IMAGING Management

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Imaging the next move

** Work in progress*

Prof. Iain McCall

Editor-in-Chief

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Dear readers,

Healthcare is generally thought to be relatively storm-proof as far as its susceptibility to financial crises – people, after all, still get sick at the same rates. Separating the economy from healthcare, on the other hand, seems a foolhardy approach. The depth of the present crisis means that department heads need more than ever to consider belt-tightening measures and to keep an eye on the changing financial landscape.

Rising unemployment and shrinking healthcare insurance coverage are the first worrying consequences for any financial downturn, followed by the onset of a drop in financial resources the year after a recession begins, when social contributions drop in parallel to business failures and layoffs. We haven't yet begun to see the potential impact of delayed primary and preventive care on levels of demand for medical imaging services.

Therefore, despite the integral part medical imaging plays in healthcare, in this issue's cover story, we examine the likely impact of the global recession on medical imaging and provide tools to assist those thinking about taking preventive measures in their department. The first contribution from regular columnist Prof. Mathias Goyen, a well-known expert in the field of healthcare economics, acts as a general survey on the impact of the recession so far in the healthcare arena and then goes on to examine the individual modalities that have been affected, and provides advice for those who are concerned that their department is covered in the face of a potential drop in demand for services, shrinking budgets or stalled purchasing.

This is complemented by an indepth examination of the sorts of belt-tightening measures department heads can use to streamline the management and administration of their department, written by Prof. Philip Gishen and Dr. Nicola Strickland, both noted representatives of the radiology management world. It explains how a new departmental organisation and a new focus on customer (i.e. patient) satisfaction can create the most profitable and effective results.

Finally, President of the European Association of Nuclear Medicine (EANM) Prof. Wolfram Knapp has contributed an article that examines the impact of spending cuts on healthcare, rounding up with a summary of the EANM's strategy for ensuring that nuclear medicine is not affected by any existing or coming upheaval in the financial world. It is impossible to predict every consequence as a result of the ongoing financial recession, and how that will filter down to medicine. However, by assessing the impact to date, and sharing guidance, hopefully the long-held view of radiology as recession-proof will still hold true.

As usual, we welcome your thoughts and feedback. Please send your comments to editorial@imagingmanagement.org

Prof. Iain McCall

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IMAGING Management
Volume 9 Issue 2, 2009

Cover Story: The Impact of the Recession on Medical Imaging

Healthcare Economics

Features

CONTENT

IMAGING Management
Volume 9 Issue 2, 2009


ITA
NETWORKING AWARDS 2009
Submit your project summary NOW!
WINNING PROJECT GETS EXTENSIVE PRESS COVERAGE AND €5,000 CASH

IT@NETWORKING

The IT @ Networking Awards 2009 will select outstanding European healthcare IT solutions in hospitals and healthcare facilities and bring them to the pan-European stage.

WINNING PROJECT GETS EXTENSIVE PRESS COVERAGE AND €5,000 CASH

WHERE AND WHEN

Brussels, the centre of European decision-making, will be the location for the IT @ Networking Awards 2009 *(IT @ 2009)*. It will be held from 29 - 30 October 2009 during the European Autumn Summit, ensuring international attention.

WHO

The attendee roster will include heads of radiology and radiologists with an interest in IT, hospital CEOs, CIOs, CMIOs, hospital and healthcare IT managers, members from European and national institutions whose mandates cover health-care IT, as well as members of the specialist healthcare and IT press.

WHY

Behind its fragmented façade, European healthcare IT includes a number of world-class jewels: cutting edge IT solutions that meet real-world challenges, efficiently and cost-effectively, and not rarely, in an elegant fashion.

Unfortunately, many such jewels remain unknown to the outside world – not just the general public, but ironically, to the healthcare IT community as well.

So too do their designers and architects, unsung heroes who have often invested their creative talents, and dedicated months and years of hard work – to create and build something good, something better, all the way through to the very best. But many such efforts extend beyond job definitions, stretch far above the call of duty.

These pioneers need recognition! Their stories will inspire others. The lessons they have learned can help both avoid mistakes and transform healthcare IT challenges into opportunities, into "Made-in-Europe" success stories. This is the goal of *IT @ 2009*.

HOW

Several national or European awards are often decided by "experts", thus not always familiar with real-world challenges. Sometimes, they even make decisions on political grounds.

The European Association of Healthcare IT Managers believes that peers will make the wisest decisions in respect to their own needs. As far as healthcare IT is concerned, the Association considers it to be self-evident that senior healthcare professionals will know what is the best solution for them.

To use familiar terminology for IT professionals, *IT @ 2009* is built on the principles of best-of-breed and peer-to-peer networking.

An on-the-spot, one-person = one-vote electronic system will be used to enable attending radiologists, CEOs, CMIOs, CIOs and hospital and healthcare IT managers to make their choices. Only they are eligible to vote.

ORGANISER:

European Association of HEALTHCARE IT MANAGERS

MEDIA PARTNERS:

HEALTHCARE IT MANAGEMENT

Hospital

G AWARDS 2009

ROLLOUT: FROM MINDBYTE TO WORKBENCH

FIRST DAY: MINDBYTE

All successful submissions for the *IT @ 2009* will be allocated 5 minutes for a short presentation (a Mindbyte) on what differentiates their solution and makes it special.

VOTING

Voting will immediately follow a synopsis of all presentations, and the finalists will be announced by the Chair of the Organising Committee.

SECOND DAY: WORKBENCH

Finalists of the *IT @ 2009* will be given 45 minutes to provide an in-depth presentation, followed by a 1/4 hour Q&A session with the audience.

FINAL VOTING

Final voting will commence immediately after the last presentation followed by the awards ceremony.

THE IT @ Networking Awards 2009 CEREMONY

Out of the finalists, the 3 top rated IT solutions will be awarded a prize.
The winning project will:
- receive the IT @ Networking Awards 2009 Trophy;
- have a detailed presentation of their solution in Europe's leading healthcare management media, and
- be awarded a cash prize of Euro 5,000.

WHO SHOULD PARTICIPATE

Developers and implementors of innovative healthcare IT solutions. Solutions can be built on both COTS as well as bespoke designs. However, all entries have to demonstrate a considerable degree of customisation and proven benefit to the healthcare facility. All entries must be already implemented and running in at least one site.

SUBMISSION DEADLINE

Submissions must be received by **25 September 2009.**

Candidates should send us a brief, 250 word synopsis of their solution – what makes it special and outstanding; what makes it a European answer to a European or global challenge. Joint presentations from radiologists, IT management together with their industry partners are stongly encouraged.

*For further information or your project submission please visit our website **www.imagingmanagement.org**, contact the General Secretariat of HITM via email **awards@hitm.eu** or call **+32 / 2 / 286 8501**.*

CARDIOLOGY MANAGEMENT

IMAGING Management

ICU MANAGEMENT

News

EUROPE

Commission Concerned About Insufficient Cancer Screening

With an ageing population, figures on cancer deaths are due to increase, unless preventive measures are taken. The European Union (EU) shares a common commitment to ensuring proper screening for breast, cervical and colorectal cancer, as set out in Council Recommendation of 2 December 2003 on cancer screening (2003/878/EC).

In the first implementation report, the Commission highlights that although much progress has been made in cancer screening, Member States have not fully put this screening in place. Less than half of the minimum recommended numbers of screenings take place in the EU each year. By providing a clear description of the situation, this report helps to renew the commitment to put in place breast, cervical and colorectal cancer screening as a crucial and cost-effective measure to reduce the burden of cancer in the EU.

"Less than half of the minimum recommended numbers of screenings take place in the EU each year."

Report Findings

- For breast cancer, only 22 Member States are running or establishing population-based screening programmes;
- For cervical cancer, only 15 Member States are running or establishing population-based screening programmes, and
- For colorectal cancer, only 12 Member States are running or establishing population-based screening programmes.

The current annual volume of screening examinations in the EU is considerable; however, this volume is less than one-half of the minimum annual number of exams that would be expected if the screening tests specified in the Council Recommendation on cancer screening were available to all EU citizens of appropriate age (approximately 125 million examinations per year). Less than half of these examinations (41%) are performed in population-based programmes, which provide the organisational framework for implementing comprehensive quality assurance as required by the Council Recommendation.

How do we increase the volume of screening in the EU?

- Member States should continue to improve or implement population-based cancer screening programmes, supported by collaboration between Member States and professional, organisational and scientific bodies and experts.
- Additional efforts must be made to improve and maintain high-quality screening measures to assure the quality, effectiveness and cost-effectiveness.

CORPORATE UPDATE

Toshiba Introduce New Scanner

The Aquilion/Premium, a new 160-detector row scanner, covers 80 mm in a single rotation. By virtue of the new "coneXactTM", 3D volume reconstruction algorithm, the Aquilion/Premium generates up to 320 slices per rotation. Its unique concept allows an easy upgrade path to 320-detector rows, with 160 mm coverage, and 640 slices per rotation, the same as the Aquilion ONETM.

Portuguese Hospital Signs Agreement With Sectra

Hospital de São João, one of Portugal's largest hospitals, has selected Sectra as its provider of PACS products and services. With this order, Sectra is the main contractor in digital radiology solutions for all five public hospitals in Porto. Hospital de São João performs approximately 300,000 exams annually, a figure that is projected to grow to 400,000 over the next few years with the integration of other clinical departments such as gastro-enterology, cardiology and other image-producing departments.

University Hospital of Bonn selects Agfa for PACS

Agfa HealthCare has announced that the University Hospital of Bonn in Germany has selected its IMPAX ™ PACS system for an enterprise-wide implementation. It was selected after a European-wide tender process for a PACS solution. The project is supported financially by the Deutsche Forschungsgemeinschaft (German Research Foundation, DFG).

Barco Selected as Stanford UMC Supplier

Barco has been selected by Stanford Hospital & Clinics, part of Stanford University Medical Centre, to supply 58 of its recently-launched MDRC-2120 clinical review displays. Installation of the 2 MegaPixel displays is ongoing with forty currently deployed.

Aycan Enters Hungarian Market

Aycan, together with its partner Xerox, has launched its aycan xray-print solution in Hungary, with its first install at St. Janos Hospital in Budapest. aycan xray-print, a DICOM plain-paper print solution, is currently sold in more than 20 countries, according to the company.

Philips Healthcare Informatics Create 30 New Jobs

In addition, Invest Northern Ireland's 595,000 dollar offer to support the expansion brings total employment to 49, the company said.

Philips Healthcare Informatics has had a presence in Northern Ireland since it acquired Belfast-based cardiovascular information systems developer Tomcat Clinical Systems in March 2008.

What inspired our MultiTransmit innovation in 3T? No two patients are alike.

The Achieva 3.0T TX automatically adjusts to each patient's unique anatomy. Its MultiTransmit parallel RF transmission technology tailors the RF signals to provide consistent high image quality and reduced scan times – across a broad range of clinical applications. Make diagnoses based on information that is fast, robust and reliable. It just makes clinical and economic sense.

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PHILIPS

sense and simplicity

News

FUJIFILM Win CR Award

The "2009 European Mammography Systems Product Quality Leadership Award," was presented to FUJIFILM Corporation by Frost & Sullivan in recognition of its computed radiography (CR) mammography systems. The company's quality control, product performance, quality assurance programme and product manufacturing were also commended.

Carestream Managed Services Reaches New Levels

Carestream Health's eHealth Managed Services now manages more than 10 million imaging studies worldwide, representing more than 500 terabytes of data. The company operates eight data centres in five countries to service healthcare providers throughout Europe and North America. This growth reflects a trend by healthcare providers to contract with an external data services provider in a move to reduce capital expenses since hardware, software, maintenance, monitoring, upgrades and obsolescence management are included as part of the service.

RESEARCH

Participate in EIBIR's Pharmaceutical Trial Survey

EIBIR is inviting interested parties to provide input to the survey on pharmaceutical trials who wish to be considered for potential EIBIR-coordinated projects. The use of imaging as a biomarker in preclinical and clinical studies has gained increasing interest in the pharmaceutical industry. EIBIR is currently in discussion with different pharmaceutical companies to employ the expertise of its members in such studies and to help identify the most suitable partners for specific projects and studies.

Stent Grafts To Treat Blunt Trauma Injuries

Endovascular repair is a better option for individuals who receive highly lethal injuries from high-speed collisions or falls and is shown to save more lives and nearly eliminate paraplegia, a complication of surgical repair for thoracic aortic aneurysms.

States Eric K. Hoffer, Director of vascular and interventional radiology at Dartmouth Medical School, "This minimally invasive interventional radiology technique can decrease the death rate by half and diminish the risk of paraplegia by 75 percent as compared to open surgical repair".

ASSOCIATION NEWS

New MIR Course Covers Management for Juniors

Designed to provide answers to the oft-asked question: "What do you need to know at the start of your career", Management in Radiology (MIR) have announced the topics to be discussed at the forthcoming Junior Course taking place July 22 – 23 2009 in London, UK. The programme includes the following learning objectives:

22 July
- New responsibilities
- Your job plan
- The departmental timetable
- Career goals
- Balancing your professional life
- Fitting in research
- Private practice in perspective
- Setting up a new service
- How to write a business case
- Value added imaging
- Medical politics: a primer
- The RCR, ESR - why bother?
- Clinical governance
- Medicolegal aspects

23 July
- Working with colleagues
- Building a team
- Leadership
- Influencing people
- Presenting your ideas

To register for this course, or for more information, please visit **www.mir-online.org**

CARS 2009 Invites you to Berlin

The CARS Congress Organising Committee invites you to join them in Berlin in June 2009, if you work in the fields of radiology, surgery, engineering, informatics and/or healthcare management, and have an interest in topics such as image-guided interventions, medical imaging, molecular imaging, image processing and display, computer aided diagnosis, surgical simulation, surgical navigation and robotics, as well as new PACS applications, including infrastructures adapted for surgery. Clinical specialties represented at CARS include:

- Image Guided Tumour Ablation Therapies
- Cardiovascular Imaging
- Computed Maxillofacial Imaging
- Computer Assisted Radiation Therapy
- Computer Assisted Orthopaedic and Spinal Surgery
- Computer Assisted Head and Neck, and ENT Surgery
- Image Guided Neurosurgery
- Minimally Invasive Cardiovascular and Thoracoabdominal Surgery

For further information, please visit **www.cars-int.org**

CIRSE 2009 – Register Now!

The CIRSE Annual Scientific and Postgraduate Educational Meeting (Lisbon, Portugal, September 19 - 23, 2009) is a unique forum where medical professionals will meet colleagues from all around the world to exchange ideas and information in the field of minimally invasive, image-guided therapies. The best recent scientific developments and novel research will be presented in more than 100 hours of sessions and workshops. The next edition takes place in Lisbon and full details are online for attendees.

For more information please visit **www.cirse.org**

Medical Technology Guide Launched by ECRI Institute

ECRI Institute has published a new report focused on helping gain a strong understanding of today's IT-intensive medical technology. The guide covers medical technologies that are heavily IT-based or highly integrated into IT infrastructures. Each chapter examines a specific medical technology - what it is and how it works - then dives deeper into the issues affecting IT.

Recent Connectathon Proves Need for Greater Interoperability

Integrating the Healthcare Enterprise (IHE) recently held the ninth IHE-Europe interoperability testing event, or Connectathon, from 20 - 24 April in Vienna, Austria. During this meeting, IHE Austria and the University of Applied Sciences Technikum Vienna presented a parallel workshop entitled "Sharing Clinical Documents and Integrating Workflow - Practical Solutions from Integrating the Healthcare Enterprise." It also featured workshops organised in two tracks, one for users of health IT and another for vendors of such systems.

The parallel format is designed to inform the audience about the benefits of implementation of technology using IHE with a special focus on projects for healthcare in Austria and Europe. More than 1,850 interoperability tests were carried out over the five days, verified by a team of over 31 volunteer monitors led by Eric Poiseau (INRIA), IHE-Europe Technical Project Manager.

Please go to **www.ihe-europe.net** for more news.

Taking PACS to a new level

As the demand for imaging continues and with it the associated need for increased efficiency, PACS is taking a central role in the IT strategy of healthcare providers across Europe. Carestream Health's determination to innovate in this market is demonstrated by a new generation RIS/PACS platform, scheduled to be available during the second Quarter of 2009. The new platform offers advanced tools and features to streamline the delivery of imaging services and boost productivity.

The New Platform—CARESTREAM PACS—ONE Solution

- ONE **Workstation for Reading, Reviewing and Distribution, 3D-Processing**
- ONE **Archive and Viewing System for DICOM and Non-DICOM**
- ONE **Back-End Solution for Single and Complex Multi-Site Configuration**

Differentiating the new PACS platform from its competitors is the innovative **PowerViewer.** Part of the new PACS workstation, this feature promises to speed exam interpretation and reporting for routine exams and 3D imaging studies where complex data sets need to be compared.

This new capability provides automatic registration and volumetric matching of 3D studies created at different times and by different modalities directly within the viewer used by radiologists.

The PowerViewer goes beyond the functionality offered by integrated or native 3D capabilities, enabling radiologists to directly and dynamically view image data in different planes without switching to other applications or workstations. Automatic registration among differing studies will allow radiologists to manipulate one data set in any spatial plane and the other data sets will automatically follow.

Time-consuming manual or semi-automatic processes currently used to set up comparison tools are eliminated. Instead radiologists can immediately use reference lines, swivel, rotate, relate and other tools within current and prior imaging studies. This advanced comparison includes volumetric analysis and different rendition types such as MPR, MIP and others.

New SuperPACS™ Architecture

To meet the growing need to manage disparate radiology solutions across multiple locations, Carestream Health is introducing a new SuperPACS™ Architecture designed to integrate multi-vendor, multi-site PACS into an efficient enterprise solution. Crucially, in today's difficult economic climate, the SuperPACS concept allows healthcare providers to streamline workflow using existing PACS resources. The new technology can help drive improvements in workflow and productivity by creating a common global worklist, allowing images and reports originating anywhere within the enterprise to be examined by radiologists onsite or offsite.

This architecture is designed to reduce expenses by maintaining use of existing PACS and storage devices and allowing for consolidation of resources. As part of its workflow grid, the new architecture can synchronise disparate PACS. Images and reports are automatically updated in the original PACS or RIS for local storage and distribution.

CARESTREAM PACS for DDH, Germany

Diakonische Dienste Hannover GmbH (DDH), one of Germany's largest welfare institutions, together with the Röntgenpraxis am Marstall X-ray Clinic, have selected Carestream Health to install the latest generation PACS. The PACS will manage approximately 250,000 annual X-ray images captured from a variety of modalities in the Diakonie hospitals Friederikenstift and Henriettenstiftung, and in the Röntgenpraxis am Marstall X-ray clinic, providing radiologists with immediate electronic access to images to support the diagnostic reporting process.

Agreeing the contract, left to right: Paul Saalfeld, DDH Head of Information Technology; Wolfgang Menrad, Managing Director of Carestream Health Deutschland; Dr. Michael Schmidt, Managing Director of DDH Gesellschaft für Zentrale Dienste and Controlling mbH, and Manfred Bischof, Healthcare Information Solutions, Carestream Health.

What the clinicians say

"In the daily clinical routine, digital technology means optimised processes, quicker availability of information in the relevant departments and, last but not least, more safety for our patients."

PD Dr. Peter Landwehr, Head of the Radiology Department, Henriettenstiftung Diakonie Hospital.

"With PACS, the multi-site, comprehensive care of our patients will be made considerably easier both in our own clinic and in the clinical departments we manage."

Dr. Hellmut Elgeti, Röntgenpraxis Am Marstall.

Visit us at

DRK 21-23 May, Berlin and **UKRC 8-10 June, Manchester**

To register for a product demonstration:

DRK—visit **www.carestreamhealth.de/drk**

UKRC—contact **jane.grimsley@carestreamhealth.com**

Carestream HEALTH

Want to find out more?

pacs.carestreamhealth.com

THE ECONOMIC **CRISIS**

The Outlook for Healthcare & Radiology

Author
Prof. Mathias Goyen

Chief Executive Officer (CEO)
UKE Consult and Management
Hamburg, Germany

goyen@uke.de

The worldwide financial crisis has not spared the healthcare and medical communities. Until the credit markets fell into a black hole in September 2008, healthcare was seen as a growth industry with a variety of "fail safe" debt instruments available to borrowers. With the onslaught of the financial crisis, things changed dramatically.

From mid-September to the end of December 2008, there were almost no healthcare financings brought to the capital markets. Financings that were closed were private placements or previously committed deals. The availability of capital for healthcare continued to be stunted well into the first quarter of the 2009 calendar year. However, the good news is that healthcare versus other sectors, such as municipalities, or schools, is more stable and still viewed positively. There have been very few defaults, and as the turmoil calms, it is expected that healthcare will be considered a rather "safe haven" for investment.

Impact for Hospitals

Nevertheless, the worldwide economic crisis has significant impact on hospitals. The American Hospital Association has released a study that shows 39% of hospitals are considering reductions in information technology capital investments and 45% are considering reductions in clinical technology. The report documents that patients are less likely to access hospitals for care and less likely to be able to pay for services.

Hospitals are having a much harder time paying off their debt and have less access to capital. 33% of hospitals are reporting increased interest expenses for variable rate bonds, with interest rates in the most recent quarter up 15% over the same period last year. More than half of the hospitals surveyed reported that they are also considering reductions in administrative costs and staff, as other financial pressures come to bear. Hospitals' total margins were down significantly in the third quarter of 2007 from plus 6.1% to minus 1.6%.

The margin pressures include:

- Non-operating revenue is down significantly due to investment losses, which are causing 31% of hospitals to increase funding in their pension plans;
- 38% of hospitals are reporting a moderate or significant decline in admissions and 31% are seeing a moderate or significant decline in elective procedures;
- Unemployment is increasing. Each 1% increase in national unemployment takes 2.5 million people off of employer health plans;
- Uncompensated care rose 8% compared to the same quarter last year;
- Medicaid expenditures are growing with increasing enrollment, but the state Medicaid funding gap is also increasing as the states confront their own budget deficits, and
- Hospital payment shortfalls for Medicare and Medicaid are increasing.

According to Millennium Research Group's (MRG's) 'US Markets for Diagnostic Imaging Systems 2009' report and its US Imaging Marketrack™ service, a combination of factors involving the current state of the US economy, excess installed capacity, and regulatory initiatives aimed at managing healthcare costs will have a negative effect on sales of computed tomography (CT) systems, magnetic resonance imaging (MRI) systems, and nuclear medicine scanners over the next five years.

The effect of the US economic downturn in the diagnostic imaging market was evident in MRG's US Imaging Marketrack™ findings. Compared to Q2 2008, respondents in Q3 reported a decrease in facility financial health and a notable decrease in diagnostic imaging purchase intentions.

"In addition to the current credit crunch, which has made raising capital for new purchases more difficult and expensive for many facilities," says David Plow, Manager of MRG's Diagnostic Imaging division, "there are already over 8,000 MRI scanners installed in the US, meaning the market has reached saturation. Compounding these restrictions, most MRI facilities are operating below capacity and, as a result, do not intend to purchase additional scanners."

Government cost-cutting initiatives are further dampening revenues. The implementation of the Deficit Reduction Act (DRA) has constrained the market for diagnostic imaging systems. Reduced reimbursements enforced by the DRA have made investment in additional scanners more difficult for non-hospital facilities. Furthermore, proposed initiatives from Centers for Medicare and Medicaid Services (CMS) designed to regulate contrast-enhanced procedures performed in physicians' offices to restrict self-referral will also hinder scanner sales.

The markets for magnetic resonance imaging (MRI) and computed tomography (CT) have been affected more than other industries by the economic crisis, because they represent the most expensive and highly advanced equipment. The regions most affected by the global economic crisis are

EU Hopes Social Policies Will Mitigate Impact on Healthcare

The 2009 'Joint Report on Social Protection and Social Inclusion' focuses on the contribution of social policies in responding to the crisis. This year's report looks at the role of social policies in an economic downturn. The report highlights the following areas relevant to healthcare:

- Comprehensive strategies for 'active inclusion' – that combine inclusive labour markets, access to quality services and adequate minimum income – need to be implemented.
- Continued efforts are needed to reach the Lisbon target of a 50% employment rate for older workers to ensure long-term adequacy and sustainability of pension systems.
- Member States need to step up their efforts to improve value for money in the provision of healthcare and to reduce health inequalities, notably through increased attention to primary care, prevention, health promotion, better coordination and rational use of resources.
- Member States should continue to strive to establish and strengthen systems for quality long-term care, by creating a solid financing basis, improving care coordination and ensuring sufficient human resources as well as support for informal carers.

The report is available at:
http://ec.europa.eu/employment_social/spsi/joint_reports_en.htm

the US and Europe. A lot of companies are on the brink of a tumble or about to move to other countries. Radiology prices are still very high, and because of company failures, insurance coverage is lost, and though medical expenses are needed, they are necessarily kept low. According to consolidated estimates cited by industry sources, revenues from CT shipments to US sites in the first half of 2008 fell to 580 million dollars, down from 755 million dollars over the same period a year earlier. This financial carnage came on the heels of a double-digit drop in 2007 compared with 2006, during which total revenues fell from 1.75 billion dollars to 1.4 billion dollars. MR shipments dropped 16% in the first half of 2008 compared with the same period from the previous year. This decline to about 530 million dollars versus 630 million dollars for the first half of 2007 was foreshadowed by very slow order activity in 2007. In the first half of 2008, revenue from the shipment of integrated PET/CT systems to US customers plummeted to from 155 billion dollars in the year prior to 110 million dollars. By comparison, revenues in the first half of 2006 amounted to about 178 million dollars.

There were some bright spots, typically markets for equipment requiring the least capital investment. Ultrasound, for example, weathered the storm well in the first half of 2008. Consolidated industry estimates indicate that radiology revenues and the number of delivered new units each rose by about 3% compared to the previous six months. Ob/gyn revenue rose by about 2%, but substantially fewer units shipped.

The industry estimates pegged new unit deliveries at about 18% below the previous six month period, indicating a trend toward the purchase of expensive, high-performance products. Mammography was a star performer, as vendors shipped 1,200 full field digital systems to US customers in the first half of the year. This compared with 765 in the first half of the previous year.

Nevertheless, there is no reason for healthcare providers not to move forward with capital plans. The following points are fundamental, however:

1. Solid business plans and strategic justification for projects.

2. Specific assumptions regarding operating performance, market dynamics, and return on investment.

3. Careful construction planning with realistic budgeting that aligns with debt capacity.

4. Appropriate equity contributions, guarantees, and operating/financial covenants.

Credit is certain to be tighter and more closely linked to operating performance, but capital will be available for prudent borrowers with strong financial performance. The amount of debt (leverage) an organisation is able to take on

>Continues on page 27

HOW TO
RECESSION-PROOF RADIOLOGY
Adapt or Perish!

Authors
Prof. Philip Gishen
Dr Nicola Strickland

Department of Radiology
Hammersmith Hospital
London, UK

philip.gishen@imperial.nhs.uk
nicola.strickland@
imperial.nhs.uk

It isn't just the economic crisis that might bring profitability to the forefront of the imaging manager's mind. Global mobility, technological advances and the formation of the European Union (EU), in combination with the digital revolution, has completely transformed the way radiology is practiced. In this article, we look at the tools that imaging departments can use to remain ahead of any economic woes.

1) An Ideal Imaging Experience?

Firstly, it is useful to establish an 'ideal' vision of where your imaging service should be. Public transport to the hospital, easily available parking and good signs to the department are essential. This does not just happen – make it happen. A warm friendly greeting for the patient by the receptionist, to a comfortable and spotless environment - no detail is too small to elaborate. Radiology departments must make imaging available to the patients when and where they wish.

Our ideal solution to waiting lists is a "have the procedure and go" department. To run this system, flexibility is a byword, as you have little control of numbers of patients arriving at any one time. To work such a scheme you must be allowed to expand or contract your services, bypassing hospital bureaucracy. Extra space for scanners and staff may be needed if the service grows. Once the x-ray or scan is done an 'instant' report is required. A large reporting room allows free and easy exchange of ideas and multiple opinions without embarrassment, teaching on current cases and an easily accessible contact point for clinicians to access radiologists for discussion of cases. This reporting room should be the centre of your department. 12 or more workstations with sound-proof divisions, excellent adjustable lighting and chairs, air conditioning, telephones, reference books and internet access should be readily available. Visits by clinicians to the reporting room are not interruptions – they are essential to reinforce the role of on-site radiologists.

2) Implement Multidisciplinary Meetings

Multidisciplinary Team meetings (MDT), where every case is discussed with clinical colleagues and histopathologists, are an essential part of departmental life. The MDT room should include at least dual overhead projectors, PACS connection, microscopy, connection to remote rooms, and excellent furniture, heating and air-conditioning.

3) Timetabling

Working an hourly timetable allows the creation of a flexible work force and a department which has a capability to work longer days. Appendix 1, on page 18, shows the construction of a working day for individual radiologists. You must assess whether your work output is sufficient. The Ready Reckoner (see appendix 3 on page 23) has been compiled from the detailed work output figures of six departments. This is a realistic expectation based on an average of 40 weeks of work output per year (not including private radiology practice and the ability of radiologists to produce substantially more work in this environment).

4) Delegate

Delegate major jobs to the most suitable people; for example Head of Research, Head of Postgraduate Teaching, Head of Undergraduate Teaching, Head of Conference Organisation.

5) Research

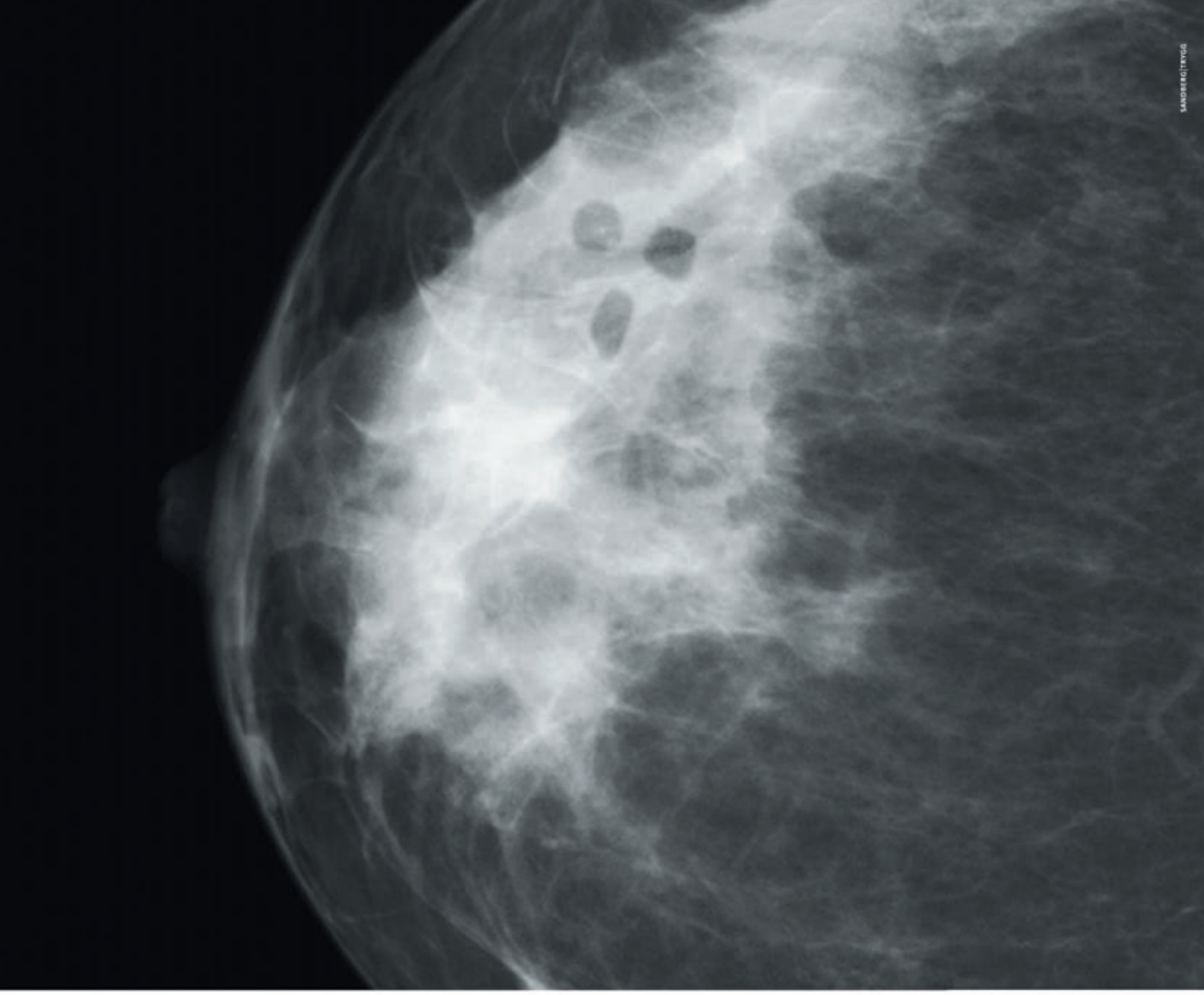
A research committee should be established with a dedicated coordinator. The appointed head of imaging research should develop close communications with clinical colleagues on all imaging projects, making sure there are imaging consultants on the project: they will report the research, be involved in the writing of papers and attract grant applications. A database on research activities outlining grant projects, applications and grant income is essential.

There must be a simple process for starting new projects, research radiation compliance and all research governance matters, to develop a viable academic department. Money is vital, so there must be robust methods to establish all possible funding streams.

6) Training

A successful postgraduate training scheme depends on committed, enthusiastic consultant trainers. Trainees, when they move into consultant posts in new departments, always cite inspirational trainers as the single most important contribution to their careers.

A robust rota of undergraduate teaching is not reliant on one or two radiologists. The design includes teaching by consultants and specialist registrars and radiographers who provide insight into taking x-rays, scans and safety checks. The medical students have a mixture of didactic teaching, observing reporting and scanning as well as multidisciplinary team meetings. This teaching is best achieved with small groups to personalise learning.



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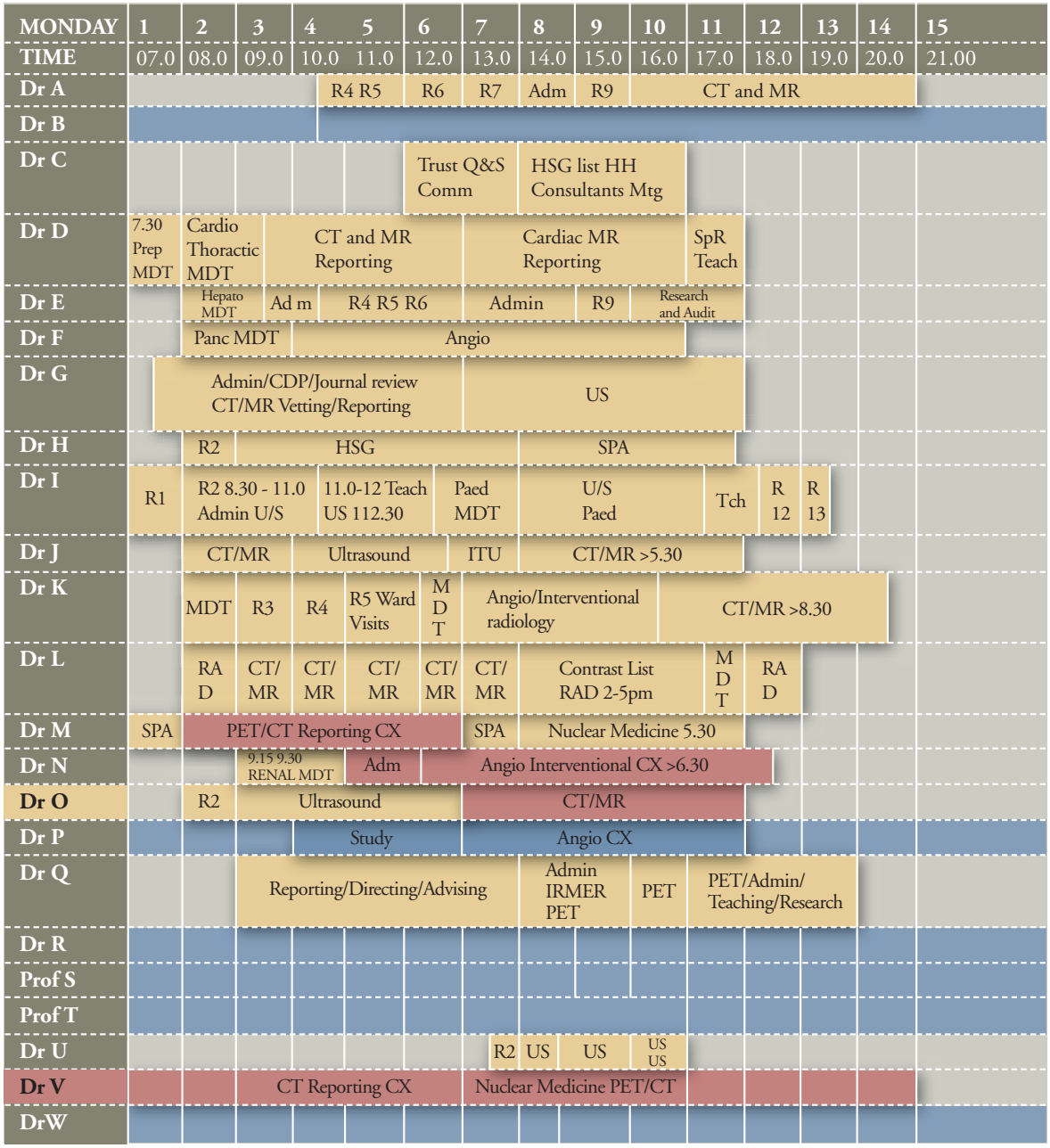
Appendix 1

HAMMERSMITH HOSPITAL TIMETABLE 2008



Example of the Monday 0700 to 2100 timetable.

This type of timetable should very accurately reflect the hour-to-hour actual working practice of the individual radiologist.

KEY: R = Plain Film Reporting

SpR = Specialist Registrar (trainee)

SPA = Special programmed activity, to include research, teaching, administration.

MDT=Multidisciplinary Team Meeting with clinicians, radiologists, histopathologists, physiotherapists, etc. to review individual patients investigations and their management.

7) Assess Individual Modalities

Meet regularly with the radiographic leaders of each modality to look at output (appendix 2, see below). Modern working practice requires imaging departments to work from early morning to late evening. Not every modality needs to be worked this way. If you can cope with the numbers of patients in the normal working day, do so, but many modalities, e.g., MR, require prolonged use of equipment to reduce costs for the consumer and cope with the yearly 15 - 20% rise in MR scanning requests. Make waiting lists the responsibility of radiographers. You must not give anyone the excuse to "get the investigation elsewhere". Doctors will use the department providing the quickest service.

During the past two years we have run an ultrasound service for general practice patients requiring no appointments. Patients have been asked to arrive with their request forms. This removed a huge amount of bureaucratic activity around the booking process. The ultrasound requests rose from 850 patients to 3,500 per month within 18 months. We coped by re-organising timetables, getting more people to scan - some for short periods of time, improving the waiting area and patient information and increasing the amount of equipment.

What we found was more patients coming from greater distances, bypassing their local hospitals that had waiting lists. The problem for UK departments is the method of payment. For this system to work you must have a fee-per-item of service and a management which responds to increases in numbers to buy equipment, hire staff and have sufficient space.

8) Manage Equipment Requirements

How should one manage equipment? Personally we favour an 'everlasting equipment renewal' contract or 'managed con-

Appendix 2
MODALITY: Ultrasound statistics for a department

Month: / Year:		DEC 2008	NOV 2008	OCT 2008	SEPT 2008	AUG 2008	JUL 2008	JUN 2008	MAY 2008	APR 2008	MAR 2008	FEB 2008	JAN 2008
ACTIVITY													
Total Number of Exams		2996	3152	3548	3456	2957	3618	2973	2806	3178	2650	2758	3084
Casemix / Patient Type	Inpatient	543	467	542	606	505	691	527	538	497	460	504	572
	Outpatient	976	1045	1239	1204	946	1193	930	917	1145	903	934	1118
	GP	1222	1485	1569	1462	1295	1510	1324	1191	1408	1160	1206	1225
	A&E	217	148	177	179	203	216	150	156	126	117	110	158
	Other	38	7	21	14	8	8	42	4	2	10	4	11
Included in above totals	Private Patients	80	67	108	121	88	138	88	82	114	48	78	89
	Research	3	10	10	0	0	2	4	2	2	4	0	0
	Out of Hours	283	356	333	300	297	298	201	237	208	178	207	201
Casemix / Exam Type	FNA	36	41	65	42	45	47	51	52	50	53	48	45
	MSK/INJ	58	74	74	84	35	48	62	51	61	36	43	56
	BIOPSY	23	15	13	33	18	46	27	18	15	20	20	15
	U/S CONTRAST	28	16	80	48	40	28	36	60	32	24	28	32
Did Not Attend (DNA's)	Inpatient	0	6	4	4	3	5	5	6	4	2	2	2
	Outpatient	51	82	130	120	74	133	98	110	100	96	51	107
WAITING TIMES													
Waiting Times (Working days)	Inpatient	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day
	Outpatient	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day
	Urgent-OPD	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day
	Cancer	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day
	GP	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day
	URGENT GP	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day	Same day
	MSK	10 DAYS	10 DAYS	10 DAYS	10 DAYS								

First Hospital in the UK Trials Using 3D Imaging for Breast Cancer Screening

New Technique Could Save 12,000 Lives a Year

Breast tomosynthesis, a new three-dimensional (3D) digital x-ray technology for breast cancer screening and diagnosis, is being trialled at King's College Hospital (London, UK), the first national hospital in the UK to undertake this kind of trial. If successful, 3D breast imaging could offer new hope in the fight against breast cancer.

King's College Hospital is one of the UK's largest and busiest teaching hospitals, with over 6,000 staff assisting around 700,000 patients a year.

With around 46,000 women diagnosed with it and causing over 12,000 deaths in the UK each year, breast cancer is the commonest cancer in the country. This trial will hopefully prove that 3D technology can assist doctors in reducing the numbers of not only the estimated 70 - 80,000 women every year who are wrongly told that something unusual has been found, as well as the small number of women mistakenly given an all-clear.

The system used in the trial is a Hologic Selenia Dimensions breast tomosynthesis system, now commercial in Europe and other areas of the world and in the process of gaining FDA approval in the US.

2D IMAGING SHOWS ROOM FOR IMPROVEMENT

At present, two-dimensional (2D) mammography is the standard breast x-ray used in the UK. Although recognised as safe and reliable in detecting the early signs of cancer, the so-called 'anatomical noise' associated with 2D imaging can sometimes hide cancers, or produce shadows that falsely create the suspicion of cancer. The new technology at King's enables doctors to look at separate 'slices' of the breast. Some cancers remain undetectable with 2D technology. The trial hopes to prove the efficacy of 3D in overcoming this deficiency.

In March King's College hosted the first ever hands on breast tomosynthesis users training meeting attracting radiologists from tomosynthesis sites throughout Europe.

The Selenia Dimensions breast tomosynthesis system looks much like a conventional 2D mammography system, but generates 3D images.

2D VERSUS 3D IMAGING

Breast tomosynthesis is a three-dimensional imaging technology that involves acquiring images of a stationary compressed breast at multiple angles during a short scan. The individual images are then reconstructed into a series of thin high-resolution slices that can be displayed individually or in a dynamic ciné mode.

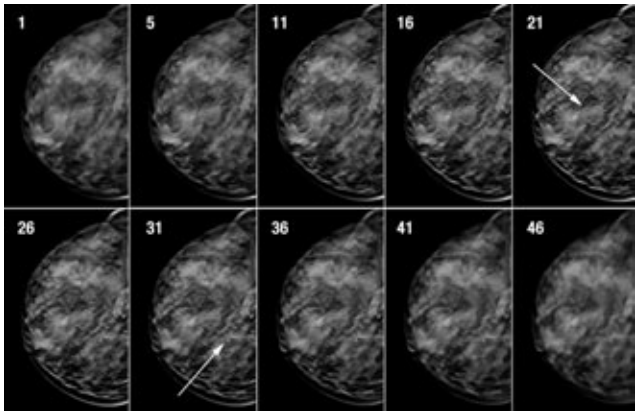
Reconstructed tomosynthesis slices reduce or eliminate the problems caused by tissue overlap and structure noise in single slice two-dimensional mammography imaging. Digital breast tomosynthesis also offers a number of exciting opportunities including improved diagnostic and screening accuracy, fewer recalls, greater radiologist confidence, and 3D lesion localisation.

Dr Michael Michell, Director of Breast Screening at King's, has this to say about the developing technology:
"This is exciting new technology, which could improve the accuracy of breast cancer screening and help save more lives by detecting more breast cancers when they are small and at an early stage, when they can be more effectively treated."

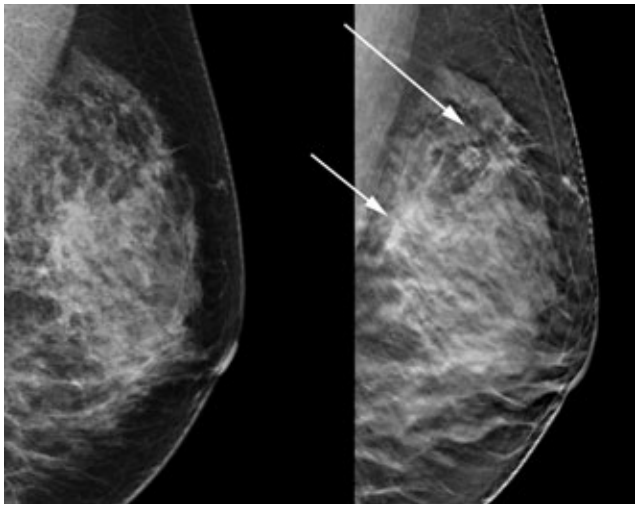
"In human terms this technology could spare a lot of women a lot of heartache, and also save the NHS [National Health Service] valuable resources through people not having to attend follow-up appointments and undergo further tests,"

Mrs Sarah Sellars, Assistant Director of NHS Cancer Screening Programmes, added:
"The NHS Breast Screening Programme welcomes research into the use of new technology for screening and we await the outcome of this study with interest."

The trial use of digital breast tomosynthesis at King's has been authorised by the hospital's Ethics and Research and Development committees. The clinical results of the trial at King's will be considered by the NHS Breast Screening Programme.



Tomosynthesis slices reveal objects lying at differing heights in the breast, such as cysts and calcifications shown by arrows.



Infiltrating lobular carcinoma and multifocality not seen well in a conventional 2D mammogram (left image) is visible with 3D breast tomosynthesis (right image).

tract'. A 15-year contract allows a company to install, replace and service the equipment and introduce new technology.

Final Thoughts: Is "Recession-Proof" Possible?

A government or national hospital practice, working a fixed salary scheme, not dependent on patient throughput, will always have a need for more staff. What incentive, other than professional pride, encourages a radiologist to report 300 instead of 100 cases? The salary is the same, but there is a constant assumed need for 'more staff'. We should learn from private practice, where the approach is "Let's get more work, cut the level of staffing, do the same job and work harder to increase profit".

So, finally, recession proof – yes, very possible. Make the life of the individual radiologist better, turn every situation to an advantage, not a hindrance, make the patient and clinician need you and your practice only. If there are no waiting lists, all imaging studies are reported and patients are treated wonderfully, you are effectively now recession-proof.

The Industry Standpoint on the Recession

Graeme Allan, General Manager Digital Medical Solutions, Europe North, Carestream Health has this to say about the industry standpoint on the recession:

"As with the rest of the world, the European healthcare industry is impacted by the current economic downturn. Access to capital is more limited and institutions are looking carefully at planned investments. In the past most healthcare facilities opted for capital expenditure. Now, as capital becomes increasingly restricted, we are seeing a greater use of our lease and pay-per-procedure plans, especially by small to mid-size hospitals.

Despite the economic slowdown, many European organisations are still pressing ahead with essential modernisation as part of e-Health technology initiatives. The delivery of telemedicine also remains a priority, particularly for those countries where a lack of radiologists exists. Carestream Health is currently implementing a number of Europe's long-term regional e-Health projects and these are continuing as planned, but perhaps at a slower speed.

In our industry, certain factors enable success in any economic climate and in periods of uncertainty they take on renewed importance. Healthcare institutions face incredible challenges - declining reimbursements and government funding, shrinking budgets and growing costs. At Carestream Health we remain committed to efficient and effective delivery of our solutions and services, managing both cost and quality and providing value for money. Being a global supplier helps our position as we have greater stability than regional or national suppliers.

R&D remains a priority and we have no plans to decrease our continuing investment in new product development as such a move would hinder our long-term growth strategy. The market for imaging equipment and solutions may well dip in 2009 but most European healthcare providers take a long-term perspective and are looking for systems and solutions that lower cost and improve care through innovative technology. R&D efforts are central to meeting those aspirations. As an example, new products like the CARESTREAM DRX-1 System fit perfectly in constrained economic times. This new detector can be employed in all applications where a 35 x 43 cm X-ray cassette would be used and can be incorporated into all types of radiology environments without modification of existing rooms.

Growth in 2010 will depend on stabilisation of the financial markets not only in Europe but also across the world. During the interim, the aligned efforts of the European Union will play a key role in helping the industry remain optimistic for the future. The current situation is temporary, long-term markets will improve, and in the meantime the key to riding the storm is to remain focused on customers, cost and quality."

HOW TO ESTIMATE YOUR OUTPUT

	Check	CT	MR	US	Reporting	Interventional			
						Basic	Complex	Super Complex	Neuro Coil
Cross Sectional Radiologist									
Dr A	830	1080	500	232	5030				
Generalist Radiologist									
Dr B	330	120	320	-	11300	50	100		
Interventional Radiologist									
Dr C	310	527	366	220	8300	460	200	100	
Neuroradiologist									
Dr D	630	745	920		70		50	25	45

This will allow Dr A to make adjustments and to have a idea of his/her work output

Dr A checks:	830 plain films	=	1.2	hours per week	Say Dr A spends 5 hours per week at MDTs, this will be added to the output.
	1080 CT	=	10.8	hours per week	
	500 MR	=	5.0	hours per week	
	232 US	=	2.3	hours per week	The new total = **32.5 hours.** The work output just reaches a reasonable, acceptable output
	Reporting plain films	=	8.25	hours per week	
		TOTAL	**27.5**	**hours per week**	

Using The "Ready Reckoner" to Assess a Radiologist's Work Output

The above formula equates time and work with numbers of cases. I have estimated that a consultant works 40 weeks a year, allowing for 12 weeks to include unavailability, such as annual and study leave, meetings and sickness. I have then averaged out the work. It is very easy to do 40 reports in an hour but it is very difficult to average 40 reports per hour, consistently over a year. So, what I have done is carefully worked out the number of cases expected from consultants on average per hour throughout the year.

The Reckoner takes into account interruptions, and other reasons for not doing constant reporting. The other calculation that needs to be done is to look at the new consultant contract, which clearly states that 75% of a consultant radiologist's time should be clinical work. Work an hourly timetable so each consultant on 10 sessions provides 30 hours of clinically related work, which includes MDTs (*) and preparation for MDTs. Assume 5% of the work is private, so in order to make sure of compliance ask everyone to work 33 hours, ie 10% extra, just to make sure no manager says "How can you justify doing private work during working hours?".

Now, look at the Ready Reckoner. Expect 600 plain x-rays over a period of 40 hours, i.e. 600 plain x-rays reported equates to 1 hour of work per week for 40 weeks. If you divide 40 into 600 you will see that on average radiologists should do 15.0 plain X-rays per hour (A radiologist is quite capable of reporting 40 or 50 plain x-rays in an hour, but this figure of 15 is an average or mean amount. No radiologist can sustain 40 or 50 films per hour every time they sit down to report). Similarly for ultrasound MR and CT expect them to do 2.5 examinations per hour and when multiplied by 40 weeks, this equals 100 examinations – which equates to one hour of their weekly timetable over 40 weeks.

Appendix 3 **GISHEN'S READY RECKONER (Relates to output time)**

Average Points								Interventional				Breast		
	Check	CT/ MR	US	Re-port-ing	Bari-um	Nuc Med	PET CT	Basic	Com-plex	Super Com-plex	Neuro Coil	Scre-en	Sym-pto	Sympt US Biopsy
1 hour		2.5	2.5	15	1.5	2	1	1	0.5	0.25	0.125	20	5	1
1 hour x 40 weeks		100	100	600	60	80	40	40	20	10	5	800	200	40
1 session = 4 hours x 40 weeks per year		400	400	2400	240	320	160	160	80	40	20	3200	800	160

WILL SPENDING CUTS IN HEALTH SYSTEMS HIT RADIOLOGY?

The Case for Nuclear Medicine

Author
Prof. Dr. Wolfram H. Knapp

Director
Klinik für Nuklearmedizin
Medizinische Hochschule Hannover
Hannover, Germany

Also,
President
European Association for Nuclear Medicine (EANM)
knapp.wolfram@mh-hannover.de

There are a few very logical predictions one can make when discussing the likely impact of the economic downturn on healthcare. The recession, which became a worldwide reality at the beginning of 2009, is likely to hit social security systems in 2010, when income from taxes, which are based on the preceding weak economical year, drop. Furthermore, the unemployment rate will continue to grow, the longer the economic crisis lasts. In Europe, health systems are predominantly financed by taxes and/or by contribution coupled to the amount of individual revenues. Even revenue cuts of only up to 10 - 20% have dramatic consequences, as the by far predominant share of public income is spent on fixed costs.

Several things should cushion medical imaging from the worst of the blow: imaging technology has become a solid part of rational diagnostic work-up and is thus essential for hospitals in flat-rate based reimbursement systems. Furthermore, it has been shown that using high technology medicine like imaging reduces the duration of hospitalisation.

In addition, imaging technology has made tremendous progress in the last decades, resulting in substitution of invasive procedures. Since expenditure for research and development continues to be at a very high level, it seems unlikely that there will be no further progress as to new fields for the application of imaging technology. These new applications will certainly be driven, e.g., by the availability of an increasing number of targeted drugs. For instance, adequate methodology to monitor early drug effects will be essential to avoid unnecessary treatment and expenditure.

Aging Population Adds Pressure

As well as the recession, Europe and other countries will deal with the increasing challenges posed by an aging population: replacing the large number of retiring radiologists from a smaller pool of young radiologists may prove difficult. The key question is whether the wealth produced with an employment rate of as low as 30% (instead of 40 - 50% nowadays) will be sufficient to cover the costs for the health services demanded. This will depend on the competitiveness of Europe with other worldwide economies. It will take between one and two decades to see how Europe will cope with the challenges of aging, whereas the actual recession will be – according to most experts – a matter of a few years.

Identifying Best Procedures Will Save Costs

With the increasing number of imaging modalities, there will be growing pressure to define the adequate priorities and sequences, in order to avoid redundancies and to streamline the diagnostic process. More than ever before, radiologists will need to be experts on the complete armamentarium of nuclear medicine procedures and nuclear physicians must know the indications for and the diagnostic potential of CT and MRI, with their particular contrast agents and technical modalities. Imaging specialists will need to adopt a role as gate-keeper by consulting referring physicians as to the most straight-forward procedure in a specific clinical setting.

There may be potential for expenditure savings in the future, if radiological procedures are performed solely on a referral basis - not currently the case in every European country. In summary, spending cuts for health systems may affect radiology in a complex manner, but will certainly not decrease its role.

Restricted Budgets Likely

Another possible impact of the recession on medicine is a slowing of resources devoted to investment on capital projects and technology: one can expect funding on a lesser scale than recent years. Although in 2009, technology-based medicine still expects a growth in turnover of 2 – 3% worldwide, expectations thereafter are not too optimistic. However, this may be a phase of limited duration. On a global scale, there may be a shift concerning the world's leaders in imaging. The US and Europe may lose their predominant position in the use of imaging technology in the long-term. With respect to nuclear medicine, actual prognoses agree

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AHA Reports Note Downward Trend

Several American Hospital Association (AHA) reports are looking in to the impact of the recession on healthcare provision. The first, entitled "The Impact of the Economic Crisis on Health Services for Patients and Communities", looks at data for a constant panel of 658 hospitals reporting to DATABANK for the fourth quarter of 2008 versus the fourth quarter of 2007. DATABANK is a web-based reporting system developed by the Colorado Hospital Association that is licensed in 28 states.

Results:

- Participating hospitals are seeing fewer patients overall in many services;
- An increase of 6.6 percent in cost of care for which no payment was received;
- Hospitals report less income from investments which traditionally subsidised losses from patient care, leading to diminishing hospital financial reserves, and
- This leads to difficulties in funding ongoing capital projects.

According to DATABANK, the cost of borrowing jumped 12 percent for the fourth quarter of 2008 compared to the same period in 2007. More than half of reporting hospitals were in the red in the fourth quarter of 2008 – raising concerns about the impact on hospital services and jobs.

A second more recent report based on data from 1,078 hospitals in the US shows that 60% of respondents are seeing a higher proportion of uninsured patients come through their emergency department doors. At the same time, nearly half of hospitals report that the recession has forced them to cut staff.

According to the survey, 90% of hospitals are cutting staff, administrative expenses or community services to help weather the economic storm. Despite this, 70% of hospitals are experiencing a decline in their overall financial health, which they say is affecting their ability to care for their communities. Eighty percent also report cutting capital spending for facility upgrades and clinical and information technology.

on a continued moderate increase in conventional (non-PET) procedures and significant increase in PET procedures in the next 15 years.

Governmental restrictions imposed on imaging budgets can be expected in those European countries in which health services are centrally regulated. Budgeting for special imaging services has already been established in some European countries, e.g. for PET. An increase in direct and indirect restrictions is likely to occur. Reimbursement for new imaging technology will most certainly depend on criteria such as evidence-based medicine.

Nuclear Medicine During the Downturn

In the case of nuclear medicine, adequate reimbursement can only be guaranteed when the field has improved standardisation as a prerequisite for performing multi-centre studies. The latter is essential to verify medical benefits and cost-effectiveness. In addition, nuclear medicine has to raise awareness that many of its diagnostic procedures generate relatively low radiation exposure, e.g. examinations of the thyroid, kidneys or lungs. An important goal is to strengthen cooperation with oncologic societies, to better include nuclear medicine in diagnostic and therapeutic guidelines.

The EANM has several ongoing projects that, it is to be hoped, will continue untouched by the downturn. To facilitate funding for research, the EANM has founded a company (EARL) to create research platforms for centres of excellence and standardisation. In addition, the EANM has become co-shareholder of EIBIR, which has developed a research network and supporting body for EU grant applications within in the FP7 programme.

To guarantee delivery of radioisotopes, the EANM is networking with EU officials, the IAEA, and the industry, represented by AIPES. A short-term result is increased cooperation between reactor operators in planning their irradiation cycles and maintenance periods. The long-term problem, that stable molybdenum-99 delivery needs redundant capacities, and that redundant capacities are economically not feasible, can only be solved on a political level. A number of workshops are planned to find a solution.

The EANM has forwarded a number of position papers to explain the special case of radiopharmaceuticals to different bodies on a European level, e.g. the EMEA. The fact that radiopharmaceuticals have short half-lives, short shelf lives, and extremely low pharmacodynamic and toxic potential, makes it necessary to implement special legislation for approval. Satisfactory regulations have only been achieved in some countries on national levels, so far. In conclusion, identifying our key projects and consolidating our objectives is the key to riding out the recession.

Third-World Countries Use Telemedicine to Offset Poverty

It is possible that financial pressure will push radiology even further into the telemedicine nexus. In 2008, a pan-African e-network joint initiative between the African Union and India was set up to improve digital connectivity and communication using satellites and fibreoptic links, creating a new market for India and providing much-needed healthcare services to Africa as a by-product.

In Africa, under-investment in rural healthcare facilities, a shortage of doctors caused by a drain of African health workers to wealthier countries, and a severe lack of infrastructure are only some of the problems they face. However, aid from India of 2.13 million dollars has catalysed a three-year telemedicine venture whereby two Ethiopian hospitals will have access to Indian healthcare via digital technology. Ultimately, the backers of the Care Group of hospitals in Hyderabad behind the Ethiopia Pilot Project aim to set up 10 such hospitals, that use Indian specialists to provide digital consultations to under-serviced, over-burdened African hospitals. Videoconferencing and transmission of patient images, records and remote monitoring are all features of this investment.

Under the scheme, Telecommunications Consultants India Limited (TCIL) has set up a network that allows the Care group to facilitate teleconsultations to the Black Lion, Ethiopia's only teaching hospital, and which has also been linked to the remote Nekempte Hospital, 300 km west of Addis Ababa. India plans to fund the projects and train Africans for five years before handing the scheme over to African countries.

These two hospitals in Ethiopia are equipped with medical equipment such as x-ray machines, electrocardiogram (ECG) and ultrasound machines, amongst others. African specialists are also receiving training and information via this network. The next step is to bring a total of 20 hospitals across Ethiopia into the ambit of this network, to help rural Ethiopia access better standards of medical care.

>Continued from page 15

will likely be less than in the past – no more 100% financings. Also, for projects involving physician investors, expect to see requirements for upfront personal guarantees and stricter requirements for bonuses (i.e., no bonus payout unless approved by the lender).

Checklist for renovation/expansion projects:

• ***Look first for operational and non-facility solutions***

Not every facility problem requires a new building. Adaptive reuse of existing space and cosmetic upgrades can often lead to improved patient experience, community awareness, and operational efficiencies.

• ***Conduct a rigorous analysis of the market***

Good business planning demands an understanding of the market and its competitive dynamics before becoming dazzled by architectural renderings of future facilities. A typical market analysis will look at population demographics, volume analysis, and utilisation of current services in terms of the organisation as well as its competitors.

• ***Consider department relocation and redesign***

From both an efficiency and a cost standpoint examine whether or not existing spaces are appropriately located before reaching the conclusion that new facilities are needed. Good examples of this are the relocation/co-location of EDs and surgical areas to improve operational efficiency and increase outpatient revenue streams. A volume optimisation and efficiency analysis is an important first step in this area.

• ***Design new spaces with flexibility in mind***

Technology will continue to be a huge driver of how space is used in healthcare institutions. It is important to design space so that it can be adapted to new purposes and to create new opportunities for patient care and revenue generation as space needs and uses change.

Further Reading

1) Wipfli Healthcare Perspective: Healthcare Trends and Issue 2009, January2009, www.wipfli.com
2) www.aha.org/aha/content/2008/pdf/081119 econcrisisreport.pdf
3) US Markets for Diagnostic Imaging Systems 2009, Millennium Research Group. www.mrg.net

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Contact
ECRI Institute Europe, Weltech Centre Ridgeway,
Welwyn Garden City, Herts AL7 2AA, United Kingdom
info@ecri.org.uk - www.ecri.org.uk

	ECRI INSTITUTE'S RECOMMENDED SPECIFICATIONS<1>	SIEMENS
MODEL	PACS	Syngo Imaging
WHERE MARKETED		Worldwide
FDA CLEARANCE		Yes
CE MARK (MDD)		Yes
SYSTEM CONFIGURATION		
Architecture	Single server cluster	Client/server / centralized web-enabled architecture
Hardware	Hardware-independent	All major vendors supported
Operating systems		
Image server	Windows or UNIX	Both LINUX OS and Windows Server
Web server	Windows or UNIX	LINUX Apache
Security	128-bit SSL	SSL
Database server	Windows or UNIX	LINUX
Management	Experienced database company	Oracle
Long-term storage		SAN, NAS, Tape, RAID, HSM; also DICOM long term archive
Media	Hardware independent	DVD, Tape, HSM / (independent)
Max capacity, TB	Unlimited	Unlimited
On-demand storage		
Hardware	RAID (SAN)	RAID (SAN)
Max capacity, TB	Unlimited	Unlimited
Multiple remote servers capable	Yes	Yes
DIAGNOSTIC WORKSTATION		
Independent login	Yes	Yes; configurable per implementation
Admin-controlled worklist	Yes	Yes
Ad hoc patient search capability	Yes	Yes
Auto notification of prior exams	Yes	Yes
Prior reports (without images)	Yes	Yes
User-definable hanging protocols	Yes	Yes
Session interruption function	Yes	Yes
Color and grayscale display	Yes	Yes
Key image select	Yes	Yes
Teaching file selection	Yes	Yes
3-D image processing	Yes	Yes
Tools		2D and 3D
Patient search	Name or MRN Automatic based connection bandwidth	multiple criterias including either, Name, MRN…combinations,etc., User defined
Image compression		DICOM JPEG 2000, supports DICOM-compatible compression formats; User Selectable via progressive loading quality; modality-specific
IMAGE SHARING		
Patient manage	Yes	Yes
Hardware manage	Yes	Yes
Auto failover of critical comps	Yes	Yes
Back-up		
SYSTEM ADMIN		
Power	UPS standard	Available
DBase frequency	Every hour	Daily
IHE conformance	Year 5	Yes; see latest profiles http://www.siemens.com/ihe
RIS	Brokerless, bidirectional	Bidirectional, brokerless, based on IHE profiles
Electronic patient record	Yes	Yes, inc. API support
Report dictation	Yes	Yes, available
INTERFACES		
Query/retrieve SCP	Yes	Yes
Query/retrieve SCU	Yes	Yes
Worklist management	Yes	Yes
Performed procedure step	Yes	Yes
DICOM JPEG 2000	Yes	Yes
DICOM 3.0		
Price structure	Hardware and software separate, based on number of exams	Hardware and software separate. Software based on number of exams per year.
Typical price range		
Hardware		From $60k to ++$1M
Software		From 20k proc/a to Enterprise/Regional solution
Alternative		Not specified
OTHER SPECIFICATIONS		None specified.
LAST UPDATED		

Footnotes

<1> These recommendations are the opinions of ECRI Institute's technology experts. ECRI Institute assumes no liability for decisions made based on this data.

<2> Hardware and software separate. Software model includes seat or concurrent-based pricing. Procedure-based model available in the U.S.

<3> Open architecture allowing a variety of scalable storage solutions for non-DICOM and DICOM, including long-term media: linear table-open and 9840; spinning disk, DVD jukes, tape jukes, remote storage services; EMC Centera, enterprise solutions (EMC, Hitachi, IBM, others)

<4> Varies based on volume; number of procedures, storage, and concurrent user requirements supported through flexible license schemes

<5> 2008: software versions 10.1 and 10.2, May 2009: software version 11.0, Q4 2009: software version11.2

<6> Native document scanning for paperless operations; optimal workflow integration with peer review, discrepancy reporting and teaching files with peerVue (optional); scalable for university hospitals, imaging centers and physician offices of all sizes; teleradiology solutions with tight integration to ThinAir Data; Centricity RIS/PACS/Postprocessing for imaging centers and hospitals; comprehensive solutions for referring physician access; Boost referring physician marketing program.

<7> Integration of RIS, PACS and reporting; workstation desktop integration with third-party applications, worklist and display wizards for single-button operation.

SIEMENS	Carestream HEALTH	GE Healthcare	AGFA HealthCare
Syngo Imaging XS	**Carestream PACS**	**Centricity Web-PACS**	**IMPAX Enterprise Suite**
Worldwide	Worldwide	Worldwide	Worldwide
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Centralized or decentralized client/server architecture. Web-enabled architecture	Distributed or centralized configurations including high availability and business continuity solutions.	Web-based, all on-demand	Centralized server
Hardware-independent	Sun, Dell, HP, IBM, EMC	Dell, IBM, HP, EMC, Nexsan	Dell, IBM, HP, Sun (servers)
Windows	Sun Solaris 8, Windows server 2004	Windows 2003 server; clients include Pentium IV, 3 GHz or greater	Windows, UNIX
Windows	Sun Solaris 8, Windows server 2004		Windows
SSL	VPN, SSL, HTTPS, lightweight directory access protocol (LDAP), 128-bit SSL, RC 4 algorithm	Windows 2003 Server	128-bit SSL
Windows	Sun Solaris 8, Windows server 2004, Oracle Database	SSL, VPN	Windows, UNIX
Sybase SQL	Oracle	SQL Server 2005	SQL or Oracle
		SQL Server 2005	
SAN, NAS, RAID, HSM; DAS	<3>	RAID, DAS, NAS, SAN, long term; tape and	Tape, DVD, spinning disk, MOD, UDO, others
CD/DVD, DVD-RAM, Tape, Disk, HSM (independent)	Spinning disk (Multitiered), DVD and tape juke boxes, remote storage services; supports EMC Centera and Enterprise, IBM Enterprise storage	Nexsan, EMC Centera	Unlimited
Unlimited	Unlimited	Unlimited	
	Yes		
RAID (SAN)	RAID (SAN/NAS), EMC Centera	RAID, DAS, NAS, SAN, tape, EMC Centera, Nexsan	RAID (SAN/NAS)
Unlimited	Unlimited	Unlimited	Unlimited
Yes	Yes, including load balancing	Yes	Yes
Yes; configurable per implementation	Yes	Yes	Yes
Yes	Yes	Yes, and user-controlled	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes. Stored as non-DICOM images	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Native MIP/MPR; optional integrated GE AW Server for advanced postprocessing. Barco (Voxar) 3D can be integrated.	Yes
2D and 3D			
multiple criterias including either, Name, MRN…combinations,etc., User defined	Yes	Comprehensive and on-the-fly for complex searches use Boolean logic	Over 30 search criteria including Name, ID, GPI, location, accession number, doctor, modality, body part, study status, sex
Yes, auto.: DICOM JPEG, DICOM JPEG 2000: ; supports DICOM-compatible compression formats; modality-specific	Yes, configurable	DICOM standard JPEG 2000	User selectable compression ratio
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes, optional with cluster configurations (active-active)	Yes, clustered environment, business continuity	Yes
	Yes. Many configurations available including a meta data backup option for user configuration		
Available	Yes, UPS options	UPS	UPS
Daily	Yes, frequency configurable	Configurable	Configurable
Yes; see latest profiles http://www.siemens.com/ihe	Yes. View details at http://ihe.carestreamhealth.com	Comprehensive, most conformant Web-based	All relavent radiology, cardiology, IT Infrastructure Integration profiles
Bidirectional, brokerless, based on IHE profiles	HL7 integration with third-party RIS, no broker required	Bidirectional and brokerless, HL7	Bidirectional using HL7, DICOM, IHE, Custom
Yes, inc. API support	URL activation, enterprise storage integration, XDS repository, patient-centric clinical content viewing	Yes, via HL7, URL, Web services, applet, others	Image enabler to EMR and EMR on radiology desktop
Yes, available	Optional	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Roadmap	Yes
Yes	Yes	Yes	Yes in IMPAX Data Center Option
<2>	Software, hardware, professional services, service agreement	Customer choice: turnkey and software-only capital purchase, per study, lease, others	Turnkey or software-only solutions available
	NA		
$2k (workplace) to ++$1M (Enterprise/regional)	Varies; multiple configurations depend on size with business continuity and disaster recovery options	Configuration dependent	Varies
From single workplace to Enterprise	**<4>**	Configuration dependent	Not specified
Not specified	Varies	Not specified	Not specified
None specified.	http://pacs.carestreamhealth.com and http://www.carestreamhealth.com/superPACS	**<6>**	**<7>**
	<5>	May-09	May-09

	MERGE Healthcare	PHILIPS	SECTRA
MODEL	Fusion PACS GL (EMEA)	iSite PACS	Sectra PACS
WHERE MARKETED	Europe	Worldwide	Worldwide
FDA CLEARANCE		Yes	Yes
CE MARK (MDD)	WIP	Yes	Yes
SYSTEM CONFIGURATION			
Architecture	Smart-clients, 64-bit processing, centralized, distributed, and redundant servers	Web-based image distribution and radiology information technologies in one application; uses a single database with common data model to manage images and radiology information	Centralized database distributed storage, high-availability clustering
Hardware	Dell servers, Dell workstation	IBM	Windows servers, HP (for UNIX); NAS optional
Operating systems		MS Windows server technology	Windows 2003, HP-UX
Image server	WIndows	MS Windows server technology	Windows 2003
Web server	Windows	MS Windows server technology	128-bit SSL
Security	SSL	VPN, SSL, HTTPS, lightweight device access protocol (LDAP), 128-bit SSL	Windows 2003, HP-UX
Database server	Windows	MS Windows server technology	SQL server, Oracle
Management	Sybase	MS SQL server technology	
Long-term storage		Direct attached storage (DAS) with data always on line. Offsite data-center back-up with anticipated 96 hour initial system recovery	
Media	NAS, SAN, DVD, tape	Direct attached storage (DAS) with data always on line. Offsite data-center back-up with anticipated 96 hour initial system recovery	NAS, SAN, DICOM archive
Max capacity, TB	Unlimited	Unlimited	Unlimited
On-demand storage		Direct attached storage (DAS) with data always on line.	
Hardware	RAID (SAN/NAS)	Direct attached storage (DAS) with data always on line.	RAID (SAN/NAS)
Max capacity, TB	Unlimited	Unlimited	Unlimited
Multiple remote servers capable	Yes	Yes	Optional
DIAGNOSTIC WORKSTATION			
Independent login	Yes	Yes	Yes
Admin-controlled worklist	Yes	Yes	Admin/user
Ad hoc patient search capability	Yes	Yes	Yes
Auto notification of prior exams	Yes, priors can be automatically loaded	Yes	Yes
Prior reports (without images)	Yes	Yes	Optional
User-definable hanging protocols	Yes	Yes	Yes
Session interruption function	Yes, up to 5 sessions	Yes	Yes
Color and grayscale display	Yes	Yes	Yes (can be mixed)
Key image select	Yes	Yes	Yes
Teaching file selection	Yes	Yes	Yes
3-D image processing	Yes	Advanced visualization toolset included	Optional
Tools			
Patient search	Yes	Wild card based searches on name, medical record number, accession number, modality, others	Name, MRN, referring unit/physician, others
Image compression	Lossless and lossy, JPEG 2000	iSyntax platform uses lossless 2.5:1 compression for storage; delivers full-fidelity, full resolution images to iSite Radiology and iSite Enterprise clients	User selectable compression ratio
IMAGE SHARING			
Patient manage	Yes	Yes	Yes
Hardware manage	Yes	Yes	Yes
Auto failover of critical comps	Yes	Yes	Optional (in all)
Back-up			
SYSTEM ADMIN			
Power	UPS	Yes	Optional
DBase frequency	Configurable	Selectable	Configurable
IHE conformance	Limited Profiles	Not specified	Yes
RIS	HL7, ADT/ORM/ORU messaging	Yes, XIRIS RIS	Brokerless, bidirectional, desktop synch, HL7
Electronic patient record	Yes, direct access via Web link	Via URL	Via URL
Report dictation	Optional	Yes	Yes
INTERFACES			
Query/retrieve SCP	Yes	Yes	Yes
Query/retrieve SCU	Yes	Yes	Yes
Worklist management	Yes	Yes	Yes
Performed procedure step	Yes	Yes	Stores and manages
DICOM JPEG 2000	Yes	Yes	Yes
DICOM 3.0			
Price structure	Flexible	iSite PACS is provided as a Service Delivery Model through Fee-per-Study or capital purchase	Varies by market
Typical price range			
Hardware	Not specified	Hardware obsolescense protections is included	Varies
Software	Not specified	All updates and upgrades are included	Varies by market
Alternative	Not specified	Not specified	Varies
OTHER SPECIFICATIONS	http://www.merge.com	User-selectable compression for teleradiology.	None specified.
LAST UPDATED	May-09	May-09	May-09

MARKET ACCESS IN EUROPEAN UNION COUNTRIES

Pricing and Reimbursement of New Healthcare Technologies

A major aim of health policy in most EU member countries is to regulate and control the price of, access to and the use of new and expensive medical technology. Despite this common objective, there are great differences in the means used to achieve it, because healthcare, pricing and reimbursement systems as well as domestic industry and economic status and priorities are different across countries.

This article classifies and presents the common practices and mechanisms employed in different member states to determine access to and use of new pharmaceutical and medical technology. Practices either aim at the supply side or the demand side of the medical market.

Supply-Side Practices

A commonly used measure is price control or regulation of medical technology. Prices may be set on the basis of production costs, the prices in other countries, of similar products within the country, the medical and economic benefits and the cost-effectiveness of therapies under consideration. Another mechanism involves the direct control of healthcare expenditure where discounts, freezes, cuts and rebates are imposed on manufacturers.

> **"Incentives are mainly aimed at maximising effectiveness and minimising risk and cost."**

Often, agreements about price, volume and risk sharing are in place, where manufacturers pay back the state in cases where consumption is greater than a certain predefined level, or in cases where medical and economic benefits promised are not realised in real life. Other mechanisms involve the regulation and control of industry profit rates and tax obligations. Another group of measures involves the reimbursement policies applied. Often positive or negative lists, reference price systems and economic evaluations are employed to decide how to reimburse new pharmaceutical and medical technologies.

Demand Side Practices

Demand side measures focus mainly on changing the behaviour of the parties determining the demand for healthcare technology including physicians, pharmacists and patients. Physician measures include the implementation of practice and prescription guidelines, the implementation of education, the provision of information, the monitoring of prescribing patterns, prescription quotas, implementation of budgets and financial incentives, all of which influence their choices and market behaviour.

In terms of patient measures the main one includes cost sharing, either in the form of fixed or variable co-payments, co-insurance or deductibles. Lately, information and educational campaigns aim to guide and define patient behaviour. In terms of pharmacists, various incentives schemes and discounts are used to promote substitution of expensive with cheaper drugs and technologies.

Direct Price Control

Price control is the easiest and oldest measure aiming to limit private and public pharmaceutical and medical technology expenditure to ensure the affordability of patient treatment and the financial sustainability of the healthcare system. Price control is common for instance in countries such as Austria, Finland, France, Italy, Ireland, Latvia, Lithuania, Poland, Slovenia and Spain. Evidence suggests that where prices are not controlled, they may be higher compared to countries where there is more regulation.

Cost Sharing

Cost sharing is a commonly used approach to control access and expenditure even though it disproportionately affects low-income individuals. A form of splitting the cost of healthcare services in order to reduce public expenditure

Author
Nikos Maniadakis

Ass. Prof. Health Economics & Management
Department of Economics
University of Piraeus
Piraeus, Greece
nmaniadakis@yahoo.com

on the service, it aims to generate income or reduce expenditure for the third-party payer, to reduce administrative costs, to make users cost-conscious, to promote competition, to reduce abuse and inefficiency and to facilitate access where needed. Countries where this approach is used include Austria, Italy, UK, Belgium, France, Greece, Estonia, Finland, Latvia, Lithuania, Poland, Portugal, Slovakia, Slovenia, Spain, Cyprus, Germany, Norway, Denmark, Sweden and Ireland.

"Payback and risk-sharing mechanisms control access and expenditures on new therapies"

Reference Pricing

International price comparisons and reference pricing represents a new trend in EU countries. Price comparisons are used to set the price of the product in one country on the basis of other countries selected for this purpose. Reference pricing represents a mechanism for establishing a maximum level of third-party financing/reimbursement for a group of products classified somehow with a therapeutically equivalent class.

A price above the reference price is borne by the consumer to generate and reinforce price competition and to reduce cost especially when generic products become available, while maintaining standard quality. To be implemented, products are first clustered in groups and then a formula is used to set the reference price.

Risk-Sharing Mechanisms

Payback and risk-sharing mechanisms control access and expenditures on new therapies. In this context, manufacturers are asked to return a certain part of their revenue to a purchaser or the state authority if sales exceed a previously determined maximum amount or in cases where medical benefits have not been realised in real life either at individual or at population level. It is used in countries like the UK, Spain, France and Norway to reduce deviations from a prospectively set budget and to guarantee that a fair relationship will be attained between expenditure and benefit and to reduce the risk for the payer.

Prescribing Incentives

Prescribing incentives involve the application of various explicit or implicit measures, which guide the choice and use of medical and pharmaceutical technology. The objectives tend to vary depending on the aims and priorities of those who establish them. Incentives are mainly aimed at maximising effectiveness and minimising risk and cost.

Use of Generic Equivalents

Generic use promotion is a priority in many countries. Measures include fast track and cheaper registration of generics, encouraged or mandatory prescribing by active pharmaceutical ingredient, incentives for substitution in favour of generics by physicians and pharmacists and consumers, selective financing of generics in positive lists, reference price systems, procurement by tendering, and favourable pricing policies. Obviously the main purpose of generic policies is to increase competition and access and to contain expenditure, without compromising quality and therapeutic equivalence.

Fast-track registration and/or lower registration fees are used in Austria, Finland, France, Hungary, Italy, the Netherlands, Portugal, Slovakia, and Sweden. Financial or other motives for doctors are provided in the UK, the Netherlands, Portugal, Romania, Italy and price control of generics is used in Austria, Cyprus, Finland, France, Hungary, Ireland, Italy, Portugal, and Slovenia. Generic substitution by the pharmacist is encouraged or imposed in Cyprus, Denmark, Italy, Sweden, Finland, France, Hungary, Malta, Romania, Slovakia, Slovenia and the Netherlands.

Economic Evaluation

Finally, economic evaluation or otherwise cost-effectiveness analysis is also used in many countries either to set the price or the reimbursement level or to determine the prescription pattern of new technologies. This approach compares the extra cost and benefit of new products in relation to existing ones, to find out whether a fair premium is asked for the innovation. Nonetheless, it needs to be said that it raises issues as to what the threshold of fairness may be from one country to another.

Conclusions

EU countries are all trying to promote greater and more equitable access to new medical and pharmaceutical therapies, but they also share common concerns about limiting public expenditure. The mix of measures employed is determined by their economic and industry status and by the characteristics of their health policy and health care system. In this context direct price regulation, international price comparisons, economic evaluation, cost sharing, reference pricing, generic use, rational prescription and pay back policies are used in different ways to achieve the above often conflicting objectives.

PROJECT FUNDING & THE NATIONAL INSTITUTES OF HEALTH (NIH)

Could You Be Eligible?

Author
Prof. Barbara Y. Croft

Cancer Imaging Programme
National Cancer Institute
Maryland, US
bc129b@nih.gov,
Barbara_Croft@nih.gov
CIP Web Site:
www.imaging.cancer.gov

This article is written to introduce readers to National Institutes of Health (NIH) funding and, for those with experience, to point out the changes that are being made in the grant application format and the grant review process.

Getting Started

The NIH is made up of over 25 individual institutes. Identifying which of these might be the best target for your application is therefore a good first step. Though it isn't mandatory to choose at the start, it will help guide the direction of the application. The institute websites are quite thorough and can provide information about the core mission and disease focus, research funding, training funding, programmes, and personnel.

The application must meld the science that is being explored with the application process, so that the reviewers and programme officials can understand the science and all the various administrators can understand their part.

> **"If the application is not funded, it may be amended and resubmitted"**

The start of every application must be an idea for research that is new. Many of us have ideas and some of us have the resources to carry them out. The NIH can help provide more resources, but it will not build a laboratory for the investigator from the ground up and it cannot provide the ideas. Often NIH announcements will provide the inspiration to try to put a favourite project together for funding.

How can your Idea be Turned Into a Project?

Thus the first step has to be investigating how the idea for new research could be turned into a project. A literature search is the start. Save all the information that is found. Also look into what has been planned but not completed; this means a search of databases of funded projects such as CRISP and a search for clinical trials in ClinicalTrials.gov if the idea involves a clinical trial. The next step is to assess what kind of a team and resources are needed for the project. The team members will complement each other's knowledge, experience and skills. Young investigators can benefit from adding an older colleague, many projects can use the skills of a statistician, technical projects can use a clinician, and so forth.

Involve the selected team members in the planning, over a series of months, meeting and trading ideas about the research. This helps envision not only the science, but also the practicalities of writing the application and of carrying out the work. The project should start to coalesce during this period.

Seeking Funding

Search for the funding agencies that can help. Many start with small projects and local funding and progress to small grants from government agencies. Look at the announcements of Requests for Applications (RFA) and Programme Announcements (PA) that the NIH puts out in the NIH Guide, as well as at the more general announcements for such standing grant mechanisms as R01s. Non-US sites are not eligible for some of these grants but the announcement will make that plain; if not, contact the listed programme officials for information. There is other information for non-US sites on the web. Look at the literature to see what agencies have funded projects that resemble yours. If they were funded by NIH, CRISP can be a source of the information about the specific funding source.

Contacting programme officials early in the process is important; they can read your proposed idea and counsel you on its focus and appropriateness for their programme.

> *Continues on page 52*

EU GREEN PAPER
SHEDS LIGHT ON HEALTHCARE WORKFORCE

Summary of Key Issues

Author
Dervla Gleeson

Managing Editor
IMAGING Management

Launched officially in December 2008, the European Commission's Green Paper on the EU Workforce for Health officially recognises the many challenges facing health systems in Europe. In this article, we summarise the key points of interest.

The Green Paper aims to describe the challenges faced by the EU health workforce common to all Member States. The second objective is to help identify where the Commission believes further action can be undertaken and to launch a debate on it.

What are the Main Issues?

1. Demography and the Sustainable Health Workforce

Life expectancy has increased consistently since the 1950s by around 2.5 years per decade. This is expected to continue. As the population ages, so does the workforce. Between 1995 and 2000, the number of physicians under 45 in Europe dropped by 20%, whilst the number aged over 45 went up by over 50%. As these staff approach retirement age there need to be sufficient recruits to replace them.

> **"A range of diverse activities are needed to protect and improve the health of the general population"**

Possible Action Areas

- Assessing levels of expenditure on the health workforce;
- Ensuring better working conditions for health workers;
- Considering recruitment and training campaigns, in particular to take advantage of the growth in the proportion of over-55s in the workplace;
- Organising chronic disease management practices and long-term care provision closer to home or in a community setting;
- Providing for more effective deployment of the available health workforce;
- Considering "return to practice" campaigns to attract back former health workers;
- Promoting social and ethnic diversity in recruitment, and
- Raising awareness in schools of careers in health sectors.

2. Public Health Capacity

A range of diverse activities are needed to protect and improve the health of the general population, tackle inequalities, and address the needs of disadvantaged and vulnerable groups. Tasks include carrying out health impact assessments for service planning, prevention of diseases, health promotion and education, securing the blood supply, epidemiological surveillance, etc.

Possible Action Areas

- Strengthening capacity for screening, health promotion and disease prevention;
- Collecting better information about actual and potential population health needs in order to plan the future development of the public health workforce;
- Promoting scientific vocations in schools by highlighting lesser known public health jobs;
- Giving the Agency for Safety and Health at Work (OSHA) more visibility in the Member States, and
- Promoting the work of occupational health physicians and giving incentives to doctors to join this area.

3. Training

Training capacity is an issue crucial to workforce planning. If more doctors and other staff are needed, more university places will need to be created and more staff to train them. This will require planning and investment. Member States will have to assess what types of specialist skills will be needed.

Possible Action Areas

- Ensuring that training courses take into account the special needs of people with disabilities;

- Focusing on health professionals' continuous professional development (CPD);
- Developing training courses to encourage the return to the workforce of mature workers;
- Providing management training for health professionals;
- Fostering cooperation between Member States in the management of numerus clausus for health workers and enabling them to be more flexible;
- Providing language training to assist in potential mobility, and
- Creating an EU mechanism on the health workforce to assist Member States in planning future workforce capacity, training needs and the implementation of technological developments.

4. Mobility of Health Workers Within the EU

Free movement of persons provides for the right of EU citizens to work in another Member State as an employee or civil servant. Directive 2005/36/EC provides for the recognition of professional qualifications in view of establishment in another Member State and in the provision of cross-border services. The Directive has also introduced a requirement for the competent authorities of the host and home Member States to exchange information regarding disciplinary action or criminal sanctions taken or any other serious, specific circumstances.

Possible Action Areas
- Fostering bilateral agreements between Member States to take advantage of any surpluses of doctors and nurses;
- Investing to train and recruit sufficient health personnel to achieve self-sufficiency at EU level;
- Encouraging cross-border agreements on training and staff exchanges;
- Promoting "circular" movement of staff (i.e. staff moving to another country, and then returning to their home countries with additional knowledge and skills), and
- Creating an EU-wide forum or platform where managers can exchange experiences.

5. Global Migration of Health Workers

The EU has made a commitment to develop a Code of Conduct for the ethical recruitment of health workers from non-EU countries and to take other steps to minimise the negative impacts on developing countries resulting from immigration of health workers to the EU. A common immigration policy will include approaches to avoid undermining development prospects of third countries through, for example, exacerbating "brain drain", by instead promoting circular migration.

6. Data to Support Decision-Making

Data is needed on migration of healthcare workers. For example, the European Commission collects data on the decisions on recognition of qualifications that show movement to, or the intention to practice, in another Member State covered by the sectoral systems of recognition: (http://ec.europa.eu/internal_market/qualifications/regprof/index.cfm.)

However, since there is no further information on whether the professional actually took up that post, these data can be used only as a proxy in the absence of more detailed information. Other data collected by EUROSTAT on numbers of health professionals relies upon what different Member States collect: (http://ec.europa.eu/health/ph_information/dissemination/echi/echi_en.htm.)

"The EU will develop a code of conduct for ethical recruitment of non-EU workers"

In addition, an EU-supported OECD project on the migration of doctors and nurses in the OECD/EU-25 countries is underway and will in future look also at other health professionals.

Possible Action Areas
- Harmonising or standardising health workforce indicators;
- Setting up systems to monitor flows of health workers, and
- Ensuring the availability of data on the health workforce to determine the precise movements of particular groups.

7. New Technology & the Workforce

The introduction of new technology requires that health workers are properly trained, to use it. The Commission communication on "Telemedicine for the benefit of patients, society and the economy" proposes a European framework to tackle some of these challenges.

Possible Action Areas
- Ensuring suitable training to enable health professionals to make the best use of new technologies;
- Taking action to encourage the use of new information technologies;
- Ensuring interoperability of new information technology, and
- Ensuring better distribution of new technology throughout the EU.

>*Continues on page 40*

PORTABLE ULTRASOUND **ON THE RISE**

Trend Shows Technological Advances Fuelling Growth

Author
Diane Wilkinson

Market Analyst
Medical Electronics
Research Group
InMedica
IMS Research
Wellingborough, UK

The ultrasound imaging equipment market is currently seeing a clear trend towards miniaturisation. The dramatic increase in the use of hand-held and portable ultrasound (defined by InMedica as compact ultrasound), has driven additional growth for ultrasound in markets such as cardiology.

Developments in the ultrasound imaging market today focus on improvements in diagnostic performance and workflow enhancements. The trend to portability further aids improvements in point-of-care services and ultimately, patient care. With the ultimate goal of increasing the efficiency and productivity by which hospitals and clinics operate, these enhancements are necessary to ensure increased patient volume and throughput, and consequently, the survival of many hospitals and clinics globally. This holds particular relevance in the current environment where the cost of healthcare is vastly out-pacing government spending and reimbursement.

Cardiologists Increase Use of Portable Ultrasound

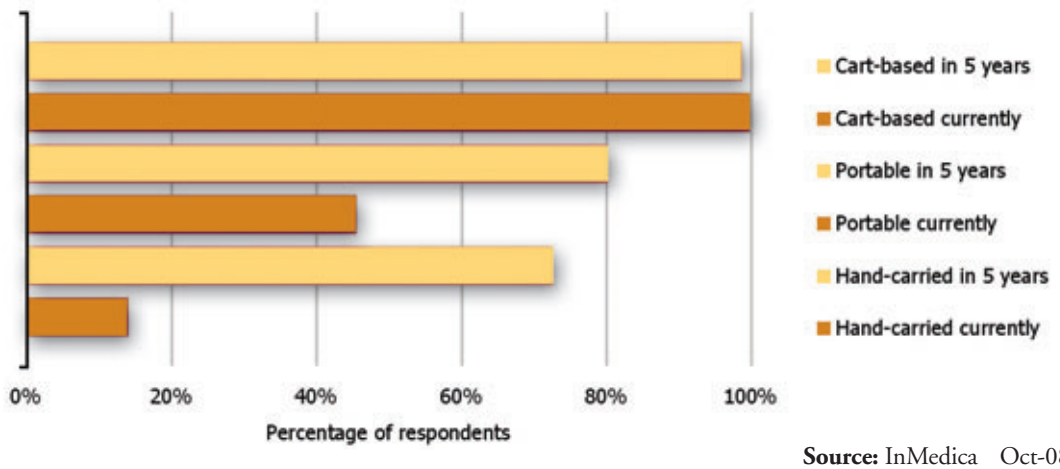
The trend to miniaturisation is affecting the use of ultrasound by cardiologists. A recent survey by InMedica on the use of ultrasound in western European hospitals and imaging centres has highlighted that cardiologists expect to be using much more mobile ultrasound in the near future, with emerging applications for ultrasound in cardiology including emergency room, critical care and bedside exams.

Cardiologists from across Europe were recruited in this research, to help equipment manufacturers improve their product development and overall service to customers. Working in partnership with a number of leading equipment manufacturers, InMedica designed a questionnaire to gather direct feedback from cardiologists on the equipment they are using, the examinations they are performing, ways in which their systems could be improved and how their work is changing. The results of the survey are presented by InMedica in the report, "European Customer Insights – Ultrasound in Cardiology".

Survey Results

Table 1 presents the types of ultrasound systems being used by the surveyed cardiologists. While 100% of respondents were using cart-based ultrasound in cardiolo-

Table 1. What types of ultrasound systems are being used by Cardiologists?
Data presented is a cumulative total for system usage forecast.



Source: InMedica Oct-08

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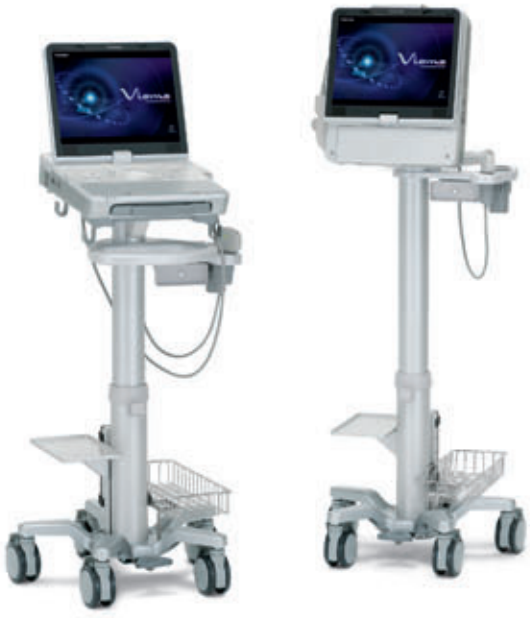

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ULTRASOUND CT MRI X-RAY SERVICES

gy, InMedica found that 46% of respondents were also using a portable ultrasound system to complement their traditional cart-based system. Furthermore, 73% of respondents expected to be using hand-held ultrasound within the next five years.

For future use of hand-carried and portable ultrasound systems in cardiology, 85% of respondents answered that their role would be complementary to cart-based systems. Moreover, 6% thought cart-based systems would be fully replaced by hand-carried and portable systems. Only 9% of respondents thought that hand-carried systems played no future role for the use of ultrasound in cardiology.

"73% of cardiologists expect to be using hand-carried ultrasound within five years."

Workflow Benefits

In relation to workflow, the greatest numbers of responses (25% of cardiologists) were in relation to the positive use of hand-carried and portable systems in emergency, critically ill and bedside examinations. 21% of respondents considered these systems to have a "strongly positive" impact in cardiology, relating to the increased use and importance of hand-carried and portable systems in ad-hoc and routine exams. Conversely however, 19% of respondents considered that these systems would have little or no impact on workflow in relation to cardiology.

The survey also showed that cardiologists expect their work to become more mobile in future, with bedside examinations becoming common practice. Out-patient examinations were also expected to increase in regularity. By taking ultrasound to the patient, a reduction in waiting times can be achieved as all scans will not have to be referred to overstretched imaging departments.

Quality of Care to Rise

Screening and minor scans can also be performed using portable equipment, often by non-imaging specialists, only referring patients to the imaging departments for in-depth scans for serious conditions. The increased use of ultrasound, particularly in new applications, will raise the overall quality of care.

COST-EFFECTIVENESS & CARDIAC IMAGING

Combined Approach to Patient Management May Yield Substantial Savings

Coronary artery disease (CAD) is presently the most common cause of death in the industrialised countries. Consequently, to diagnose and treat cardiovascular diseases represents a large drain on resources. In this challenge, stress imaging techniques represent a cornerstone in the management of stable patients and have demonstrated, over the years, an effective gatekeeper over the use of more invasive and sophisticated techniques. However, this is obtained at an excessive cost for society.

From a healthcare policy perspective, the value of strategies for the management of patients with chest pain should rely not only on diagnostic accuracy, the absence of side effects, and the cost of the procedure, but also on the pre-test probability of significant CAD, the cost of additional tests and treatments that the results may induce, the costs of events that may be driven by a subsequent treatment (i.e. a coronary angioplasty), and the quality of life of the patients. Unsurprisingly, cost-efficiency analyses are increasingly seen as solutions for integrating both economic concerns and efficacy into one indicator to be used to compare different therapies, technologies or global clinical strategies relative to one another.

The importance of a cost-efficiency analysis in clinical diagnosis depends, in general, not only on the costs related to the choice of the initial diagnostic technique, e.g. direct catheterisation versus stress imaging techniques, but also on the extent to which the test selected as the first line approach induces the use of additional resources, i.e. the overall clinical strategy.

Strategies employing myocardial perfusion scintigraphy (MPS) have been proven very cost-effective in several clinical scenarios. In patients with stable angina and intermediate pre-test probability of CAD, strategies including MPS have been consistently shown to be more cost-effective than the conventional exercise ECG. In addition, a management strategy based on MPS data results in 23% to 41% cost-savings compared with a direct referral to coronary angiography.

Despite the higher direct costs of MPS with respect to conventional exercise ECG, MPS is more cost-effective because of its higher diagnostic accuracy and prognostic power, thus allowing a reduction in resources use for patients with a normal test result. Marwick et al. reported that a normal exercise ECG does not prevent additional diagnostic testing and causes an unexpected increase in the use of coronary angiography; on the contrary, patients with a normal MPS are infrequently referred for additional investigations.

In patients with overt CAD, MPS may also lead to significant cost savings by limiting expensive therapeutic procedures to patients with high-risk scans who have the most to gain from an intervention. In particular, the greatest cost-effectiveness of strategy driven by the results of MPS seems to occur in women, with a significant reduction in the number of normal coronary angiograms and an increase in the identification of those patients with multivessel coronary disease (from 23% to 42% of patients) as compared to a strategy including a direct referral to the cath lab as a first line intervention strategy.

There are, however, studies reporting different conclusions. Hernandez and Vale, applying a probabilistic model analysis, concluded that strategies that involve the use of SPECT seem to be optimal for low levels of prevalence of CAD, and in this setting they would reduce the number of invasive tests required. For high levels of prevalence of CAD, the result seems to be the opposite; that is to say, strategies that involve the direct referral to angiography seem to be optimal. The conclusions of such an approach, however, seem to be limited only to the detection of the anatomical aspect (CAD) and do not consider the physiological aspect, i.e. the presence of ischaemic heart disease.

In a more comprehensive clinical vision, both the detection of myocardial ischaemia and the associated risk stratification would more efficiently impact on the selection of the appropriate patient management, e.g. revascularisation versus medical treatment. In this context, strategies including stress imaging techniques demonstrated a better cost-effectiveness with respect to those including a direct referral to an invasive approach. It is worth noting that, in every class of pre-test likelihood of

Authors
Dr. Claudio Marcassa
Dr. Pier Luigi Temporelli (above)

S. Maugeri Fnd, IRCCS, Scientific Institute of Veruno, Cardiology Dept., Veruno (Italy)
Department of Cardiology
S. Maugeri Foundation
Veruno, Italy
claudio.marcassa@fsm.it

CAD, the two strategies resulted in a comparable event rate at follow-up.

The previous considerations also apply to the noninvasive assessment of coronary anatomy by multislice CT angiography (MSCT); in particular, when considering risk stratification as the major clinical decision point in both asymptomatic and symptomatic patients, appropriateness criteria for MSCT had recently obtained either uncertain or inappropriate scores.

MPS Versus Stress ECG

Most of the considerations on MPS as a strategy that is more cost-effective than stress ECG or direct referral to the cath lab might also be applicable to stress echocardiography, and the choice of the imaging stress modality (echocardiography or radionuclide imaging) often depends on which test is most available at a given institution and in local variation in accuracy.

However, in studies where head-to-head comparisons between MPS and stress echocardiography were performed in the same population for vasodilators, dobutamine, and exercise stress tests, MPS demonstrated to have higher sensitivity and equivalent specificity.

In addition, the negative predictive value of MPS for annualised hard event rate has been demonstrated to be significantly higher than that of stress echocardiography both in the general population and in patients with known CAD. This translates to a very low event rate in patients with negative MPS (<1%) when compared to patients with negative stress echocardiography (approximately 6%).

These rates of adverse events are too high to be fully effective in categorise a patient as ”low risk”, particularly in patients with intermediate to high pre-test likelihood of CAD or known CAD, and a clinician is unlikely to be so confident on a negative test as to justify no additional testing. However, the lower cost and the sufficiently high accuracy make echocardiography economically attractive for lower-risk diagnostic populations.

Conclusions

Widespread application of a combined clinical and stress imaging driven approach to a patient’s management could result in substantial cost savings for the healthcare system, and in a survival benefit for those patients at risk of major cardiac events.

In lower risk populations with suspected coronary disease stress echocardiography may be considered as the first line diagnostic test whereas, for intermediate-to-high risk patients (including patients who are diabetic, with peripheral arterial disease, chronic kidney disease, or pre-surgical risk stratification), literature results support the use of the slightly more expensive nuclear cardiology imaging.

>*Continued from page 35*

6. The Health Professional as “Entrepreneur”

Some health professionals work as entrepreneurs running their own practices or medical centres and employing staff. Commission policies to improve the business environment in Europe and to support and encourage entrepreneurship have an impact on these activities. The Small Business Act (SBA) is a key element in the EU's Growth and Jobs Strategy (Commission Communication "Think Small First –A Small Business Act for Europe" – COM(2008)394).

Possible Action Areas

- Encouraging more entrepreneurs to enter the health sector to improve planning of healthcare provision and create new jobs, and
- Examining the barriers to entrepreneurial activity in the health sector.

7. Cohesion Policy

Development of the EU health workforce is also linked to Cohesion Policy. Under the current legal framework it is possible to use Structural Funds to develop the health workforce. The Community Strategic Guidelines for Cohesion, which defines the priorities for the Structural Funds for the 2007 - 13 period, contains a section describing the aim to “help maintain a healthy labour force”.

Possible Action Areas

- Making more use of the support offered by structural funds to train and re-skill health professionals;
- Improving the use of the structural funds for the development of the health workforce, and
- Enhancing the use of structural funds for infrastructures to improve working conditions.

CHOOSING THE RIGHT **MAMMOGRAPHY SCREENING SYSTEM**

Why Low Dose Really Matters

Author
Dr Jean-Charles Piguet

ImageRive
Geneva, Switzerland

Most healthcare systems in Europe and the US now promote breast screening on a national level. These programmes are designed to implement early detection on a mass scale to reduce the death toll from this commonly occurring disease. This article addresses the key criteria for choosing the right system for your needs, highlighting the need for high image quality and a tandem low radiation dose.

Screening providers need to identify cancers as early as possible. This necessitates investigating not only women who have felt a tangible lump in their breast, but examining an otherwise asymptomatic population. Though in 99% of cases no cancer is detected, studies show that the life-saving benefits of screening programmes clearly outweigh the potential radiation risk. At the same time, it is our responsibility as healthcare providers to keep the dose as low as possible for the patient. So, how can healthcare providers find a ratio between low dose and the essential high image quality?

In my experience, DR is the single most effective means of achieving this. I believe that three different technologies will prevail:

- Indirect conversion with a cesium-silicon sensor and a spatial resolution of 100 microns;
- Direct conversion with a selenium sensor. There are two suppliers of these sensors, one using 70 microns and one 80 microns, and
- Photon counting, with a scanning multi-slit detector geometry and a pixel size of 50 microns.

Criteria for Choosing the Best System

Each screening system will offer a different range of qualities, from pixel size, DQE, contrast and reliability, to workflow, etc. Firstly, if a system does not offer top image quality, excluding it from your shortlist is a logical step. When evaluating image quality you should take into account factors including resolution, noise and the algorithms for image processing. Additional purchasing criteria must include ergonomy, workstation features and connectivity/compatibility with existing PACS and RIS systems.

And of course, the price. Though this is often an important factor in screening, surprisingly, it should have little bearing on the final decision. The reason for this is clear. For example, a high volume screening site can, during the lifetime of its FFDM system, perform 50,000 to 100,000 exams, taking 200,000 to 400,000 images (or as much as 180,000 exams, or 720,000 images with a fully optimised workflow*). If we imagine a price difference of even 100,000 euros between two vendors, this means a price increase per exam of 25 to 50 cents. Compare this to the average charge for a mammogram and you will see that what counts is not the selling price but performance, in terms of reliability and throughput.

What About Dose?

Dose is an essential factor. A sufficient number of photons must pass through the breast to produce an interpretable image quality. Three other factors affect signal quality. Firstly, DQE: the higher the detector efficiency, the lower the dose needed for a good image. Image quality also depends on scattered radiation. There are two different systems in use to reduce scatter: anti-scatter bucky grids, and multislit collimation of the x-rays before and after the breast, in a scanning system.

In terms of scatter rejection, collimation is ten times more efficient, letting through only 3% of scatter compared with 30% by a grid. This translates to a lower dose needed for the same image quality. Also, the higher the signal-to-noise ratio, the lower the dose needed to obtain the necessary image quality.

The Sectra system we currently use implements these key elements, operating at 50% of the standard dose of other DR systems, and at about 20% of the dose of CR systems. Hence the following question: if the image quality is equivalent, can it be justified to double the necessary dose to women who are 99% healthy? To me, at least, the answer is very simple.

Conclusion: DR Systems Lead the Pack

To conclude, in screening mammography more than 99% of all mammograms will produce no significant findings. It is the price to be paid for efficient detection in "healthy" women. The aim is to minimise false negatives and false positives, using the most sensitive and specific tool. DR systems offer good images, in accordance with government regulations, and are obviously better than conventional film mammography. Choosing one that uses half the dose compared with any other system has allowed us to achieve the desired low dose/high quality ratio that surely should be at the top of your checklist when selecting a screening system.

**With a lifespan of eight years and an optimised workflow of 12 women per hour over an eight-hour workday.*
***As Low As Reasonably Achievable (ALARA) – a radiation safety principle and regulatory requirement for all radiation safety programmes, for minimising radiation doses.*

INTERVIEW WITH **PROF. GUSTAV VON SCHULTHESS**

Interviewee:
Prof. Gustav Von Schulthess

Director
Nuclear Medicine Clinic
University Hospital Zurich
Zurich, Switzerland
gustav.vonschulthess@usz.ch

Professional Achievements

- MS Physics Swiss Fed Institute of Technology 1974
- PhD Physics Massachusetts Institute of Technology 1980
- MD Harvard 1980
- Professional training in Internal Medicine, Nuclear Medicine (NM) and Radiology in Zurich, St. Gallen and San Francisco (UCSF, A. Margulis, H. Hricak, Ch. Higgins)
- Board certification in NM 1985, equivalent in Radiology 1996
- Acting Director (87 - 91) and Director and Professor of NM (91 - present) University Hospital and University of Zurich
- Chief Medical Officer University Hospital and Vice Dean for Clinical Services University (2005 - 07)
- International Diagnostic Course Davos: Co-Director since 1995 (www.idkd.org)
- Board Member, Secretary, Vice-President and President ESMRMB (1989 – 1996)
- Board Member ISMRM (1989 – 92)
- President Swiss Society of Nuclear Medicine (1998 – 2002)
- Co-Founder and Chief Scientific Advisor, Timaq (www.timaq.com)
- Author and co-author of over 220 peer-reviewed publications
- Editorial Board Member of several journals, past and present
- Honorary Member of ESMRMB 1995, RSNA 2008
- Honorary Doctorate in Medicine, University of Copenhagen (2007)

A former student at Harvard and MIT, you eventually settled on nuclear medicine. Why was this?

I initially had no clear intention to go into imaging. I was attracted by the integration of medicine and physics in the Harvard-MIT division of Health Sciences and Technology (HST). During medical school I was drawn towards haematology and intensive care medicine. My residency in internal medicine quickly showed that much of what I had learned in physics I couldn't use, so I entered nuclear medicine, then focusing on kinetic labelling experiments with blood cells. This got me hooked on imaging.

I was an early player in the MR field, starting a fellowship in San Francisco in 1984 and building the MR centre in Zurich. My 'thing' was always combining morphology and function - they complement each other. I have gone further in this field than I ever dreamed. This is documented with the first worldwide clinical PET-CT and with being one of the first two users of a solid-state based cardiac SPECT camera (five times faster than conventional techniques) integrated with CT.

What distinguishes you most from other radiologists and scientists?

What may distinguish me from many of my colleagues is that, with my physics background I have reasonable ease in technolo-

gy assessment. In this way I can prioritise which technology to invest in and where to hold back. The fact that I am an MD and PhD, an NM physician and a radiologist, an "old" European having lived more than seven years in the US, may also be relevant. I do not like to be put into a box, be cornered and labelled. That may mean that I am relatively free in my associations and not much constrained in thinking along given lines. Lastly, it is hard to achieve anything consistent without perseverance and hard work.

Did you feel prepared when you learned you would be made Director of Nuclear Medicine in Zurich?

My great mentor, Prof. Walter Fuchs, prepared me for this role very well. I had been running the service as an acting chief for almost four years, and I made it a rule to identify what was needed beyond daily management and I presented that to Walter. Then he would add his own thoughts or questions in response. Thus, I learned independent decision-making. The critical moments came prior to assuming this position. Having a wife and three children, the pressure to achieve a definitive and relatively stable position was something I required!

What is your advice to young radiologists hoping to emulate your success?

Think outside the box, be thoughtful first and then consistent in what you want. Tolerate others and their other way of doing things. Remember, it is the result and not the path to the result, which counts at the end. Try to find a good mentor, who has the desired qualities. He/she will not need to make you small to feel big him/herself. Seek a mentor 10 or more years older than yourself.

As a co-founder of Timaq, what lessons did you learn from the corporate world?

In a corporate environment, things have to be more structured and less chaotic than in academia. This may sometimes stifle creativity, but discipline is more readily learned in the corporate world and can be very helpful in academia. Furthermore, I learned that it is not easy to do many things simultaneously. A start-up company is not something you can do as a sideline. You need excellent people in your company, because you cannot make five things work by yourself.

"In a corporate environment, things have to be more structured than in academia

Is it a difficult task to balance your workload?

I would always like to do more. At times, however, you need to be able to say enough is enough and to let go. Giving young people the opportunity to demonstrate their ability to decide independently may positively surprise you. For personal reasons, my children had to function relatively independently at an early age. If I could have, I would have provided much more guidance. But this may often be unnecessary - people internalise what you want much before you become aware of it – hence: "all you ever needed to learn, you learned in kindergarden…"

Finally, our cover story in this issue concerns the impact of the recession – is radiology at risk?

To be blunt, people get sick more or less independent of the economic situation. Imaging will be required at a steady rate, independent of economy. The equipment manufacturers clearly suffer in such times, because investments are delayed, but when the economy picks up, they are the first to sell again. So for us as physicians, times like the current ones have a positive side. I certainly have not seen my numbers drop in the last months. Is that not a nice confirmation that my service is providing something needed and useful?

Facts: Switzerland

Area: *41,293 sq km (16,000 sq mi)*
Population: *7.5 million (2007)*
Capital City: *Bern*
People: *German (64%), French (19%), Italian (8%), Romansch (1%)*
Languages: *Swiss German, French, Italian, Rhaeto-Rumantsch*
Religion(s): *Roman Catholic (46.1%), Protestant (40%), Muslim (4.3%)*
Currency: *Swiss franc (SFr)*
Government: *7 member Federal Council*
Political system: *Federal Republic with strong local governments (cantons)*
President: *Hans-Rudolf Merz (for 2009)*
Foreign Minister: *Micheline Calmy-Remy (for 2009)*
Membership of international groupings/organisations: *Council of Europe, EAPC/PfP, EBRD,EFTA, IBRD, IMF, OECD, OSCE, UN, UNESCO, UNHCR, WTO*

Basic Economic Facts

GDP: *US $ 387.7bn in 2006 ($418.1 forecast for 2007)*
GDP per head: *$38,602 in 2006*
Annual Growth: *2.8% (2007)*
Inflation: *0.8% (est. 2008)*
Unemployment: *3.1% (February 2007)*
Major Industries: *Banking and insurance, machine and precision tools, textile machinery, chemicals and pharmaceuticals, watches, telecoms, graphic machinery, food processing and packaging materials, electrical and mechanical engineering.*
Major trading partners: *Germany, France, US, Italy, UK, Japan, Netherlands, Austria*

OVERVIEW OF **THE HEALTHCARE SYSTEM IN SWITZERLAND**

OECD and WHO survey of Switzerland's health system

Switzerland's health system meets the important goals of good health outcomes and universal health coverage, but these successes come at a high financial cost. The OECD and the WHO, in a new report on the Swiss health system, praise the quality of the system and make recommendations to control its high spending.

The Swiss healthcare system compares well with other OECD countries. It has universal health-insurance coverage, permitting access to a broad range of modern medical services, and patients are largely satisfied with the health care they receive. However, spending on health as a share of Gross Domestic Product (GDP) is the second highest (after the US) in the OECD area, while other OECD countries perform equally well, or even better, at lower cost.

Switzerland spent 11.5% of Gross Domestic Product (GDP) on health in 2003, against the OECD average of 8.8%. The cost has been increasing steadily in Switzerland, rising by 2.4% of GDP between 1990 and 2004, above the OECD average increase of 1.5%. These high levels of health spending, compared with other OECD countries, reflect both the generous supply and the high prices of the services provided.

Ageing populations, coupled with new healthcare technologies, suggest that health spending will continue to rise, creating concerns about the financial sustainability of the system. "Switzerland will have to develop more cost-effective policies if it wants to better control health expenditure in the future" said John Martin, Director of the Employment, Labour and Social Affairs Directorate, OECD.

While overall health expenditures are high, Switzerland devotes only 2.2% of its health spending to disease prevention and health promotion compared with an average of 2.7% for all OECD countries. "Investing in prevention and health promotion programmes would help Swiss health authorities focus on important public health issues such as tobacco and alcohol consumption and on areas in need of more attention such as mental health and obesity. This would promote health and prevent disease in the whole population, by actively targeting people at high risk." said Dr. Marc Danzon, WHO's Regional Director for Europe.

The report recommends measures to increase the cost-effectiveness of the Swiss healthcare system. Current payment arrangements to both doctors and hospitals – e.g. fee-for service or by number of bed days - do not provide strong incentives to increase cost-efficiency and the report recommends that new methods of paying for healthcare should be considered. A system of payment on the basis of fixed prices per pathology for inpatient care would promote greater efficiency in provision and shorter hospital stays.

More reliance on gatekeeper or family doctors arrangements and less on fee-for-service payment arrangements could also be considered in primary care. If the Swiss authorities plan to control costs through competitive markets they should limit the possibilities of insurers to select insurees on the basis of their health risk. Insurers should contract with providers on the basis of quality. People buying health insurance should shop for the best coverage at the lowest premium. Increased competition in the market for non-patented drugs (such as generics) would also help reduce prices for pharmaceuticals.

Competition in both insurance and the provision of healthcare services should cross canton boundaries.

Though financing through insurance premia remains regressive and out-of-pocket pay-

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ABSTRACT SUBMISSION

July 4 – September 18, 2009

The annual meeting of ESR myESR.org

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97 Countries
270 Scientific and Educational Sessions
1,684 Accepted Papers and Exhibits:
rejection rate: 68%
Fully Electronic Scientific Exhibition
Industrial Exhibition on 26,000 m²
285 exhibitors

ESR
European Society of Radiology

> **"The Swiss health system is made up of twenty-six semi-autonomous health systems**

ments are high in Switzerland relative to most other OECD countries, the existing premium subsidies and cost-sharing exemptions do ensure that vulnerable groups have good access to healthcare. However, there are large cross-canton differences in subsidy levels and eligibility conditions and the report recommends setting minimum national standards.

Finally, longer-term gains in performance will require changing health-system governance. Despite its small size and population, the Swiss health system is made up of twenty-six semi-autonomous health systems, making it difficult to develop consistent national policies and competitive markets for health-care insurance, health care services and drugs. The report recommends an overarching framework law for health which would include existing legislation on health insurance, future policies on prevention, gathering national health data, and oversight of health-system performance. This would also set out national objectives and funding responsibilities and ensure that health insurance and supply are available on a broader geographical basis.

Federal Office of Public Health FOPH

The overriding aim of the FOPH is to promote and maintain the good health of all people living in Switzerland.

On the one hand, it seeks to promote people's awareness and thereby enable them to take responsibility for their own health. On the other, it wants a general and consistent improvement of everyone's health through health promotion, disease prevention and health protection campaigns and the curing of illnesses and alleviation of suffering caused by disease and accidents.

In order to achieve these aims, the FOPH deals with issues such as

- Epidemiology and infectious diseases,
- Substance abuse and drug prevention,
- Food safety,
- Noise and radiation protection,
- Assessment and checks on chemicals and toxic products,
- Stem cell research and bioterrorism, and health and accident insurance.

PROFILE

Federal Office of Public Health (FOPH)

The Federal Office of Public Health (FOPH) is part of the Federal Department of Home Affairs. As the national authority in health matters, the FOPH represents Switzerland in international organisations and in dealings with other countries. Within Switzerland it is responsible - together with the cantons - for public health and the development of national health policy.

This includes the management and development of the social healthcare and accident insurance system. The FOPH specifies which services are paid for by compulsory health insurance and supervises the social healthcare and accident insurance funds.

The FOPH issues legal directives on consumer protection (particularly in relation to food, chemicals, therapeutic products, cosmetics and utility goods) and supervises their implementation.

The FOPH is responsible for monitoring transmissible diseases and for radiological protection in Switzerland and issues the necessary regulations.

The FOPH is responsible for national programmes designed to reduce substance dependence (tobacco, alcohol, illegal drugs) and promote healthy lifestyles (nutrition and exercise, health and the environment) and for the national HIV/AIDS programme.

It is also responsible for issuing the regulations governing the basic and advanced training of doctors, dentists, pharmacists and veterinary surgeons and awards the corresponding Swiss degrees.

Finally, the FOPH is responsible for legislation on biological safety, research on humans (including stem cell research) and transplantation medicine, and for supervising these fields.

The FOPH employs around 500 people. It has an annual budget of CHF 129 million and administers CHF 1.85 billion reserved for premium reductions in the compulsory health insurance system.

Switzerland and the EU

Switzerland and the EU have signalled a mutual interest in intensified and institutionalised cooperation in the area of public health. The priorities are the fight against communicable diseases, general health concerns, food safety and production security in general. Of interest in this regard are Swiss participation at both the relevant EU agencies the European Centre for Disease Prevention and Control (ECDC) and the European Food Safety Authority (EFSA). Additional issues are Switzerland's accession to three rapid and early warning systems and participation in the EU health care programme for 2008 - 2013 (HP).

THE SWISS APPROACH TO MEDICAL IMAGING

How We Do It

Professor Thomas Roeren is Chairman of the Department of Radiology at the Kantonsspital Aarau, Switzerland, and Professor of Radiology at the Medical School of Heidelberg University in Germany. He completed his radiology training in Freiburg, Philadelphia and San Antonio, before he became Assistant and later Associate Professor at Heidelberg University. Professor Roeren has conducted experimental and clinical research and studies specialising in interventional and abdominal radiology. He is currently Past-President of the Swiss Society of Radiology and Fellow of several radiological societies. He has a special interest in the clinical training of radiology residents and fellows and in the development of integrated multidisciplinary solutions to clinical problems.

Please tell us about the origins and activities of the Swiss Society of Radiology

The Swiss Society of Medical Radiology was founded in 1913 to promote radiology in all areas of medicine including experimental and clinical research. Until the year 2000 the society united all imaging specialists. Following a revision of postgraduate education, three societies were the formed - besides the Swiss Society of Radiology (SSR) the Swiss Society of Radiation Oncology and the Swiss Society of Nuclear Medicine are now in existence.

Where do you work, and what is it like?

I work at the Kantonsspital Aarau, one of the three largest non-university hospitals in Switzerland. The hospital has 600 beds, is a tertiary care and trauma centre and runs a large outpatient clinic. The department of radiology performs around 105,000 diagnostic and over 3,000 interventional procedures per year. We have 14 staff positions and 12 residents, as well as 45 technicians and 12 support personnel. We have specialist teams in neuroradiology, interventional radiology, paediatric radiology and breast imaging.

What is the education system for radiologists in Switzerland like?

The current curriculum requires one clinical year and five years of radiology in accredited residency programmes to be board eligible for radiology. The national requirements and the international standards will require us to reduce the years of postgraduate education to a maximum of five years. By approximately 2010, the clinical year will no longer be obligatory.

To be accredited, our residency programmes need to present a rather elaborate curriculum for all stages of the residency. This curriculum is regularly updated. Since 2007 all accredited programmes have regular external audits based on these curricula. In between these audits, questionnaires are sent to all residents on an annual basis to rate their programmes according to the requirements. The results are made public and are used to improve the programmes and to increase competition.

"Switzerland has the highest share of foreigners/migrants in Europe, which meanwhile has risen to >20% of the total population"

Our board exam in radiology is taken in two parts: the first exam, covering the knowledge of the anatomical, technical, biological, pharmacological, medicolegal, ethical and economic subjects pertinent to radiology is a written exam that residents usually take during their second or third year. The second exam, a two-day round-up of written and oral exams as well as individual pre-

Author
Prof. Dr. Thomas Roeren

Chefarzt
Institut für Radiologie
Kantonsspital Aarau AG
Aarau, Switzerland
thomas.roeren@ksa.ch

sentations is taken during or after the last year of residency. During these exams the candidates have to prove sufficient knowledge in all subspecialities of radiology.

Our postgraduate education programme ensures a high quality and competence. The Swiss board certification in radiology is a definite requirement for all staff radiologists employed in our department.

Is continuing medical education very important in Swiss radiology?

It definitely is. All board certified physicians need to collect at least 50 hours/CME credits per year. If a physician is not able to prove this, the Department of Interior can revoke their medical licence.

Does working in a multilingual country pose problems for radiologists? E.g., are imaging IT systems configured appropriately, can students take exams in different languages, etc?

Of course we will have occasional language barriers – not everybody can and will be multilingual - and professionals changing their employer may have to learn (or learn better to use) another of our three major languages. But in this respect we are probably just a little bit ahead of the rest of Europe's medical community, where mobility to other countries and languages becomes more common. Our exams can be taken in German and French. The configuration of IT systems is usually not a problem, because Germany, France and Italy are large markets and these language configurations are usually readily available.

How closely does Switzerland converge with Europe in standards and guidelines?

To my knowledge the Swiss guidelines are adapted mostly from EU guidelines.

Is interventional radiology well known in Switzerland?

A large number of interventional radiological procedures are performed in Switzerland each year. IR is not yet an official subspecialty, but we have a Swiss Society of Cardiovascular and Interventional Radiology working on a subspecialty programme. Interventional radiologists in Switzerland face problems similar to those of their European colleagues: their speciality is not known and promoted well enough and they need a lot of energy and stamina to gain direct patient access. Traditionally radiologists have worked as consultants and we cannot expect that the specialists who have unrestricted patient access will gladly share with us. Patient information about minimally invasive radiological procedures is improving, especially through use of the internet but it is far from being adequate.

"Every reorganisation at the medical schools threatens to erase 'radiology' from teaching and dedicated courses"

Are migrant workers common in radiology departments in Switzerland? How can employers be sure of their educational standards?

Switzerland has the highest share of foreigners/migrants in Europe, now greater than 20% of the total population. Due to its rapid growth our health system employs about 30% of non-Swiss nationals. The vast majority come from EU countries, with which educational standards have been homogenised to assure our standard of care. In 2002, Switzerland and the EU agreed to accept their respective educational and professional diplomas, so that since then there are basically no restrictions for EU nationals. If we have applicants from other countries, where the educational standards are not comparable, the applicants have to take and pass the Swiss exams to be eligible for work.

How can more Swiss medical residents be encouraged to enter radiology?

Like in other European countries, radiology is in danger of disappearing as a distinct specialty from the medical student's curriculum. Every reorganisation at the medical schools threatens to erase radiology from teaching and dedicated courses. Without a role model or at least an idea of what radiology can do for a patient and how much impact it can have, the student will not choose this specialty. We have students from various universities and countries, who come for a 1 - 3 month locum, who have

L'imagerie au cœur de la prise en charge des patients

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experienced nothing more about radiology than seeing a chest x-ray but who are fascinated by its pivotal role in modern patient management. It is our obligation to assure that students or at the latest young residents are made aware of the radiologist's clinical impact.

How useful is the European Society of Radiology's exchange programme for radiologists?

We just had one of the first exchange programme trainees with us for a week. He came from the UK and worked with our team for one week. We all judged this exchange of ideas and perceptions as a unique opportunity to achieve a mutual understanding for the differences and commonalities of our postgraduate programmes and clinical training. In the end it is the personal impression and knowledge of each other that will decide whether or not we can plan and form a common European future for our specialty.

What are your three key pieces of advice for other radiology managers?

I am far from being an old (fortunately) or wise (unfortunately) radiologist, but I guess that the following personal experiences may be of benefit to colleagues:

- Your diagnostic or therapeutic procedures must benefit the patient and not just satisfy the referring physician - we are specialists in radiology and therefore independently able to choose and tailor our procedures to the patient's needs.
- Your language must be understood: A radiological description is nice but the translation into the answer to a clinical problem is the essential step.
- Make clinical decisions (i.e. insist on clinical information yourself) and take responsibility. Differential diagnoses must prioritised and recommendations for further procedures given.

Management In Radiology

ESR MIR

European Society of Radiology

MIR annual scientific meeting

Management in Radiology

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- Imaging in the Baltic States
- How to manage low budget imaging
- Managing the public face of imaging
- Making tele-imaging relevant
- Making imaging IT relevant
- Managing imaging equipment

WWW.MIR-ONLINE.ORG

>*Continued from page 33*

If you have no knowledge of any of these things, search for a mentor, who has been successful with the process. Such people can be found through your institutional grants and contracts office, through departmental contacts, through literature searches, or by contacting the programme officers at the relevant institute of the NIH to have them identify candidates for you. Ask your mentor to share insights and, if he/she is willing, actual copies of a successful grant application and its review. Study the application very carefully. Non-US sites must present full budgets, not modular budgets.

How Does the NIH Process Applications?

The process in general, is that the application is submitted electronically through the Grants.gov web site, with a particular FOA (funding opportunity announcement) noted for the submission, it is given a number and referred to a specific review panel for review and to a specific institute for possible funding, it goes through a peer review and receives a score, and the applicant receives a copy of the critiques. If the score is within the funding payline, he/she will be notified to provide information about other grant support and overlap, as well as relevant human subjects and/or animal welfare approvals, and the grant will be funded. The timeline for all of this amounts to six months to a year. If the application is not funded, it may be amended and resubmitted once, using the critiques to guide changes in the application.

The application must conform to all the rules and suggestions in the FOA, whether this be an R01 submitted in response to the parent announcement or a submission to a particular RFA or PA. Typical RFAs have one receipt date and specify the amount of money that might be expected to be granted, which is set aside for the funding. Typical PAs have several to many receipt dates and do not have set-aside funds. The announcements should be read carefully. Programme officials mentioned in the announcement can be contacted by email or telephone for answers to questions and helpful suggestions.

The application is submitted through Grants.gov; to effect this, the submitting institution must be pre-registered with Grants.gov and with the eRA Commons, and the investigator must be registered with the eRA Commons. The electronic registration processes are not difficult but they do take time, so one should not wait until it is time for grant submission to complete this process.

All of this said, the whole process is about to undergo an immense change. The impetus was a desire to simplify and streamline the process and to increase access for younger investigators. The announcements were for enhancing peer review at NIH (http://enhancing-peer-review.nih.gov/), provided for a change in the way applications are reviewed, starting in May 2009, and for limiting an investigator to one original submission and one amended submission. The "New Investigator" policy is being augmented with the "Early Stage Investigator Policy." The final step in the implementation will be a shorter application for most grant mechanisms.

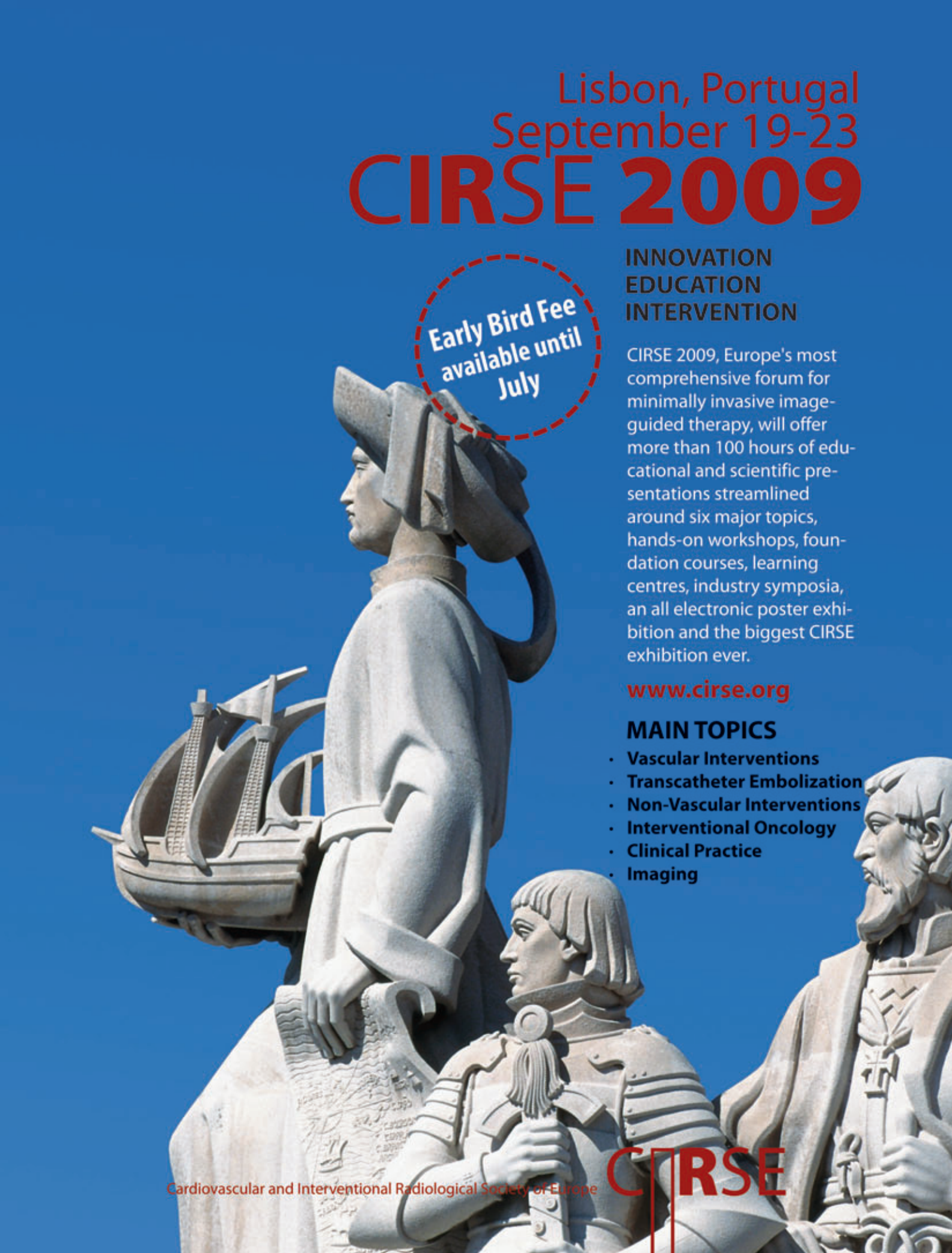
"The electronic registration processes are not difficult but they do take time"

The reader will need to watch the NIH web site to learn what the changes will be and how they will be implemented. It is expected that the R01 research strategy section will be shortened to 12 pages (from the current 25) for applications arriving after January 2010; six more pages will be allowed to describe a clinical trial. A slide set about the whole process can be found at http://enhancing-peer-review.nih.gov/training_communication.html

Please do not hesitate the contact me and the National Cancer Institute Cancer Imaging Programme (http://imaging.cancer.gov) if you have questions that we might be able to help answer.

Further Resources

(1) Institute descriptions and web addresses: http://www.nih.gov/icd/index.html
(2) CRISP (Computer Retrieval of Information on Scientific Projects): http://crisp.cit.nih.gov/
(3) ClinicalTrials.gov: http://clinicaltrials.gov/
(4) NIH Guide: http://grants.nih.gov/grants/guide/index.html
(5) Mechanism descriptions: http://imaging.cancer.gov/researchfunding/mechanisms
(6) Foreign site budgets: http://grants.nih.gov/grants/guide/notice-files/NOT-OD-06-096.html
(7) Grants to Foreign Institutions, etc: http://grants.nih.gov/grants/policy/nihgps_2003/NIHGPS_Part12.htm
(8) Grants.gov: http://grants.gov/
(9) eRA Commons (Electronic Research Administration Commons): https://commons.era.nih.gov/commons/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Article texts must contain:

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The format for listing references in submitted articles should follow the Harvard reference system. Example of standard journal reference: Sydow Campbell, K. (1999) "Collecting information; qualitative research methods for solving workplace problems", Technical communication, 46 (4) 532-544. Readers will be provided with an e-mail contact for references, which will be kept on file and supplied on request. Authors are responsible for the accuracy of the references they cite.

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In order to qualify please fill in the questions below:

Medical Doctors (respond below)

1. What is your occupation? (check only one)
   - ❑ Diagnostic Radiologist
   - ❑ Other Physician (please specify)

1a. I am Chief of my Department
   - ❑ Yes
   - ❑ No

1b. What is your radiology sub-specialty? (check only one)
   - ❑ General Radiology
   - ❑ Neuroradiology
   - ❑ Nuclear Medicine
   - ❑ Vascular & Interventional
   - ❑ Nuclear Radiology
   - ❑ Cardiovascular Diseases
   - ❑ Paediatric Radiology
   - ❑ Other (please specify)

Non-physician professionals (respond below)

1c. What is your occupation? (check only one)

Administrator/Manager:
- ❑ Radiology Administrator
- ❑ Radiology Business Manager
- ❑ PACS Administrator

Executive
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- ❑ Chairman / Managing Director / Executive Director
- ❑ Chief Financial Officer / other executive titles

Other
- ❑ Medical Physicist
- ❑ Academic
- ❑ Chief Technologist / Senior Radiographer
- ❑ Manufacturer
- ❑ Business Consultant
- ❑ Distributor / Dealer

All respondents reply to the questions below

2. In what type of facility do you work? (check only one)
   - ❑ Private clinic
   - ❑ Hospital (check number of beds)
   - ❑ More than 500 beds
   - ❑ 400-499 beds
   - ❑ 300-399 beds

3. With what technologies or disciplines do you work? (check all that apply)
   - ❑ Diagnostic X-ray
   - ❑ Nuclear Imaging
   - ❑ Interventional Radiology
   - ❑ CT
   - ❑ Ultrasound
   - ❑ MRI
   - ❑ Mammography
   - ❑ Bone Densitometry
   - ❑ PACS/Teleradiology
   - ❑ Cardiac Imaging
   - ❑ PET
   - ❑ Echography
   - ❑ Angio/Fluoroscopy

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AGENDA

Key Seminars & Conferences

June 2009

15-19 **ERASMUS COURSE Central Nervous System I**
Amsterdam, Netherlands
www.emricourse.org

23 – 26 **ESGAR 20th Annual Meeting and Postgraduate Course**
Valencia, Spain
www.esgar.org

23 – 27 **CARS 2009 Computer Assisted Radiology and Surgery 23rd International Congress and Exhibition**
Berlin, Germany
www.cars-int.org

July 2009

16-18 **International Symposium on State-of-the-Art Imaging**
Taormina, Italy
radiologycme.stanford.edu/dest

27-30 **3rd Annual LAVA (Latest Advances in Inteventional Techniques)**
Maui, US
radiologycme.stanford.edu/dest

August 2009

3-8 **NYU Radiology in Banff**
Banff, Canada
www.med.nyu.edu/courses/cme/banff09

28-2 **ERASMUS COURSE Central Nervous System II**
Antwerp, Belgium
www.emricourse.org

30-3 **WFUMB 2009 Sydney Ultrasound World Congress**
Sydney, Australia
www.asum.com.au
www.wfumb2009.com

September 2009

17-19 **11th ESGAR CT-Colonography Hands-on Workshop**
Stresa, Italy
www.esgar.org

19-23 **CIRSE 2009**
Lisbon, Portugal
www.cirse.org

24-26 **5th International Congress on MR-Mammography**
Jena, Germany
www.med.uni-jena.de/idir/mrm2006/

October 2009

1-3 **ESMRMB Congress 2009**
Antalya, Turkey
www.esmrmb.org

5-9 **ERASMUS COURSE Musculoskeletal II**
Bratislava, Slovakia
www.emricourse.org

8-9 **ERASMUS COURSE Cardiovascular MRI**
Leiden, Netherlands
www.emricourse.org

12-14 **19th Annual Current Concepts of Magnetic Resonance Imaging**
Monterey, US
radiologycme.stanford.edu/dest/

14-17 **ULTRASCHALL 2009- 33. Dreilandertreffen der OGUM, DEGUM, SGUM**
Salzburg, Austria

21- 24 **Breast Imaging Cairo**
Cairo, Egypt
www.eswih.org

22-24 **8th Annual Symposium on Advances in Breast MRI**
Las Vegas, US
radiologycme.stanford.edu/dest/

23-24 **ESOR GALEN Advanced Course on Women's Cross-sectional Imaging**
London, UK
www.myESR.org/esor

29-30 **IT @ Networking Awards 2009**
Brussels, Belgium
www.hitm.eu

November 2009

2-6 **ERASMUS COURSE Basic MRI Physics**
Madrid, Spain
www.emricourse.org

12-13 **ESOR GALEN Foundation Course on Paediatric Radiology**
Athens, Greece
www.myESR.org/esor

29-04 **RSNA 2009**
Chicago, US
www.rsna.org

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- *The Changing Landscape for Radiologists: Ten Years of Transformation*
- *How to Build an Efficient Imaging Network Among Hospitals*
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