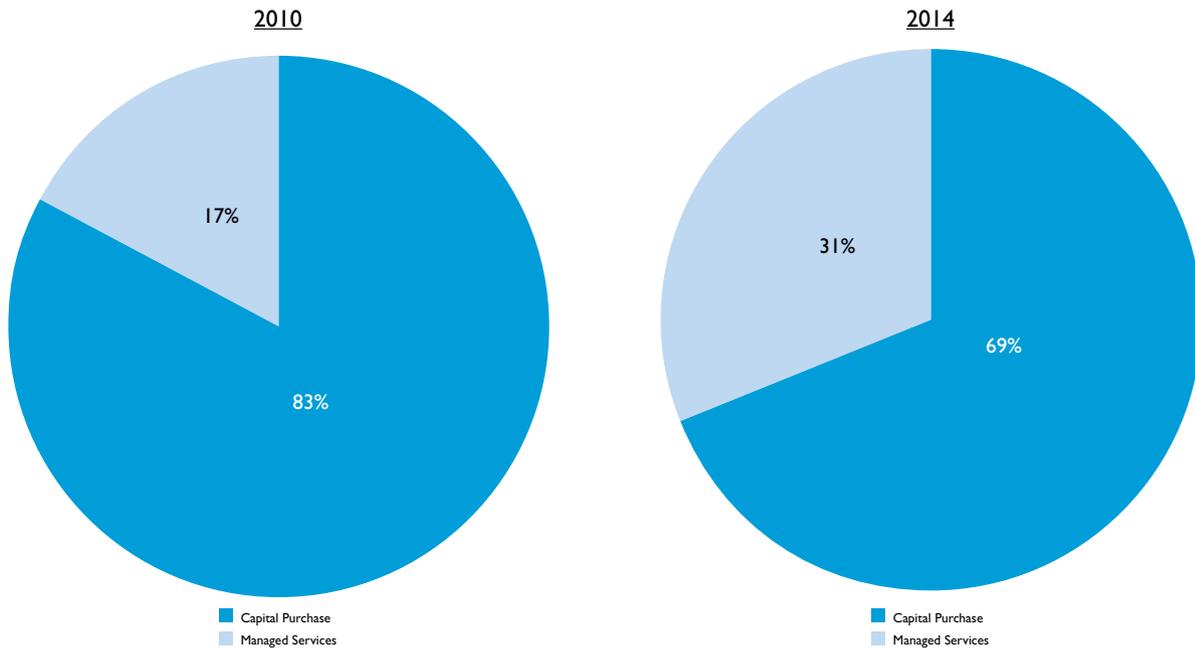


Figure 1. World PACS Revenues by Business Model Source: InMedica

The major draw for managed service models is their stated cost benefits. Once the return on investment is clearly established, penetration of this remote storage model will increase and there will be strong demand for further technological advances in the field. This phenomenon is already taking place in the UK and the Netherlands, for example, where remote managed service models currently account for most managed service installations being currently provided. However, now that the cost savings from vendor ownership and management of PACS have been realised in these countries, the next wave of demand is for further cost savings,

which may be obtained by completely moving storage and/or software to the vendor's site. Indeed, as the UK renews its national PACS programme in 2013, InMedica forecasts that up to 20 percent of revenues will derive from hosted managed models, where the storage of images is cloud-based.

As such, vendor-hosted PACS and cloud technology in healthcare will emerge strongly by proving an ability to reduce the cost of ownership to the end user. Despite any technological benefits that cloud technology may provide in medical imaging, what hospitals need to see, and what suppliers need to work on, is an enhanced return on investment.

SERVICE LEVEL AGREEMENTS FOR CLOUD COMPUTING

PHILIPP WIEDER, JOE M. BUTLER, WOLFGANG THEILMANN, RAMIN YAHYAPOUR
PUBLISHED BY SPRINGER, 2011



Service Level Agreements for Cloud Computing provides a unique combination of business-driven application scenarios and advanced research in the area of service-level agreements for Clouds and service-oriented infrastructures. Current state-of-the-art research findings are presented in this book, as well as business-ready solutions

applicable to Cloud infrastructures or ERP (Enterprise Resource Planning) environments. Service Level Agreements for Cloud Computing contributes to the various levels of service-level management from the infrastructure over the software to the business layer, including horizontal aspects like service monitoring. This book provides readers with essential information on how to deploy and manage Cloud infrastructures. Case studies are presented at the end of most chapters.

The book is designed as a reference book for high-end practitioners working in cloud computing, distributed systems and IT services.

BOOK REVIEW

“LINKING PEOPLE, POTENTIAL AND PROGRESS”

HIMSS 2012, LAS VEGAS, USA

The main objective of HIMSS 2012 was helping healthcare IT professionals to achieve new goals while maintaining their organisation’s commitment to unsurpassed quality of care. It was about bridging the gap between meeting requirements and implementing processes.

Hot topics at this year’s conference included:

- Clinical and business intelligence;
- Mobile technology;
- ICD-10;
- Meaningful use; and
- Privacy, security and the connected consumer.

There was a special emphasis on social media at this year’s HIMSS. In fact the conference reportedly set a new world record for healthcare conferences in Tweet volume. The #HIMSS12 hashtag was tweeted a total of 6,438 times in one day and 29,335 times during the week of conference. So who better to deliver the opening keynote than Biz Stone, co-founder of Twitter. Stone talked about how Twitter was created and believes it is “not a triumph of technology but a triumph of humanity.” His advice was to embrace creativity and to communicate that to succeed you need to be willing to fail.

Other keynote speakers ranged from TV anchors to explorers:

- Farzad Mostashari, National Coordinator for Health Information Technology U.S. Department of Health and Human Services;
- Terry Moran, NIGHTLINE Anchor;
- Donna Brazile, Political Strategist and Commentator Vice Chair of Voter Registration and Participation, Democratic National Committee;
- Dana Perino, Political Commentator and Former White House Press Secretary; and
- Dan Buettner, Founder of Blue Zones and World Renowned Explorer.

As well as world records, previous HIMSS attendance records were also broken. On Friday morning, Feb. 24, attendance at HIMSS12 reached 37,032 attendees, surpassing the HIMSS11 attendance figure of 31,500. These people came to network and to learn from their peers about the latest developments in healthcare IT. Presentations and roundtable discussions ranged from protecting privacy without harming patients and strategic technology planning in hospital design to laboratory data interoperability and IT governance.

HIT LEADERSHIP AT THE SPEED OF CHANGE

CHIME, 2012 CIO FORUM

One of the key highlights from HIMSS 2012 was the CHIME CIO Forum. The topic of this year’s forum was Healthcare IT Leadership at the Speed of Change.

The College of Healthcare Information Management Executives (CHIME) is an executive organisation dedicated to serving chief information officers and other senior healthcare IT leaders. With more than 1,400 CIO members and 86 healthcare IT vendors and professional services firms, CHIME provides a highly interactive, trusted environment enabling senior professional and industry leaders to collaborate; exchange best practices; address professional development needs; and advocate the effective use of information management to improve the health and healthcare in the communities they serve. This year CHIME is celebrating its 20th anniversary and kicked off the year of activities with its Spring CIO Forum.

More than 500 industry players attended the day-long forum with four very informative keynote presentations. The morning session began with congratulatory messages from a variety of healthcare luminaries, including ONC head Farzad Mostashari,

HIMSS CEO Stephen Lieber, AHIMA’s CEO Lynne Thomas Gordon, AHA CEO Rich Umbdenstock, and others.

The atmosphere and general feeling of the forum was one of hope, of the excitement and realisation of the unique position of CIOs, and how much IT can bring to the healthcare sector as a whole as well as to individual organisations. There is a clear difference between European and American conferences. While the same topics are covered, US speakers cannot contain their passion for their specialty and while sometimes overlapping into hyperbole, their talks cannot help but inspire those listening.

Ken Blanchard, author and consultant, was first to address the crowd with his presentation: **“Full steam ahead! Unleash the power of vision in your work and your life”**.

Blanchard stressed the unique position of CIOs and how they can act as change agents within their organisations. He believes they must be the bearers of hope in the changing landscape of healthcare IT. He went on to look at the change process from different perspectives and stressed the importance of change management, “Healthcare and its technology are undergoing rapid

transformation with CIOs shouldering much of the leadership responsibilities. CIOs are being asked to do more with less, while maintaining employee morale and gaining buy-in for enterprise-wide change initiatives."

In order to successfully lead change, Blanchard stressed that CIOs need to define their leadership point of view and then share it with other people. He believes he is a 'servant leader' and that that is "the only way to get great results and great human satisfaction together."

Blanchard explored the four levels of change, from the easiest to the hardest:

1. Adding knowledge;
2. Changing attitude;
3. Changing individual behaviour; and
4. Changing organisational behaviour.

Next to take the floor was Paul Grundy, President of the Patient-Centered Primary Care Collaborative. His keynote was entitled **"HIT powered patient-centred medical home: the foundation for meaningful connections"**

A Patient-Centred Medical Home (PCMH) provides comprehensive relationship-based care, where clinicians are empowered by tools to manage the data and communicate effectively across the care delivery spectrum. His presentation covered the processes and technology challenges that lie ahead and the leadership, teamwork and discipline needed to shift to PCMH level care and achieve the goal of patient-centred health management and care.

Grundy is clear on the power of healthcare IT and how it will transform healthcare delivery, "IT will do to the brains of medical students what imaging has done for radiology." It is transforming the delivery of information right down to the point of care. He stressed how new generations are demanding more from their healthcare providers - they want a totally different experience of care.

He spoke of less need for hospitalisation with improved ambulatory environments, arguing that things "can be managed further upstream" and that we need to do something to counter the huge amount of waste in the system. He believes this can be achieved by using this huge amount of new data to transform our practices and redesign our services and that it is the role of the CIO to help the management understand the power of the data and illustrate how new technologies demand new organisation of healthcare.

Grundy believes that we need to pay for outcomes and data and not fee for service; there is too much service. Instead we must focus on patient-centred care and empowering patients: Less hospitalisation and more compliance. "It's a no brainer to re-engineer a system with data that's available and can be used to hold providers accountable. Different tools are needed to enable accountable care, because otherwise buyers won't want to buy from you anymore," Grundy said.

Dr. Wendy Sue Swanson, Pediatrician and avid social network user, introduced attendees to the use of social networking in healthcare with her presentation, **"Physicians and patients in the time of Twitter: Trusted relationships, social media and opportunities in health"**

Swanson believes that patients are demanding more from

their healthcare, they want the science and the answers and the role of physicians is dramatically changing. People share information about health, they don't just read information but also pass it on, and this helps prevention. This is what she calls 'peer-to-peer' healthcare. It is conversations and seeking out communities of like minded-people.

For Dr. Swanson, doctors and healthcare institutions have an obligation to be online, to facilitate better communication. Those seeking health information online and in the media often confuse experience for expertise and science is losing its voice. We need to understand data and also be emotional and be able to explain the data. "I don't think you have a choice with social media. Everyone else uses their celebrity to get a message out," she said.

She emphasised the importance of humanity in healthcare, believing people matter the most, "Humanity will blow technology out of the water"; but that we can use these new technologies to save the patient-doctor relationship. She went on to introduce the crowd to a wide array of new technologies that could be used in healthcare to facilitate communications between physicians and patients and physicians.

In the closing keynote **"The Healthcare Revolution"**, Lowell Catlett, economist and futurist, provided a different view on the resources that Baby Boomers would be able to spend on healthcare and how IT can help enable the future of care delivery.

Catlett spoke of how the physician/hospital centred model is gradually being replaced with a patient-centred, concierge model focused on non-tethered technology and centres for excellence. Catlett believes healthcare to be an industry that is borderless and holistic, where health is the norm and illness an aberration. He also spoke of the need for 'high-touch' as well as hi-tech.

Catlett seems to be bowled over by the remarkable improvements in healthcare and especially by the role healthcare IT plays in this. He told the audience they were in a remarkable position, being able to change the very way health is delivered with these new technologies. It certainly was an inspirational end to a very informative day of presentations.



UNCLUTTERED MANAGEMENT THINKING

Management Principles as a Way to Results

AUTHORS

Prof. Dr. Fredmund Malik
Dr. Johannes Flecker

Imagine an operating room with surgeons and scrub nurses operating on a patient. Imagine they all had a different understanding of the word 'surgery'. Imagine they were unsure about their tasks, competencies, and responsibilities. Imagine they would evaluate their performance by the duration of the operation rather than by the outcome. Imagine they would handle the medical instruments by instinct rather than by mandatory education and years of experience. Unimaginable.

Thinking is uncluttered in the operation room. The medical language is clear and concise, as misunderstandings and failures lead to immediate adverse effects on patients' well-being.

Uncluttered Thinking is Necessary for Management

It's essential to think, speak and act in a right and uncluttered way in management too. Failures result in negative effects on quality, productivity, creation of value, use of resources and competitiveness of companies, organisations and whole countries. The satisfaction not only of employees, but of society as a whole depends in a large part on the quality of management decisions. Therefore, management is the most important profession in modern society. Anybody wishing to manage an organisation effectively should pay special attention to uncluttered management thinking.

Today, there are more people than ever before making managerial decisions. Whether they label themselves 'managers' or not does not matter: A chief physician in the hospital, a cancer scientist as group leader, a head nurse; they all have to manage themselves, the people around and their area of responsibility.

Whereas medicine has highest quality standards for education and licensure, no such thing exists in management. Generations of managers had to learn management mostly based on trial-and-error, intuition, and of course through their experience. University education in business mostly focuses on business administration, but not on management itself. Acknowledging the great responsibility of managers in all aspects of daily life, this is an unbearable situation.

Everybody Can Learn to Manage, Everybody Must Learn to Manage

Management lacks a common understanding. Instead, there exists a clutter of management methods, styles and often contradicting and doubtful management approaches. Too often, questions like 'Who is an ideal manager?' are discussed in the media, leading to unrealistic lists of criteria that no individual can possibly fulfill. Instead, the right question is 'What should managers do?'. This shifts the perspective from management as an elite profession for special, chosen individuals

to management as a mass profession that can be taught and learned by everyone.

The first and foremost responsibility of hospital managers is to transform resources to results and value for patients. This is the *raison d'être* for any hospital and the reason why managers are paid. People create value for patients. Therefore, managers have to manage and enable their employees to be able to dedicate themselves to doing that all day long. A central question must be: 'How do we organise ourselves so that the employees really do what they are paid to do?'

Management Principles as Basis for Effective Management

To ensure clear and concise management knowledge, a common understanding of the elements of this profession is fundamental. Uncluttered management thinking means to sieve out the necessary and sufficient elements that all managers must control in any location, in any situation, in any organisation, and at all times. Management principles are one of the elements of management as a profession.

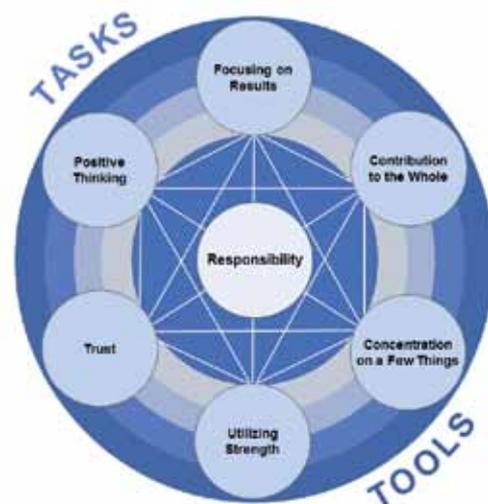


Figure 1. "Principles of Management"

Effective managers follow six principles that govern the quality of their daily work, the efficiency of the tasks they fulfill and the tools they use. Principles ensure that an organisation is based on a common understanding of management. Principles serve like a beacon in focusing on the right things instead of the wrong things. No talent is required to understand and to follow management principles, the only things that are needed are insight and discipline. Whereas principles are no guarantee that an organisation will succeed, a lack of them will result in failure.

First Principle: Result Orientation

Thinking in results changes the perspective from work input and questions like *'How long do I work every day'* to the result-oriented question *'What have I achieved?'*. The responsibility for any manager is to achieve results, to make sure that employees are able to produce results and that they can devote their working time to that. Result orientation coerces managers to think about the things that really matter to the organisation. As a consequence, it reveals many zeitgeist management tenets as harmful, e.g. the claim *'work should be pleasurable'*. Professions like critical care paramedics, ward physicians or the cleaning staff in operating rooms are not fun, yet society strongly relies on their accurate work. Hence, the focus must not be on input-driven factors like the degree of fun, but on the quality of the output and the achieved benefit for the patients. Cured patients as well as perfectly sterile operating rooms will provide pleasure, meaning and satisfaction to the responsible job holder.

Second Principle: Contribution to the Whole

This principle is the fastest way to achieve 'holistic thinking' in organisations in a down-to-earth manner. Effective managers think about their contribution to the whole by asking themselves: *'Why am I on the payroll of this organisation?'* and: *'What am I responsible for in this organisation?'*. They demand that their subordinates be able to answer those questions too. Any evaluation on whether or not employees are spending their time doing the right things can only be carried out when the employees know what their contribution to the organisation is. This is especially true for knowledge-based organisations like hospitals where only highly trained specialists are able to create value for patients. Having said that, employing 'specialists-only' is dangerous for any organisation. They know their own reality but they are indifferent to the reality of the organisation, which causes significant communication problems and a loss of touch with reality. What is needed, are specialists who integrate themselves into the whole.

Third Principle: Concentrate on a Few Things

Let's have a look at the operation room again. Imagine the surgeon answering a phone call during a heart surgery. Unimaginable again, as he focuses on the surgery, his really important task in that situation. Contrarily, in management there exists an outworn cliché of effective managers coping with many things simultaneously, which in fact has an adverse effect. As it is difficult today to focus on a few things, this principle has become even more important. There are some keys to concentration, e.g. management by objectives,

an efficient personal working method or systematic abandonment of habits that distract from creating value for clients and patients.

Fourth Principle: Using Existing Strengths

The fourth principle is one of the keys for top results. Effective managers identify their own strengths and the strengths of their employees. The best method to recognise strengths are tasks where a person has already achieved good results. Matching individual strengths with a person's job assignment is a direct, fast and economical way to achieve peak results. However, many organisations focus on attenuating weaknesses of their employees with time- and cost-intensive measures. The outcome is mediocrity and lack of motivation. These issues will not occur when the focus lies on strengths, as it makes weaknesses irrelevant and people concentrate on tasks they are good at.

Fifth Principle: Trust

What matters in the end is mutual trust. Mutual trust inside an organisation makes management situations more stable and robust enough to deal with management failures. To create trust, it's necessary to follow a few simple rules: The subordinate's mistakes are the boss's mistakes, at least to the outside world and to the senior management. Mistakes made by the bosses are theirs alone without exceptions. The success of the subordinates is theirs alone. Caring about participative or authoritarian management style is not as important as creating trust, as there is no evidence that one or the other style per se leads to better results or to a more stable organisation. What matters is being genuine.

Sixth Principle: Positive Thinking

Positive thinking turns the manager's attention from problem solving to opportunities, to make the best of a given situation with the available resources. As the things are as they are, the only difference managers can make is how they decide to perceive and react to them. This doesn't mean that problems can be ignored, but it is an invitation to seek and find possibilities even in bigger problems and asking the question: *'Is there an opportunity in this problem?'*. Positive thinking is the step from dependency to self-determination. People who are able to motivate themselves, want primarily to change things, they want to act, and not simply recognise and passively adapt. This provides a significant competitive edge.

Principles as a Guideline for Uncluttered Management Thinking and Acting

These six management principles affect all kinds of management activities. They influence the development of organisational mission and strategy in terms of transforming existing strengths into future results. Principles influence the design of organisational structure, which should empower the employees to concentrate on their tasks without redundant coordination issues. Principles define organisational culture, which arises as an emergent criterion. This organisational culture in turn is mainly based on the personal role model of superiors in the organisation. Principles can be used as a foundation for the appropriate use of management tools and tasks, as they determine their alignment in an organisation.

Principles of management support the development of uncluttered management thinking. They provide an excellent framework to become more effective and efficient in creating value for clients and patients.



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HOW TO CONDUCT STAFF APPRAISALS

A 12 Point Plan for Success

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A staff appraisal is a periodical advisory and support discussion between staff members and management that fosters agreements about objectives and the achievement of targets, that can be incorporated into target agreements. This process provides the opportunity, in a systematic and structured way that is outside of every-day working routine, to discuss matters that support and advance target-oriented cooperation. A staff appraisal is conducted in confidence between the member of staff and the appropriate member of the management team, and is concluded consensually.

Both the staff appraisal and the following target agreement are recorded in a set of minutes. The first of these is confidential. The staff appraisal and target agreement may, if necessary (e.g. at large faculties, when there is a need for agreement for resource planning or an expressed desire), be conducted at two different times. Appraisals should be measurable, so that both you and your staff know when they have succeeded. In the aftermath, do not leave it for a year before discussing things again. You can have short, informal meetings every three months to catch up and identify any issues early. Prior to the formal appraisal, both parties should make preparations. The manager should look at objectives set during previous appraisals, while the employee should give due consideration to any points they want to bring up.

Performance appraisals are crucial for effective management and evaluation of staff. Appraisals help develop individuals, improve organisational performance, and feed into business planning. Formal performance appraisals are generally conducted annually for all staff in the organisation. Each staff member is appraised by his or her line manager. Directors are appraised by the CEO, who is appraised by the chairman or company owners, depending on the size and structure of the organisation.

Are Performance Appraisals Still Beneficial Today?

There is a tendency in the present day to dismiss traditional processes such as performance appraisals as being irrelevant or unhelpful. Be very

wary, however, if considering removing appraisals from your own organisational practices. People have less and less face-to-face time together these days. Performance appraisals offer a way to protect and manage these valuable face-to-face opportunities. There are various ways of conducting performance appraisals, and ideas change over time as to what the most effective appraisal methods and systems are. Some people advocate traditional appraisals and forms; others prefer 360-degree-type appraisals; others suggest using little more than a blank sheet of paper.

In fact, performance appraisals of all types are effective if they are conducted properly, and better still if the appraisal process is clearly explained to and agreed by the people involved. Managers usually need guidance, training and encouragement in how to conduct appraisals properly. Help anxious managers develop and adapt appraisals methods that work for them. There are lots of ways to conduct appraisals, and particularly lots of ways to diffuse apprehension and fear - for managers and appraisees alike. Particularly, encourage people to sit down together and review informally and often - this removes much of the pressure for managers and appraisees at formal appraisal times.

Leaving everything to a single make-or-break discussion once a year is asking for trouble and trepidation. Performance appraisals that are administered without training (for those who need it), without explanation or consultation, and conducted poorly will be counter-productive and are a waste of everyone's time. Well-prepared and well-conducted performance appraisals provide unique opportunities to help appraisees and managers improve and develop, and thereby the organisation for whom they work.

Purpose of Performance Appraisals

Staff performance appraisals:

- Enable management and monitoring of standards, agreeing expectations and objectives, and delegation of responsibilities and tasks;
- Establish individual training needs and enable organisational training needs, analysis and planning;
- Typically feed into organisational annual pay and grading reviews, which commonly coincides with business planning for the next trading year;
- Generally review each individual's performance against objectives and standards for the trading year, agreed at the previous appraisal meeting;
- Are also essential for career and succession planning - for individuals, crucial jobs, and for the organisation as a whole;
- Provide a formal, recorded, regular review of an individual's performance, and a plan for future development;
- Are important for staff motivation, attitude and behaviour development, communicating and aligning individual and organisational aims, and fostering positive relationships between management and staff, and
- Are therefore vital for managing the performance of people and organisations.

Creating an Effective Appraisal Process

1. Prepare

Prepare all materials, notes, agreed tasks and records of performance, achievements, incidents, reports etc. - anything pertaining to performance and achievement. Include the previous performance appraisal documents and a current job description. A good appraisal form will provide a natural order for proceedings, so use one. Organise your paperwork to reflect the order of the appraisal and write down the sequence of items to be covered. If the appraisal form includes a self-assessment section and/or feedback section, ensure this is passed to the appraisee in advance, with relevant guidance for completion.

2. Inform

Inform the appraisee - ensure the appraisee is informed of a suitable time and place, and clarify purpose and type of appraisal - give the appraisee the chance to assemble data and relevant performance and achievement records and materials. If the appraisal form does not imply a natural order for the discussion then provide an agenda of items to be covered.

3. Venue

Ensure that a suitable venue is planned and available, private and free from interruptions. Observe the same rules as with recruitment interviewing - avoid hotel lobbies, public lounges, canteens. Privacy is absolutely essential.

4. Layout

Room layout and seating are important elements to prepare. Layout has a huge influence on atmosphere and mood. Irrespective of content, the atmosphere and mood must be relaxed and informal. Remove barriers - don't sit in the boss's chair with the other person positioned humbly on the other side of the desk; you must create a relaxed situation, preferably at a meeting table or in easy chairs. Sit at an angle to each other, 90 degrees ideally - avoid face to face, it's confrontational.

6. Opening the appraisal

It is important to relax the appraisee. Open with a positive statement, smile, be warm and friendly - the appraisee may well be terrified; it's your responsibility to create a calm and non-threatening atmosphere. Set the scene. Simply explain what will happen. Encourage a discussion and as much input as possible from the appraisee - tell them it's their meeting not yours. Confirm the timings, especially finishing time. If helpful and appropriate, begin with some general discussion about how things have been going, but avoid getting into specifics, which are covered next. Ask if there are any additional points to cover and note them down so as to include them when appropriate.

7. Review and measure

Review the activities, tasks, objectives and achievements one by one, keeping to distinct separate items one by one - avoid going off on tangents or vague unspecific views. Concentrate on hard facts and figures, solid evidence - avoid conjecture, anecdotal or non-specific opinions, especially about the appraisee. Being objective is one of the greatest challenges for the appraiser - as with interviewing, resist judging the appraisee in your own image, according to your own style and approach - facts and figures are the acid test and provide a good neutral basis for the discussion, free of bias and personal views. For each item agree a measure of competence or achievement as relevant, and according to whatever measure or scoring system is built into the appraisal system.

8. Agree an action plan

An overall action plan should be agreed on with the appraisee that takes account of the job responsibilities, the appraisee's career aspirations, the department and organisation's priorities, and the reviewed strengths and weaknesses. The plan can be staged if necessary with short-, medium- and long-term aspects, but importantly it must be agreed and realistic.

9. Agree necessary support

This is the support required for the appraisee to achieve the objectives, and can include training of various sorts. Be careful to avoid committing to training expenditure before suitable approval, permission or availability has been confirmed - if necessary discuss likely training requirements with the relevant authority before the appraisal.

10. Invite any other points or questions

Make sure you capture any other concerns.

11. Close positively

Thank the appraisee for their contribution to the meeting and their effort through the year, and commit to helping in any way you can. Produce a meeting note or completed summary. Provide two copies of the meeting note or completed summary and ask the appraisee to sign and return one copy to you if they are in agreement that it accurately reflects what was discussed and agreed.

12. Record main points, agreed actions and follow-up

Swiftly follow up the meeting with all necessary copies and confirmations, and ensure documents are filed and copied to relevant departments, (HR, and your own line manager typically). Make yourself available to discuss concerns that the appraisee might have about the meeting note. It could be that you have misinterpreted something or incorrectly recorded it.

360-Degree Feedback

360 degree appraisals are a powerful developmental method and quite different to traditional manager-subordinate appraisals (which fulfill different purposes). As such, a 360 degree process does not replace the traditional one-to-one process - it augments it, and can be used as a stand-alone development method. 360 degree appraisals involve the appraisee receiving feedback from people (named or anonymous) whose views are considered helpful and relevant. 360 degree respondents can be the appraisee's peers, up-line managers or executives, subordinate staff, team members, other staff, customers, suppliers - anyone who comes into contact with the appraisee and has opinions, views or reactions of and to the appraisee. Numerous systems and providers are available. The feedback is typically provided on a form showing job skills, abilities, attitudinal and behavioural criteria and some sort of scoring or value judgement system. The appraisee should also assess themselves using the same feedback instrument or form.

Further Reading

1. Performance Appraisal: Pocket Mentor. McGraw-Hill Professional 2009
2. Conducting Staff Appraisals: How to Set Up a Review System That Really Will Improve Individual Performance and Organisational Results (Paperback). How To Books Ltd; 6Rev Ed edition 2007
3. www.businessballs.com

TECHNOLOGY HORIZONS: DIGITAL RADIOGRAPHY

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Market Outlook and Trends

The emergence of digital radiography has altered the face of radiography in the recent past. It has offered a new standard for digital x-ray image capture. DR technology has brought about a transition from film-based image capture to direct digital image capture that can be previewed immediately after exposure. This optimised workflow provided by DR is highly beneficial for end users, particularly those with huge patient volumes. An estimated 70 percent of all imaging procedures are general radiography and therefore the transition to digital represents enormous market potential. Together with advancements in PACS, DR can help enable radiological departments realise improved patient throughput, optimised workflow and greater productivity.

Obstacles for Growth in the DR Market

The European DR market has shown considerable growth in the recent past but not as much as predicted in the initial years after its conception in the market. There has been a significant decline in sales owing to economic factors that perceived DR as a luxury rather than a necessity. On the other hand DR systems still continue to face stiff competition from CR systems and upgrades as they are more economical and can be integrated into existing analog conventional systems, making them a better choice for small hospital and private imaging and diagnostic centres with minimal budgets and lower patient volume.

Although CR and DR complement each other in large hospitals, CR has become a commodity and is still preferred for low procedural volumes and general applications thereby negatively impacting DR sales. Another restraining factor for the growth of digital radiography is that end users believe that DR may not be as beneficial, despite the advantages of optimised workflow and better throughput if they do not have high patient volumes. The high initial investments of DR cannot be justified if there are low patient volumes. Return on investment is an important attribute that is evaluated by end users before a purchase to analyse their productivity in the long run.

Despite the tremendous advantages that DR has to offer, such as optimised workflow, enhanced image quality and improved patient throughput, a certain percentage of physicians and radiologists are still sceptical about the transition to digital. A few of them are of the notion that a number of technical aspects need to be learned in order to use the digital solutions and therefore are hesitant to adopt this technology, thus deterring them from buying DR systems.

DR Hitting its Stride in Large Institutes

On the other hand, larger hospitals and universities are adopting DR rapidly. The primary forces driving this adoption are the significant reduction in patient exposure to radiation, greater throughput, flexibility in image manipulation and enhanced diagnostic image quality.

The widespread increase in PACS installation owing to decline in its prices is also acting as an impetus for the growth of DR in Europe. The enhancement in the clinical value of PACS, such as the ability to make digital images accessible anywhere through a digital network, is fuelling the growth of DR. Some vendors in Europe are also adopting a strategy of offering comprehensive packages comprising of PACS and DR systems, thus making it more appealing to buyers who are looking to acquire an archiving system and also make the transition to digital at the same time.

Market Trends

Wireless, mobile and retrofit DR are being increasingly utilised and are likely to be a growing trend owing to their easy integration into existing conventional and CR systems, providing digital technology at lesser effort and inconvenience. Mobile and retrofit DR helps make the transition from CR to DR cost-effective and with less inconvenience. These mobile retrofit kits can be integrated into existing CR systems and help in upgrading them to DR technology and help to improve productivity and provide immediate image access.

Also making a big impact on the digital x-ray market are flat panel detectors (FPD). In particular, FPD devices are gaining prominence in room-based angiography owing to their significant improvements in image quality, processing speed and dose-reduction. While the benefits of FPD have been proven to healthcare providers, the cost is a restraining factor preventing a faster shift to the technology. The high initial investments associated with FPD systems combined with recent capital expenditure freezes and hospital budgetary cutbacks have deterred product penetration. Meanwhile hospital administrators are forced to decide whether the benefits of FPD DR System outweigh the initial purchasing costs. However with the decline in flat panel detector prices, the technology is expected to reach a wider customer base.

Certain DR vendors are also setting their sights on market expansion and are keen on venturing into developing markets or price conscious markets and hence are trying to make DR available to these markets through a concept of economic DR. These units are best suited for the price conscious Eastern European regions where DR is not in vogue yet.



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“Resurgence in DR unit sales is expected in the future with the implementation of digitisation becoming mandatory in certain regions of Europe.”

Technology Trends

Since its inception in 1997 many developments have taken place in the DR technology sector. Some of the most significant developments in DR technology have occurred in 2009. Some of these developments are still underway in Europe and expected to be introduced in the near future.

Portable FPDs: In the past, fixed DR detectors were restricted by the positioning limits of a vertical wall stand, table bucky, or programmable U-/C-arm. Portable FPDs have added a great deal of flexibility to DR systems, enabling DR to be used in a broader range of applications which require cross-table or bedside imaging. In some instances, portable FPDs provide dual-detector functionality at a lower cost, since only one detector is needed and can be moved between positions within a wall stand and table bucky. Standard cassette-sized portable FPDs enable easy integration of DR technology into existing analog or CR systems, which has helped make the transition to DR easier and less expensive for many end-users. Portable FPDs are also available in smaller and lighter sizes, making them convenient in field and mobile imaging applications.

Wireless Portable FPDs: The integration of wireless technology into portable FPDs has been one of the most significant technology advancements in DR. This enhancement has added even more flexibility to portable FPDs, which previously required the attachment of a tethered cable during imaging and image data transfer. In addition to the numerous

advantages that this technology now provides, the integration of power and wireless data transmission capabilities into portable DR panels is a significant engineering design feat.

Dual - Energy Imaging, Digital Tomosynthesis and Computer Aided Detection (CAD):

These three major technological developments are looked upon as having potential to enhance the sensitivity of DR, thereby boosting its diagnostic power and making it more competitive than CT for chest imaging and diagnosis. Dual energy imaging digitally subtracts bone from lung soft tissue to reveal pulmonary nodules hidden behind ribs that are otherwise not clearly visible. On the other hand CAD software incorporated with DR enhances its sensitivity in detecting lung nodules and acts as a second reader aiding inexperienced radiologists to make accurate diagnosis. The addition of digital tomosynthesis features to DR provides a sense of depth and volume and is an improvement over conventional radiography as it provides 3D information and aids in pathology detection which otherwise might be a tedious task with 2D radiography. These three technological developments have great potential for DR in the future once all clinical doubts surrounding these features are addressed.

Dual Modality R/F Systems (DR/Fluoroscopy)

The Dual DR and Fluoroscopy system, which is a combination of a DR and Fluoroscopy, is a recent technological advancement. This smart combination of radiography and fluoroscopy provides cost effective comprehensive clinical functionality.

Market Outlook for DR

Germany is the most industrialised country in Europe and is one of the largest DR markets. The Scandinavian countries are technically the most developed regions of Europe in terms of installation of DR. Most hospitals in the Scandinavian regions are already digitised and are in a phase of replacing CR with DR. The United Kingdom on the other hand is a potential DR market but has been rather moderate in terms of growth. Benelux, like the Scandinavian regions, has been one of the quickest in adopting DR. Spain and France have been slow markets owing to their low investing power. These regions comprise of smaller hospitals and private imaging centres that have shown keen interest in CR systems that fall in line with their budgets and needs.

Resurgence in DR unit sales is expected in the future with the implementation of digitisation becoming mandatory in certain regions of Europe. Hospitals and large universities that have delayed purchases owing to the unfavourable economic factors and minimal budgets are expected to purchase DR in the near future; this may also be due to decline in PACS pricing as many hospitals are looking forward to purchase comprehensive packages of PACS and DR.

IMPLEMENTING LOSSY COMPRESSION

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The Canadian Story

Canada is implementing a network of large data repositories designed to store all diagnostic imaging studies generated in hospitals and clinics across the country. There will be 18 such storage units covering all provinces, called DI-r (Digital Images Repositories). The goal of this project is to make all imaging studies available to healthcare professionals, wherever they are, increase efficiency and decrease redundancies in facilitating comparison to previous data.

The DI-r will be integrated with the Electronic Patient Records (EPR) and their architecture is based on accepted standards. They will store images for the life of the patient. This will result in a considerable amount of images and therefore drive the need to use lossy compression to decrease the volume of data, to save money and improve transmission times.

Steps Taken for Successful Implementation

1. Assess the need for lossy compression:

Even if the cost of storage is dropping, the savings are surpassed by the increasing amount of data. If we consider a typical radiologist interpreting 40 CT studies per day, assuming 800 images per study with three windows, in three planes (axial, coronal and sagittal), he may review 300,000 images per day, which means 150 GB of storage. If we add comparison to previous, our radiologist may have to review more than 600,000 images in a single day, which would represent 6.6 images per second for 24 hours, which is impossible. This also means that if the cost of storage may have dropped 200 times in 15 years, the amount of data has increased 200 times, and that at the end of the day, there is no savings.

We also have to take into consideration the high cost of operation and time-consuming data migration, which consumes most of the ongoing maintenance budget. We estimate that an average 45 million diagnostic imaging exams were performed last year in Canada, and that the rate of increase has been a steady 5 percent a year. Canada Health Infoway (CHI) is implementing large data storage units (DI-r) across the country to archive all medical images generated in hospitals and clinics and the intent is to retain these images for the life of the patient. Using irreversible compression at 10:1 could save 100 million Canadian dollars per year.

But this is not all; if access to high bandwidth becomes increasingly available in local hospital networks, it is still premature to expect any health professional to use 100 mbps connections on their computers. EHR networks can-

not support large medical images and timely access to diagnostic images requires adequate level of compression. This applies also to teleradiology, where turnaround times for report delivery must be as short as possible.

2. Review the types of compression to use:

There are two ways to compress images: lossless or reversible, where the decompressed image is numerically identical to the original, such as RLE (Run Length Encoding), or lossless JPEG or JPEG-LS (where JPEG stands for Joint Picture Expert Group), but where only low compression ratios can be obtained, usually no more than 2 or 3:1; lossy or irreversible, where redundant data are discarded during the quantization phase and cannot be recovered, but allowing much higher ratios.

We considered two of the most popular algorithms supported in DICOM, lossy JPEG and lossy JPEG 2000. Technical specificities are not in the scope of this article, but it is worth a reminder that JPEG 2000 is more flexible than lossy JPEG as it supports more image formats when lossy JPEG is limited to 8 and 12 bit images.

3. Prove the usability of lossy compression:

To prove the usability of lossy compression, Canada Health Infoway looked at official statements, did an extensive review of the literature, asked for legal assessment from two reputed lawyers, and last but not least, in conjunction with Canadian Association of Radiologists (CAR), asked us to conduct a large-scale clinical evaluation.

None of the official positions we looked at prevent the use of lossy compression: the Foods and Drugs Administration (FDA) asks for the compression schemes to be identified by name and the compression ratios to be specifically stated; FDA only excludes lossy compression for mammograms. The American College of Radiology (ACR) endorses the use of compression to increase transmission speed and reduce storage requirements under the direction of a qualified physician, with no reduction in clinically significant diagnostic image quality. DICOM supports lossy compression, but has no position as to particular use of compression.

The literature review covered hundreds of articles published in reputed medical and engineering journals and all concluded that lossy compression could be used with no significant impact on image quality and no loss of diagnostic accuracy within acceptable ratios; some authors even demonstrated a gain in diagnostic accuracy linked to the denoising effect of low level lossy compression. But these articles covered only limited areas of imaging and the eval-

uation techniques were different from author to author, therefore requiring more consistency.

The legal opinions converged to state that lossy compression can be used provided that appropriate ratios are used, there is no clinically significant loss of data, lossy compression is used in primary reading (avoid altering records after primary reading), the technology is not adopted recklessly and due diligence is applied, such as: literature reviews, education, supervision, and finally that technology is used appropriately.

Our large scale evaluation was designed to standardise the disparate evaluation techniques that we encountered in the literature and we opted for a methodology based on two accepted techniques:

1. Diagnostic accuracy with ROC (Receiver Operating Characteristic) analysis where the reader is presented with an image, not knowing if it is compressed or not, and asked to identify a pathology, state in which quadrant of the image s/he sees the pathology and give a confidence rating; and
2. Subjective assessment where the compressed image is compared to the original and ranked on scale of 1 to 6.

We covered five modalities (computed and digital radiography, ultrasound, computed tomography, magnetic resonance and nuclear medicine) and seven anatomical/radiological areas (angiography, body, breast, chest, musculoskeletal, neurology and paediatrics). We looked at the two most commonly used compression algorithms, JPEG and JPEG 2000, at three different ratios of compression.

We gathered more than 2,500 exams and enrolled more than a hundred radiologists from coast to coast, with all provinces represented by one, and had 23 reading sessions with at least 5 radiologists per session, in order to have enough statistical power. We had designed a dedicated viewer and the radiologists received the images on a CD that they had to display on the workstations they used for reporting, but the results were collected on-line on a specially designed server application. After two years, we developed a set of recommendations demonstrated in table 1.

“We gathered more than 2,500 exams and enrolled more than a hundred radiologists from coast to coast, with all provinces represented by one, and had 23 reading sessions with at least 5 radiologists per session, in order to have enough statistical power ”

	CR/DR	CT	US	MR	NM	MG
Angio		10-15		16-24		
Body	20-30	JPEG 20-30 J2K 20	8-12	16-24	9-11	
Breast			8-12	16-24		15-25
Chest	20-30	10-15				
MSK	JPEG 20-30 J2K 20	10-15	8-12	16-24		
Neuro		JPEG 8-12 J2K 8		16-24		
Paediatrics	20-30	10-15	8-12	16-24	9-11	

Table 1. Recommended Compression Ratios for each Modality and Anatomical Area Investigated.

4. Publish Canadian standards:

The Canadian Association of Radiologists (CAR) had endorsed the use of Irreversible Compression at its April 2004 General Assembly, but waited for the results of our evaluation to be presented to the Executive Committee for approval. The Canadian Standard was issued in June 2008.

This standard validates the use of irreversible compression under certain defined circumstances and for specified examination types. It gives indications for operational implementation, and stipulates among others that irreversible compression, when used, must be considered part of image processing and as such the compressed images are those that are used for interpretation and become the legal record. The compressed images used for interpretation are

nal image and then apply compression when sending the images for long-term storage, but the standard specifies that images stored must be the same as images read. Therefore, is the PACS able to lossy compress right away those images received from the modalities for display on the workstations, or should we compress at the modality or between the PACS and the modality? We are currently assessing the ability of multiple vendors to perform compression this way.

There are also compatibility issues, as we need to make sure that there is enough standardisation between PACS vendors to visualise the images on any platform, which means supporting the various algorithms used. This will be even more critical when we start importing images from the DI-r into the local PACS.

**“Canada is in the process of implementing lossy compression of medical images on a large scale”,
“A literature review concluded that lossy compression could be used with no significant impact on image quality and no loss of diagnostic accuracy within acceptable ratios.”**

those that are subject to the requirements for archival storage for the legal retention periods. There is no requirement to maintain raw or uncompressed images.

Which means that radiologists will have to report on compressed images, which they do anyway when they use teleradiology or report from home.

The standard was modified when validation of the use of irreversible compression for thin slice CT was completed in early 2010. More updates are expected when more validation is completed, mainly for 3D imaging.

Download the Final Canadian Standard for Use of Lossy Compression

www.car.ca/uploads/standards%20guidelines/201004_EN_Standard_Lossy_Compression.pdf

5. Implement and identify issues:

We have started to implement lossy compression in different settings, such as several hospital systems and a large teleradiology network, and of course we started to encounter issues, for which some had not been anticipated. Here are just a few, but no doubt more will appear when adoption of lossy compression becomes more universal.

Implementation of lossy compression would be much easier if we had allowed radiologists to report on the origi-

The adoption of irreversible compression by an organisation or group of radiologists must be subject to the supervision of a qualified radiologist who must ultimately determine whether the image quality after compression that has been applied is acceptable. But how will the radiologist perform quality control? He must be aware of the type of compression used, ensure that the vendor has extensively tested compression after implementation and that recompression is not applied to already lossy compressed images. This is easy, but it becomes more complicated when it comes to access the original image and compare with the compressed image to ensure consistency. More testing is required as modalities evolve, with more advanced processing, new sequences, and new technologies.

Conclusion

Canada is in the process of implementing lossy compression of medical images on a large scale, as it is required to optimise the use of the DI-r, for storage and communication. Even if the CAR published its standard in 2008, there are still a number of issues that we are addressing with the support of Canada Health Infoway. International collaboration will certainly help greatly to foster adoption of lossy compression thanks to initiatives like the one led by the European Society of Radiology; the International Workgroup on Lossy Compression which met under the auspices of ESR and decided to rename Lossy Compression as Diagnostically Acceptable Irreversible Compression (DAIC) and which has since issued a white paper.

THE SPANISH HEALTHCARE SYSTEM

The Spanish National Healthcare System (“Instituto Nacional de la Salud”), founded on Spain’s General Healthcare Act of 1986, guarantees universal coverage and free healthcare access to all Spanish nationals, regardless of economic situation or participation in the social security network.

In 1998 the Sistema Sanitario Público (public health service) brought in an official mandate for both doctors and patients outlining the service to which they are entitled, explained in the Carta de Derechos y Deberes (Charter of Rights and Obligations).

Management

The national system has been decentralised since 2002, which has given the regional healthcare authorities the autonomy to plan, change and upgrade the infrastructure, leading to enormous development in the healthcare technology scenario, especially in the usage of information technology. The reforms, which regionalised the system, were implemented in order to provide greater and equal access to the population, thus avoiding the concentration of health services in urban areas. This has also improved response time and increased the participation of the target community in the development and management of the national healthcare system at regional and local levels.

The current system consists of three organisational levels:

1. **Central (Organizacion de la Administracion Central).** The Ministry of Health (Ministerio de Sanidad y Consumo), the state's central administration agency, is in charge of issuing health proposals, planning and implementing government health guidelines, and coordinating activities aimed at reducing the consumption of illegal drugs.
2. **Autonomous Community (Organizacion Autonómica).** Each of Spain's 17 Autonomous Communities (Comunidades Autonomas) is responsible for offering integrated health services to the regional population through the centres,

services and establishments of that community.

3. **Local (Areas de Salud).** The “areas de salud” are responsible for the unitary management of the health services offered at the level of the Autonomous Community and are defined by taking into account factors of demography, geography, climate, socioeconomics, employment, epidemiology and culture. To increase operability and efficiency, the “areas de salud” are subdivided into smaller units called “zonas basicas de salud”

The Inter-territorial Board of the National Health System (CISNS) is responsible for the coordination, cooperation and liaison among the central and autonomous region public health administrations. The board is chaired by the National Ministry of Health and the members are the Regional Ministers. It approves the national catalogue of services that must be provided by all regional health services (cartera de servicios communes). The catalogue of is divided into sections including primary care, specialised care, supplemental care, and pharmacy.

Primary Healthcare Services

Primary Healthcare services are available within a 15-minute radius from any place of residence. The main facilities are the healthcare centres, staffed by multidisciplinary teams comprising of general practitioners, paediatricians, nurses and administrative staff, as well as, in some cases, social workers, midwives and physiotherapists. The principles of maximum accessibility and equity mean that community primary healthcare also provides home care, whenever necessary and also deal with health promotion and disease prevention.

Specialist Care is provided in specialist care centres and hospitals in the form of

outpatient and inpatient care. Patients having received specialist care and treatment are referred back to their primary healthcare doctor, who assumes responsibility for any necessary follow-up treatment and care, ensuring the provision of continuous care under equitable conditions, irrespective of the patient's place of residence and individual circumstances.

Private Healthcare

Private healthcare insurance for treatment at private hospitals and clinics is not widespread and mainly used to avoid, the sometimes long, waiting lists to see specialist doctors in the public healthcare system. Only 10 percent of the population has voluntary private insurance although some private services are contracted by the public sector. Only in Catalonia, due to historical reasons, there are a large number of non-profit, semi-public entities. Private healthcare companies often offer quicker service to patients but also value-added services such as private rooms, express mailing of test results and keeping patients informed via email and SMS messages.

Funding the System

The Spanish healthcare is principally funded through taxation. The country's total healthcare expenditure, amounts to 88,828 million euro, which accounts for 8.5 percent of the GDP. Public healthcare expenditure accounts for 6.1 percent of GDP and represents an expense per inhabitant of 1,421 euro. The central government provides financial support to each region based on population and demographic criteria.

Healthcare Resources

The National Health System has 2,914 health centres and 10,202 local clinics

providing basic healthcare services to the local population. In 2009 there were 804 hospitals operating in Spain. The National Health System has 315 hospitals, equipped with 105,505 beds, and four Ministry of Defence's hospitals contributing with 995 beds. The remainder 465 hospitals are privately run and have 53,013 beds, which totals to 160,981 beds installed in Spain's hospitals. Public hospitals are generally much larger than private hospitals and deal with a much higher number of patients.

Excluding dialysis equipment, computerised axial tomography (CAT) is the most widespread high technology in hospitals and dependent facilities, with a total of 677 units and a ratio of 14.8 per million inhabitants. Magnetic resonance follows with 438 units and a ratio of 9.6 per million inhabitants. The number of mammography units dependent on hospitals totals 492. There are 4.7 physicians per 1,000 inhabitants and annually they attend to more than 273 million medical consultations per year in Primary Care.

Healthcare Challenges

Spain has among the world's healthiest people with an average life expectancy of 81, one of the highest in the EU. The incidence of heart disease in Spain is among the lowest in the world, however, skin cancer is one of the highest.

Spain also takes a different view to rehabilitation, convalescence and terminal illness, leaving care in these cases usually to the relatives, meaning that are very few public nursing and retirement homes. This may prove one of the

future challenges, as there is an increasing potential demand for social support services and benefits by the dependent population, and by carers.

However, one of the principle problems in Spain remains the limited coordination between the Autonomous Communities, which increases disparities in services and quality of care between the regions. Although the national system is overseen by the Ministry of Health and Consumer Affairs (Ministerio de Sanidad y Consumo) and coordinated by the Interterritorial Board they focus more on long-term policies and cooperation and the responsibility of healthcare delivery lies with the individual regions.

Numerous projects to improve national cooperation have been implemented by the Spanish Ministry of Health such as the 'eSOS' (European patients Smart Open Services) pilot project, which aims to develop a practical framework and an ICT infrastructure that will enable secure access to patient health information, particularly with respect to basic patient summaries and ePrescriptions between different European healthcare systems. This should improve communication between Spanish regions and encourage cooperation.

The Spanish Presidency and eHealth

The Spanish Presidency of 2010 supported a fully integrated digital healthcare system on the post-2010 European Agenda, presented four strategic goals in healthcare, which aimed to:

1. Introduce a global vision for an e-Health policy totally integrated in the post 2010 European Agenda;

2. Drive a new e-Health Action Plan, facing the new European challenges;
3. Develop and promote ministerial agreements, in particular regarding integration of e-health in community policy; and
4. Implement reinforced governance. In March 2010 two of the most important European events in the eHealth area: the High Level European Union Conference (EU) on eHealth, and the World of Health IT (WoHIT) were bought together during the eHealth Week, which took place in Barcelona.

The eHealth Week was a meeting organised within the Spanish presidency of the European Union (UE) in conjunction with the European Commission, the Ministry of Health and Social Policy, the Health Ministry of the Government of Catalonia, the TicSalut Foundation, and HIMSS Europe. It was an initiative of the Ministry of Health of the Government of Catalonia during which meetings of the European health ministers, the European Forum of Regions in eHealth enabled European regions and Spanish autonomous communities to discuss the importance of ICTs for the health systems and the extent to which they have been introduced in their territories. During the four days of the eHealth week 2010, more than 160 renowned international figures brought in their experience and views in a total 46 sessions in which they analysed the application of ICTs in the health systems from a variety of perspectives: political, economic, strategic, business and social.

SPANISH NATIONAL HEALTH SYSTEM

46.1 million inhabitants

HEALTH PROFESSIONALS	2007
MD	208,098
DENTISTS	24,515
PHARMACISTS	61,300
NURSES	243,000



Sources:

- www.msc.es
- www.eu2010.es
- www.ehealthspain.eu
- www.ehealthweek2010.org
- www.epsos.eu

Interview:

JOSEP MANEL PICAS PRESIDENT, HITM

In order to find out about healthcare IT in Spain, who better to ask than our very own HITM President, Dr. Josep Manel Picas. Managing Editor Lee Campbell spoke to Dr. Picas about healthcare IT in Spain in general, the important role IT plays in the smooth running of a hospital for both patients and institutions and where he believes IT will take us in the next few years.



Q: National healthcare and indeed healthcare IT systems often suffer from fragmentation. Is this a problem in Spain?

A: There is no national IT healthcare programme in Spain. Spain is a highly decentralised country with regards to the organisation and provision of healthcare services, which means that the regions have the responsibility of the management of these services depending on their own budgets. The Ministry of Health in Madrid has coordinating role and everything depends on the agreement between the different regions, so, up to today, the system is highly fragmented.

Historically, there have been some

intentions to create the basis for an agreement but due to political discrepancies any approaches have failed, so each region has adopted their own technical solution for IT developments.

Within the last few months there has been some good news; an agreement has been reached on creating a central database in Madrid, with a personal and unique identifier of all Spanish citizens. This will allow the transfer of patient information from one region to another when a citizen travels around Spain. Some regions are technologically prepared, e.g. Balearic Islands, Valencia and in some months Catalonia and others.

Q: A major task of the healthcare IT management must be the training of both its own staff and healthcare professionals. Are there national programmes and guidelines for this sort of thing?

A: There is not a national programme for this sort of training. At a regional level there are some initiatives and some universities are offering this knowledge with different approaches, some of them more technically based and others on the functional approach. Some new initiatives are beginning to be developed.

Q: What are the accreditation and educational requirements in this field?

A: No, it is not a profession in Spain. To work in this field depends on the background and the knowledge acquired on some partial training as it has been commented on the previous question.

There are some professional organisations at a national and regional level doing some lobbying in this direction. The position of CIO or CMIO is beginning to appear in some hospitals but it is not present in most Spanish hospitals. This is due to different reasons, the most important being that most of the hospitals are in the public sector and the direction of the healthcare IT is centralised for the region (in some regions, the situation is different or in the process of changing e.g. Catalonia due to the local history of the public healthcare development and in the islands, Valencia and Madrid due to changes in the organisation of the regional healthcare system).

Q: How widespread is the use of electronic medical records? Do GPs use them?

A: The use of EMR is high, especially at the primary care level. Probably more than 90 percent of doctors are using it, this is due to the wide use of the computerised prescription and e-prescribing. The successful development of the clinical information has been thanks to the good level of the primary care doctors and nurses, well trained and well organised. This has been reinforced with the implementation of P4P strategies, which have improved the quality and use of the clinical registries. Some of these EMR solutions are beginning to introduce advanced DSS on clinical and pharmaceutical guidelines.

At the hospital level the EMR developments are not so advanced, probably due to the financing system of the Spanish hospital system,



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which is mostly budgetary and not for clinical performance. Some of them are using the DRG system to make some kind of P4P modulation. Despite this, some advances have been produced during the past few years. Nowadays some hospitals have introduced CPOE (computerised physician order entry) and most of them are intending to introduce it in the future. The HIMSS Analytics Europe with the tool EMR Adoption Model Score, EMRAM, shows us in a good position compared with other European countries and even with US (e.g. EMRAM level 5-6: Catalonia 73%, Spain 44%, US 14% and Italy 3%)

Q: Is telemedicine widely used in Spain?

A: Telemedicine is not widely used, only in the islands and the Spanish army have made interesting developments. Some regions have made advances; for example, the Basque Country recently made some organisational changes to the delivery of the healthcare services giving priority to the services or chronic diseases, with this, they are some interesting experiences in telemedicine.

The problem remains the same: The payment system does not encourage the use of these IT services as it happens in most of the European countries.

Q: How does IT impact the quality of care provided? What are the most important/efficient IT implementations in a hospital?

A: The level of impact of IT is of course very high. IT helps to monitor quality and cost, which means that we can monitor the efficiency and effectiveness of the clinical processes, allows us to increase clinical productivity and is essential for the patient safety approach. The most efficient IT implementations come from the three main areas of a hospital: Emergency & intensive care units, Operating rooms and surgical processes and diagnoses area: Lab, radiology and imaging. All of these areas should be helped with CPOE, DSS and of course a good development of the BI and analytics.

Q: As head of an IT department, how do you decide which new technologies to invest in? Do you collaborate, discuss new implementations/technologies with physicians and other staff members? Do they come to you with requests?

A: In my case I think that is interesting to share the way that I am working in Sant Pau hospital during the last 4 years that is the same way that I developed in my former work as a CIO in Hospital del Mar in Barcelona. My team work is done with three professionals, the director of the informatics department (with a background of informatics knowledge), a doctor specialised in medical documentation (that is taking care of the quality of the information and pushing for working with clinical structured information and coded) and a clinician in my case a cardiologist (that part time is involved in the analysis of the requirements and the usability and performance of the developments).

The requirements come from physicians, nurses and other staff members, we analyse them depending on the impact, cost, and capacity to develop the proposals. As a CIO I am participating in the steering committee, where the final decision of what should be done is adopted.

Q: Is the outsourcing of IT services/equipment prevalent in Spain?

A: It depends on the regions, some of them, with a more decentralised model, outsourcing is more developed and in the regions with a more public service based system with a centralised approach are using less outsourcing. But now the situation is changing to a more outsourced model.

Q: In your opinion, what have been the three biggest developments in healthcare IT in Spain in the last three years?

A: Probably, the e-prescription development in most of the regions is the most relevant; the image and PACS evolution is also interesting. To undertake the interoperability

topic based on IHE is the main challenge, it is beginning to be developed in some regions and the others are planning to do it.

Q: Are there any innovative IT projects that are unique to Spain?

A: It is not easy to say that they are unique to Spain but some of them are very interesting and with a high level of development there are two that I personally know at this moment. To me, the DSS and clinical guidelines on computerised drug prescriptions in primary care, developed with the primary care authorities in Catalonia is one of the best. There are some very interesting developments in image simulations for surgical procedures in Hospital Virgen del Rocío in Sevilla, Andalucía. A new approach on RFID use in la Hospital la Fe in Valencia, and a Health 2.0 approach for doctors and pathology diagnosis in Hospital Puerta de Hierro in Madrid.

Q: What does the future hold for healthcare IT in Spain? Where do you think healthcare IT will develop in the next three years?

A: The practice of the medicine is moving towards industrialisation and virtualisation. For this reason, Spain, like the rest of the countries in the world has to evolve and develop electronic health interchange, interoperability and meaningful use of clinical information and related topics.

Mobile health, i.e. having the needed information at the point of care for clinicians, and access to personal health information for patients to empower them, is another great challenge for the future.

In relation to this, the background is the sustainability of the provision of healthcare services. It is necessary to balance the patient needs and the economic capacity of the governments and patients to finance it. As it is widely-known, Spain is now suffering dramatic problems with the actual economic situation. Perhaps we can find an opportunity for advancing most effective healthcare services supported by the IT solutions.

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THE STATE OF HEALTH IT IN IBERIA

A Quick Look at the HIS Market in Spain and Portugal

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In years past, much of the focus on European markets concentrated on the larger economies of Germany, the UK, France, and Italy. There is relatively little knowledge of the healthcare IT markets in other Eurozone countries, particularly among US vendors looking to expand into continental Europe.

This executive brief will focus on the countries of Spain and Portugal. Unlike Germany and the Netherlands who share relatively little in terms of vendor mix, Spain and Portugal share many market characteristics. For this reason they will be discussed jointly in this brief.

Setting the Stage: The Current Public System

Over the course of the 1980s and into the early 1990s Spanish government health responsibilities were transferred from the state to regional health authorities. The healthcare landscape in Portugal also underwent a similar shift. This has enabled Spanish and Portuguese hospitals to make largely independent decisions with regards to healthcare IT infrastructure and other solutions.

In the early 2000s, Spanish regions began a push for implementing newer technologies such as electronic scheduling and e-prescribing. This development drew interest from a wide swath of HIS vendors, including those from the US and from across Europe. Since those early initiatives hospitals in both Spain and Portugal have conducted programmes which were meant to incorporate more advanced clinical functionalities. While these developments have not been experienced uniformly across all health regions, they have resulted in an HIS landscape which is varied in terms of vendor mix and technology.

Country	Population	# of Hospitals	# of Beds
Spain	46,1 Million	1061	180.000
Portugal	10,6 Million	280	37.000

Figure 1. The size of the markets

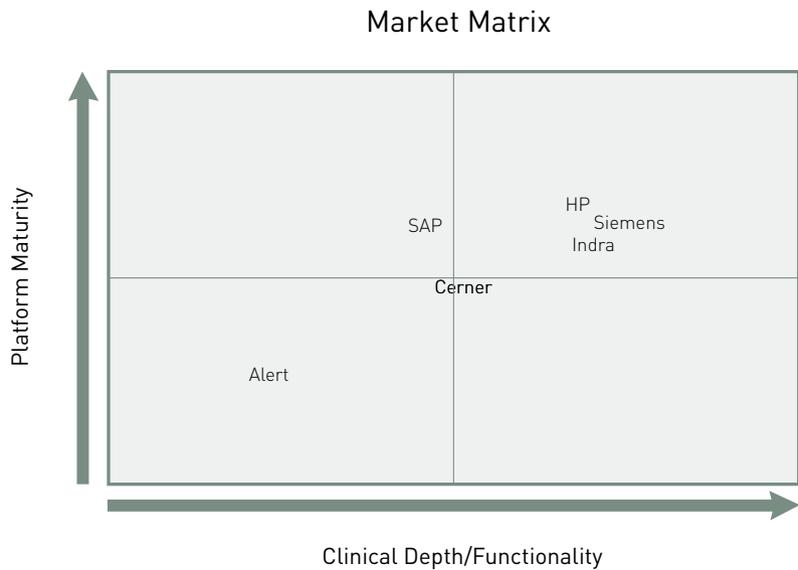


Figure 2. The vendor mix

A Look at the Vendor Mix

The HIS mix in Spain and Portugal represents a hodge-podge of vendors.

HP, Indra, and Siemens have deep functionality, but also represent rapidly ageing product lines. Hospitals which use these solutions are approaching a decision point about whether they continue to maintain and build on these solutions or evaluate new products for a potential migration.

While other healthcare markets such as the US, Germany, and the Netherlands

are obviously trending towards more integrated solutions and platforms, Spain and Portugal have proved surprisingly friendly towards best-of-breed offerings. This openness to has led to the emergence of a market with a wide cross-section of vendors and technologies.

A Quick Look at the Vendors

The HIS mix in Spain and Portugal represents a hodge-podge of vendors:

- Alert – One of the newest vendors

to enter the space. Excellent UI but limited clinical depth and untested ability to deliver on enterprise scale;

- Cerner – Immense success in the US with some international momentum. Growing clinical capability. Sizable price tag;
- HP – HIS market share leader in Spain. Good clinical depth. HP no longer exists as a healthcare IT vendor in the US;
- Indra – Spanish multinational with the second largest HIS presence in Spain. A strong vendor with cross-industry experience;
- SAP – Long history in Europe with healthcare IT solutions. Often collaborates with Siemens in multiple industries; and
- Siemens – Offers multiple HIS products, some of which are functionally rich. At a crossroads in offering a next-gen solution.

Market Outlook

The double setback of the global recession and ongoing Eurozone credit worries have caused a lot of hospital IT projects to be put on hold, though many have not yet been completely cancelled. Limited budgets and austerity measures will make new health IT projects tough to justify, though it is clear that Spain and Portugal plan to maintain a high levels of healthcare services to their citizenry.

The market gap which has yet to be truly served is the functionally-rich, subscription-based, remote-hosted clinical platform which lowers upfront costs as well as overall IT burden and spend. The vendor who can deliver that and scale to demand will have a leg up in Iberia.

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Key points

Spanish and Portuguese hospitals represent a varied landscape of HIS vendors and technologies. The most functionally rich solutions also represent ageing products. Spain and Portugal seem to be moving towards best-of-breed solutions while much of the industry is moving towards integrated platforms.



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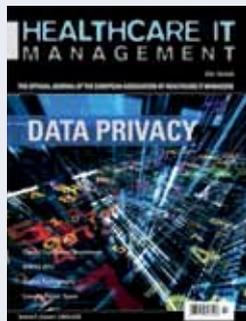
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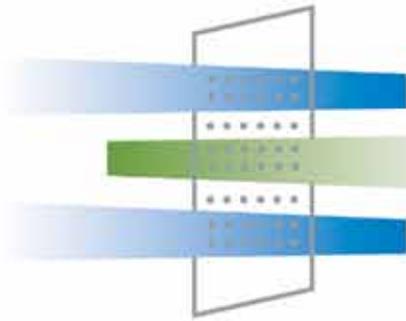
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