

# IMAGING

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# The Value of Radiology

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- Health Technology Appraisal and Radiology
- How to Maximise the Use of Ultrasound in the Radiology Department
- Trick or treatment
- Getting Ahead by Getting Along: Managing Challenging Conversations
- RSNA 2012 Review



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# The Value of Radiology

Dear readers,

For this last issue of 2012, we feature a number of thought provoking pieces for radiologists and radiology managers.

Dr. E. Jane Adam, who chairs one of the Technology Appraisal Committees of the UK's National Institute for Health and Clinical Excellence explains the place of health technology assessment in demonstrating the value of radiology. Dr. Adam argues that in a time of limited budgets in healthcare radiologists need to openly question and challenge the effectiveness and value for money of clinical pathways and see if they themselves should be changed, which is where health technology assessment comes in.

Ultrasound is a commonly used technology, but how can you maximise its use in the radiology department? Dr. Sana Pascaline has talked to a number of hospital managers and radiologist colleagues about this issue and presents her views on some of the advantages and downsides of different ways of working.


Next, Prof. Clemens Decristoforo of the European Association of Nuclear Medicine Radiopharmacy Committee writes about the issue of availability of radiopharmaceuticals across Europe. Prof. Decristoforo argues the case for specific European guidelines that harmonise and support the small-scale, local preparation and use of radiopharmaceuticals to ensure best treatment for patients.

To round off the issue we review the 98th Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA). Patients First and the visibility of radiologists were major themes this year. We include a selection of presentations from this stimulating event, as well as some of the industry highlights.

Our regular features are also included – upcoming radiology congresses and news from our partner associations, including CIRSE, MIR, COCIR and IHE.

As always, I welcome your views on any of the topics covered in this issue, or indeed ideas for future articles. You can contact me at [im-ed@healthmanagement.org](mailto:im-ed@healthmanagement.org)

Sincerely,

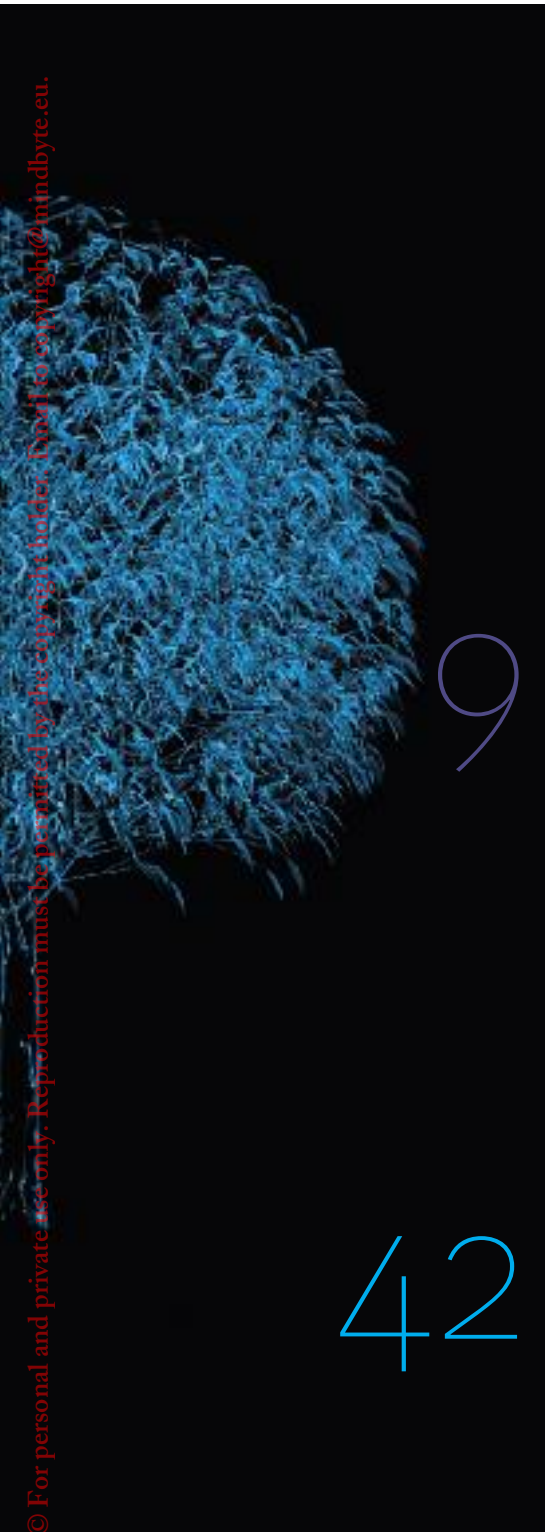



Prof. Lluís Donoso Bach

Editor-in-Chief  
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## The Value of Radiology

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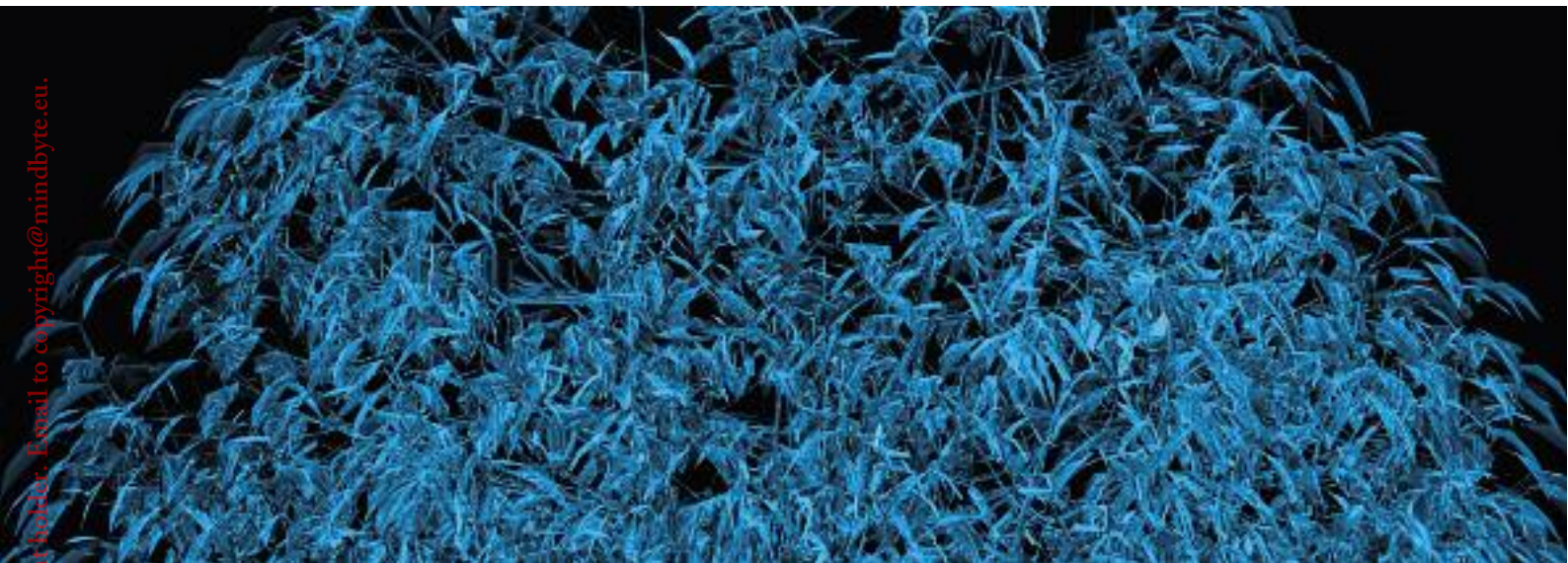
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## ASSOCIATION NEWS

## MIR@ECR



Management in Radiology (MIR) will once again present a half day symposium at Europe's leading medical imaging conference, the European Congress of Radiology in Vienna in March.

The MIR symposium on Saturday 9 March 2013 is vital for the radiologist interested in leadership and management.

The 2013 symposium will cover innovation management, leadership, the future of radiology and radiology in modern times.

## Draft Programme

13:00 - 14:45 Innovation Management and the Future of Radiology and Radiologists (Chairs: Y. Menu, P. Mildenerger)

- Welcome by the chairs
- Imaging innovation and the future practice of radiology (B. Hillman)
- Resident Training - Preparing the young radiologists for the future (B. Ertl-Wagner)
- Research, EIBIR, HTA (L. Donoso)
- Health technology assessment, can we show that radiology is value for money? (J. Adam)
- Leadership and personal development (Y. Menu)
- New imaging methods (M. Graif)
- Radiology 2020 - resident and fellow's perspective (M. Edjlali-Goujon)
- Debate on innovation management and requirements to radiology

14:45 - 15:15 Coffee Break

15:15 - 17:30 Radiology in Modern Times - Challenges by Telemedicine, eHealth, Appropriateness and Safety (G. Frija, J. Schillebeeckx)

- The radiologist's perspective - report on the development of an ESR White

Paper for Teleradiology (E. Ranschaert)

- The requirements of citizens and the role of patients using Telemedicine (tba)
- Imaging referral guidelines in Europe: impetus, innovations and initiatives (D. Remedios)
- Factors affecting safety of patients: workload, reporting speed, etc. (R. FitzGerald)
- Evidence based radiology - the math of decision in radiology (U. Senol)
- Discussion and closing remarks

## Save the Dates

## MIR Annual Meeting

October 10-11, 2013

Barcelona, Spain

## Junior Course on Management

October 9, 2013

Barcelona, Spain

More information and registration details are on the MIR website: [www.mir-online.org](http://www.mir-online.org)

## CIRSE 2013



Abstract submissions for CIRSE 2013 close on 15 February 2013. CIRSE 2013 will be held September 14-18 in Barcelona, Spain.

CIRSE 2013, Europe's most comprehensive forum for minimally invasive image-guided therapy, will offer more than 250 hours of educational and scientific presentations, including hands-on workshops, foundation courses, learning centres, industry symposia, an all-electronic poster exhibition and the largest CIRSE exhibition ever.

## CIRSE 2013 Main Topics

- Vascular Interventions
- Transcatheter Embolisation

- Non-Vascular Interventions
- Interventional Oncology
- Neurointerventions
- IR Management

Further updates are available on the society's website: [www.cirse.org](http://www.cirse.org)

## ECIO 2013



The fourth European Conference on Interventional Oncology takes place in Budapest, Hungary, June 19-22, 2013.

ECIO Congress will now be an annual event, to reflect the rapid rate of progress in the field. ECIO 2013 will include double the number of hands-on workshops, for which pre-registration is recommended.

A highly productive feature of ECIO has been the "Bring Your Referring Physician" education grant programme, which has encouraged attending interventional radiologists to invite clinical colleagues from other departments to attend the conference free of charge.

This allows the guest colleagues to familiarise themselves with what interventional oncology can offer their patients, and how different treatment modalities can be best combined for maximum efficacy. It also gives colleagues the opportunity to strengthen their working relationships and discuss collaboration away from the busy hospital environment.

So far, the programme has attracted clinicians from departments as diverse as surgery, medical oncology, hepatology, radiation oncology, nephrology and gastroenterology, and CIRSE is looking forward to welcoming more specialists again in June.

The 2013 meeting will also feature some new formats and sessions, including a series of Multi-disciplinary Tumour Boards: one on lung and kidney cancers, the other addressing hepatocellular carcinoma (HCC) and hepatic metastases. The ever-popular ECIO meets... Sessions will again take place, this year with the additional participation of the European Society for Radiotherapy and Oncology. The ECIO meets ESTRO session will be entitled "Professional issues in cancer care", and collaboration with ECIO's longstanding partners the International Liver Cancer Association (ILCA) and the World Conference on Interventional Oncology (WCIO) will also continue.

For more information, please refer to [www.ecio.org](http://www.ecio.org).

### GEST EUROPE 2013

The Global Embolization Symposium and Tech-



nologies Europe conference will be held May 1-4 in Prague, Czech Republic.

Embolotherapy, performed by interventional radiologists, occupies a central and unique role in patient care. Among the many conditions treated with embolization are uterine fibroids, vascular malformations, blunt and penetrating trauma, and gastrointestinal haemorrhage. The indications for embolic therapies have expanded over the last decade and this trend will continue into the future. Interventional oncology, an area where embolization of hepatic tumours has been paramount for two decades, has witnessed dramatic advances with the introduction of drug-eluting embolics and radioembolization.

For more information, please refer to [www.gest2013.eu](http://www.gest2013.eu)

### CONNECTATHON 2013



The annual European testing event for healthcare IT interoperability, known as the IHE Connectathon, will be held in Istanbul, Turkey from April 15 to 19, at the Halic Congress Center.

Connectathon 2013 will bring healthcare interoperability to the edge of Europe with the ambition to reach further, attracting new participants from the Middle East, as suggested by this year's theme "Connect where the continents meet."

This intensive five day 'connectivity marathon' will draw together companies implementing specifications developed by Integrating the Healthcare Enterprise (IHE), providing an opportunity to test their applications with systems from other vendors. The 2012 IHE-Europe Connectathon in Bern, Switzerland had a record attendance of 520 participants and 85 companies for 2,800 interoperability tests among 120 medical information systems. Organised by IHE-Turkey and IHE-Europe, Connectathon 2013 will be jointly sponsored by the Turkish Medical Informatics Association, the Turkish Society of Radiology, and the Association for Medical Imaging Diagnosis and Treatment Technologies.

"As one of the newest, yet most active members of our association, we can count on our colleagues at IHE-Turkey creating a rich and rewarding event for everyone with a stake in the seamless exchange of patient information," said Lapo Bertini, IHE-Europe vendor co-chair.

Haluk Celikel, vendor co-chair of IHE-Turkey, said, "Hosting the European Connectathon is both an honour and a tremendous opportunity for advancing interoperability in our country as well as demonstrating its benefits to the world."

IHE-Turkey successfully launched Connectathon 2013 for a national audience on 20 September 2012 in Ankara during a "Share the Experience" meeting with the Ministry of Health, vendors and users participating.

Turkish companies shared their experiences from earlier IHE-Europe Connectathons and the local committee presented its plans for Connectathon 2013.

The results of the Connectathons are published on the IHE-Europe website and participating vendors may refer to the IHE Integration Statements to show compliance of their products with IHE Integration Profiles. This is a clear benefit to vendors when responding to Request for Proposals from users.

The major goal of the Connectathon is to promote the adoption in commercially available healthcare IT systems of the standards-based interoperability solutions defined by IHE. The Connectathon serves as an industry-wide testing event where participants can test their implementations with those of other vendors.

For more information please visit [www.cat2013.org](http://www.cat2013.org)

### 2013 CARS CONGRESS



The Computer Assisted Radiology and Surgery (CARS) congress is the yearly event for scientists, engineers and physicians to present and discuss the key innovations that shape modern medicine on a worldwide basis.

The 27th International Congress and Exhibition on Computer Assisted Radiology Congress Organizing Committee will be held in Heidelberg, Germany from 26 - 29 June 2013. This remarkable event will feature scientific and medical presentations as well as stimulating discussions to foster new visions on the future of medicine.

At CARS you will have the opportunity to meet scholars and practising experts in the fields of radiology, surgery, engineering, informatics and healthcare management who have

an interest in topics, such as:

- Image- and model-guided interventions;
- Advanced medical imaging;
- Image processing and visualisation;
- Computer aided diagnosis;
- Medical simulation and e-learning;
- Surgical navigation and robotics;
- Model-guided medicine, and
- Personalised medicine
- Computer aided surgery
- Maxillofacial imaging

For CARS 2013 in Heidelberg, seven major organisations have decided to hold their annual conferences again integrated into one large international event:

- 27th International Congress and Exhibition on Computer Assisted Radiology
- 17th Annual Conference of the International Society for Computer Aided Surgery
- 15th International Workshop on Computer-Aided Diagnosis
- 19th Computed Maxillofacial Imaging Congress
- 31st International EuroPACS Meeting
- 14th International Federation for Computer Assisted Radiology and Surgery (IFCARS) / SPIE: the international society for optics and photonics/ EuroPACS / IEEE International Symposium on Circuits and Systems (ISCAS) Joint Workshop on Surgical PACS and the Digital Operating Room
- 5th European Association for Predictive, Preventive and Personalised Medicine (EPMA) / IFCARS Workshop on Personalized Medicine and ICT

By focusing attention on radiology, surgery, engineering and informatics, these conferences complement one another to ascertain that all aspects of digital medical imaging, computer assisted diagnosis and therapy, surgical robotics and instrumentation, PACS / RIS and telemedicine are covered with internationally renowned speakers and attendees from over 40 countries.

For more information please visit [www.cars-int.org](http://www.cars-int.org)

## COCIR WELCOMES EC EHEALTH ACTION PLAN



COCIR, as the voice of the European Radiological, Electromedical and Healthcare IT industry has welcomed the European Commission's new eHealth Action Plan, entitled 'Innovative healthcare for the 21st century' as it provides a comprehensive roadmap for smart and sustainable healthcare in Europe.

COCIR is pleased to note that the four pillars of the eHealth Action Plan - (1) Achieve wider interoperability in eHealth services (2) Support research and innovation and competitiveness in eHealth (3) Facilitate deployment and adoption of eHealth and (4) Promote international cooperation on eHealth at global level - are fully aligned with COCIR's own vision and efforts developed to accelerate the deployment of eHealth.

COCIR and other stakeholders are actively participating in providing eHealth solutions through the European Innovation Partnership and the Active and Healthy Ageing Initiative. EU investment in Research is key particularly in interoperable patient records and for demonstrating best practice in the widespread deployment of telemedicine.

Nicole Denjoy, COCIR Secretary General said, "Our industry has devoted significant efforts over the last years to improve systems interoperability in partnership with user organisations and authorities and to supply the technologies required that will make eHealth a reality. The new eHealth Action Plan takes the right steps in supporting the sustainability of these efforts. The support of the Member States remains crucial to deploy such an EU-wide interoperability framework." Adoption of eHealth by healthcare providers remains a major barrier to realising the full benefits of eHealth. The eHealth industry is working in close cooperation with clinicians to develop solutions based on clinical workflows, but additional efforts need to be developed.

## EUROPACS AT UPCOMING CONGRESSES



Two refresher courses in Computer Applications will be offered at the European Congress of Radiology in Vienna in March 2013:

RC 305: New PACS architecture: decoupling image management from image navigation  
RC 1605: Improving workflow efficiency and quality

### EuroPACS Annual Meeting Programme

The 31st Annual Meeting of EuroPACS will be held at CARS, June 26-29, 2013, Heidelberg, Germany. The draft programme is below.

- Clinical Application of Tablets in Radiology
- Integration / Clinical Application of Image Processing in the PACS Workflow
- Intelligent Infrastructures in Imaging Informatics: New Tools of PACS beyond Radiology (Cardiology, Surgery, Oncology, Radiotherapy, other)
- Structured Reporting: Tools, Initiatives, Management and Medico-legal Implications
- Managing the Cloud in Medical Imaging
- Workstations Monitors and Design
- Application of PACS Tools in the Clinical Practice: Radiation Dose and Contrast Media Monitoring Speech Recognition
- Seamless Information Sharing in Healthcare
- Healthcare Standards (DICOM, HL7, IHE) and Quality Assurance Methods and Tools
- E-Learning Tools
- Teleradiology/Telemedicine
- Electronic Patient Record

For more information please visit [www.europacs.org](http://www.europacs.org)



European Congress of Radiology

# ECR 2013

*Vienna*  
March 7–11

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## PUTTING PATIENTS IN THE DRIVING SEAT

### A Digital Future for Healthcare

The European Commission has unveiled an action plan to address barriers to the full use of digital solutions in Europe's healthcare systems. The goal is to improve healthcare for the benefit of patients, give patients more control of their care and bring down costs. While patients and health professionals are enthusiastically using telehealth solutions and millions of Europeans have downloaded smartphone apps to keep track of their health and well-being, digital healthcare has yet to reap its great potential to improve healthcare and generate efficiency savings.

The action plan attempts to increase the pace of change and improvement in healthcare by:

- Clarifying areas of legal uncertainty;
- Improving interoperability between systems;
- Increasing awareness and skills among patients and healthcare professionals;
- Putting patients at the centre with initiatives related to personal health management and supporting research into personalised medicine;

- Ensuring free legal advice for start-up eHealth businesses.

The Commission also commits to issue a mHealth (Mobile Health) Green Paper by 2014 addressing quality and transparency issues.

An accompanying Staff Working Paper gives a legal overview of how current EU legislation applies to cross border telemedicine (services such as teleradiology, teleconsultation or telemonitoring). Currently, telemedicine falls within the scope of several legal instruments. The paper clarifies the issues a healthcare practitioner faces in delivering cross-border telemedicine, for example:

- Do they need to be licensed/registered in the Member State of the patient?
- How should health data be processed? Will a given service be reimbursable?
- What is the liability regime applicable in case of legal action?

Neelie Kroes, Commission Vice President for the Digital Agenda, said: "Europe's healthcare systems aren't yet broken, but the cracks are beginning to show. It's time

to give this 20th Century model a health check. The new European eHealth Action Plan sets out how we can bring digital benefits to healthcare, and lift the barriers to smarter, safer, patient-centred health services."

Tonio Borg, Commissioner for Health and Consumer Policy, said: "eHealth solutions can deliver high quality, patient-centric, healthcare to our citizens. eHealth brings healthcare closer to people and improves health systems' efficiency. Today's Action Plan will help turn the eHealth potential into better care for our citizens. The eHealth Network under the Cross-Border Healthcare Directive channels our joint commitment to find interoperable solutions at EU level."

Members of the new eHealth Network, established by the Cross-border Healthcare Directive will help implement the Action Plan and provide a direct link to the national healthcare authorities and government departments.

For more information on the action plan, please visit: <http://ec.europa.eu/digital-agenda/en/european-ehealth-policy> ■

## PORTABLE X-RAY SOURCE COULD PUT MEDICAL DIAGNOSIS IN THE PALM OF THE HAND

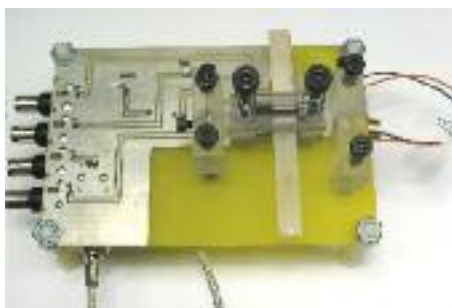


Photo credit: Peter Norgard, University of Missouri

A University of Missouri (MU) engineering team has invented a compact source of X-rays and other forms of radiation. The radiation source, which is the size of a stick of chewing gum, could be used to create inexpensive and portable X-ray scanners for use by doctors, as well as to fight terrorism and aid exploration on this planet and others.

"Currently, X-ray machines are huge and require tremendous amounts of electricity," said Scott Kovaleski, associate professor of electrical and com-

puter engineering at MU. "In approximately three years, we could have a prototype hand-held X-ray scanner using our invention. The cell-phone-sized device could improve medical services in remote and impoverished regions and reduce health care expenses everywhere."

Kovaleski suggested other uses for the device. In dentists' offices, the tiny X-ray generators could be used to take images from the inside of the mouth shooting the rays outward, reducing radiation exposure to the rest of the patients' heads. At ports and border crossings, portable scanners could search cargoes for contraband, which would both reduce costs and improve security. Interplanetary probes, like the Curiosity rover, could be equipped with the compact sensors, which otherwise would require too much energy.

The accelerator developed by Kovaleski's team could be used to create other forms of radiation in addition to X-rays. For example, the invention could replace the radioactive materials, called radioisotopes, used in drilling for oil as well as other industrial and

scientific operations. Kovaleski's invention could replace radioisotopes with a safer source of radiation that could be turned off in case of emergency.

"Our device is perfectly harmless until energised, and even then it causes relatively low exposures to radiation," said Kovaleski. "We have never really had the ability to design devices around a radioisotope with an on-off switch. The potential for innovation is very exciting."

The device uses a crystal to produce more than 100,000 volts of electricity from only 10 volts of electrical input with low power consumption. Having such a low need for power could allow the crystal to be fueled by batteries. The crystal, made from a material called lithium niobate, uses the piezoelectric effect to amplify the input voltage. Piezoelectricity is the phenomenon whereby certain materials produce an electric charge when the material is under stress.

Kovaleski's team published "Investigation of the Piezoelectric Effect as a Means to Generate X-Rays" in the journal IEEE Transaction on Plasma Science. ■

# HEALTH TECHNOLOGY APPRAISAL AND RADIOLOGY

Radiologists have become experts in evidence-based medicine. Both they and their clinical colleagues who refer patients for diagnostic tests wish to do their best for patients: to provide them with the diagnostic test or tests perceived or proven to have a high sensitivity and specificity for a particular diagnosis, and to proceed with a treatment plan based on as certain a diagnosis as possible.

Information on diagnostic accuracy is available from the published literature, or from synopses and syntheses of the evidence by organisations such as the Cochrane Library. Similarly, for interventional procedures, no longer is it enough for an individual doctor to decide on a patient's behalf what the most appropriate procedure is. This should now be evidence-based, often decided by a group, such as a multidisciplinary team, with treatment results locally audited and outcomes compared with those from elsewhere.

But is this enough? With the spectre of uncontrolled healthcare inflation, can decisions still just be made on the basis of the maximum certainty of a particular diagnosis, however many tests are done to confirm the original impression? Is a test with a much higher cost but marginally higher accuracy justified? As radiologists, our aim is to do the best for patients. But if the health budget is fixed, or even declining, more resources spent on the patient in front of you means fewer resources for others you cannot see, so called 'opportunity costs'. In other words, the opportunity to use those resources elsewhere is lost.

## Lean Processes

Looking at the efficiency of delivery of services and the development of 'lean' streamlined processes, as pioneered in the automotive industry is the next step, so that we can provide existing services and clinically driven pathways at lower cost. However, this enshrines and reinforces the existing diagnostic pathway and methods of treatment. It does not question the validity of the pathway, it just makes the current approach and processes more efficient and thereby more cost-effective.

To make a real change, the next step is to openly question and challenge the effectiveness and value for money of those clinical pathways and see if they themselves should be changed. This is where health technology assessment comes in.

## Health Technology Assessment

Health technology assessment (HTA) is designed to answer four questions:

1. Does the technology (drug, device, medical investigation, medical and surgical procedure) work, and how well?

2. Who will benefit?
3. What is the cost?
4. How does it compare with alternatives?

With the answers to these fundamental questions, it should be possible to use medical resources to get maximum population health benefit from the money spent.

The premise is that expensive tests or treatments must be able to justify their additional cost compared with cheaper alternatives by showing proven better outcomes for patients. If the extra health gain is small, but the additional cost high, the money would be better spent, and potentially buy more 'health' for the population if spent elsewhere.

These calculations are not easy however. Health technology assessment is a rapidly evolving field with more and more sophisticated mathematical modelling being used. It also relies on accurate published evidence of the effectiveness of the investigation or treatment in order to calculate its cost-effectiveness.

## HTA in Radiology

In some cases, HTA can be directly used in radiology. One, albeit highly disputed, area is in screening for disease. Breast screening for cancer is routinely carried out in many countries. The cost of the programme and the benefit in terms of additional lives saved can be calculated and compared with no screening.

Of course there will be variation of opinion and the literature on the number of lives saved, and arguments about the additional financial and personal cost of over-investigating or over-treating those who might never die of the disease. Nevertheless, an informed calculation of the cost/benefit can be made to justify starting or continuing a screening programme.

Interventional radiological procedures can be evaluated in the same way. It is surprising that not more has been done in this field, as it is highly likely that many interventional procedures are cost-effective and should probably largely replace conventional surgical treatment. One example which has been looked at is fibroid embolisation compared with hysterectomy.

Both the examples given above look at direct health benefit. But it is not quite as simple as that. Lives saved can be counted, but if only those over 90 were saved, then the number of years of life saved would be less than if the average age of diagnosis was 50.



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In the hysterectomy vs. embolisation example, the cost-effectiveness has to be evaluated in the light of the precise health benefit. If that is pain and bleeding avoided, those symptoms should be quantified and assigned a value pre- and post-treatment. Were hysterectomy to provide better symptom control, then it would have to be decided whether it was better enough to be worth the additional cost compared with embolisation. However, if the health benefits were the same or greater with embolisation, then embolisation would be the more cost-effective option. Thus cost-effectiveness depends on what you are trying to achieve in terms of health gain and the monetary cost of that gain.

As the cost of healthcare increases more focus is likely to be placed on the 'value' of diagnostic tests. Sooner or later radiology will be required to demonstrate its direct benefit to patients and to justify the costs

## HTA and Diagnostic Radiology

Diagnostic radiology is at least one step removed from any patient outcome that can be directly measured, and consequently it is a great challenge to calculate any QALY or health gain directly attributable to an individual diagnostic test. Surrogate measures of benefit to patients can however be measured more easily. For example, it is possible to calculate the accuracy and cost of using a technique to make a particular diagnosis. In order to do this, very robust research data is needed, and unlike the gold standard of randomised controlled trials required for the development and licensing of a new drug, radiology research relies on less stringent evidence, usually from observational data or trials, which will be of variable quality.

Critical appraisal of all the evidence available, which takes into account the quality of the data, an essential part of the HTA process, can result in a ranking of the diagnostic accuracy of a test, compared with its cost. This can be used to decide whether the more expensive test is 'worth it', namely how much extra needs to be spent per diagnosis made and what are the disadvantages of using the cheaper one? This is different from a radiologist's perspective which will be driven largely by the desire to do the best for the patient, whilst also minimising the doctor's medico-legal risk.

This comes into even sharper focus when it comes to using a second test to check on or confirm a diagnosis suggested by the first. An example would be a first test with 75% accuracy, and a second much more expensive one with 80% accuracy. The first test delivers 75% of the information, but the second delivers only 5% additional information at full cost, and therefore may not be value for money. The question here is how many patients (if any), and which ones, should have the second test?

Equally disconcerting for radiologists, is the question of whether we actually need the expensive machines with all the various high cost options. Would a cheaper machine be perfectly adequate for the patient population and better value for money?

## The Future

The evaluation of new drugs and treatments is the main use of HTA at present, and it is here that the HTA process is best developed and validated. As the cost of healthcare increases, however, more focus is likely to be placed on the 'value' of diagnostic tests. Sooner or later radiology will be required to demonstrate its direct benefit to patients and to justify the costs. This is in part addressed in diagnostic guidelines and referral criteria, but these are currently designed to bring together best evidence of diagnostic accuracy and to reduce unnecessary irradiation, rather than being driven by calculated cost-effectiveness data. The move towards HTA could represent an opportunity for radiology to demonstrate its worth, but it may be a threat to the cautious approach to diagnosis, which has fuelled the rise in diagnostic tests, and is characteristic of modern medical practice. ■

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## Quality Related Life Years

The quality related life year or QALY is an attempt to quantify health gain, in order to fairly compare two different health approaches. All diseases or health states are assigned a utility which is a measure of quality of life or health state which can be between 0 (death) and 1 (perfect health). The therapeutic effect of an intervention on the disease will raise the utility as the patient gets better. The rise in utility multiplied by the number of years it lasts gives the QALY gain.

A treatment which gives a small improvement which lasts many years may give an equal gain in QALY terms to a treatment giving a large benefit which disappears quickly. The whole point of the QALY is to provide a uniform unit of health gain which can be costed. This is increasingly used to decide whether new drugs should be purchased in healthcare systems and made available to patients. The National Institute for Health and Clinical Excellence (NICE) in the UK, for example, rarely approves a drug which costs more than £30,000 per additional QALY gained compared with existing treatment.

# HOW TO MAXIMISE USE OF ULTRASOUND IN THE RADIOLOGY DEPARTMENT

Demand for general ultrasound (US) examinations is increasing by approximately 7.9% per year (Society of Radiographers 2009). Combined with shrinking funds, inadequate resources and waiting list targets this puts a lot of pressure on the radiology departments.

To solve the challenging task of providing timely, quality examinations radiology departments need to work harder and/or smarter. In informal interviews colleagues and radiology managers from different hospitals shared with me solutions that work for them as well as the disadvantages.

## Working Harder

There are a number of ways to provide more examinations. Working hours can be extended by scanning a few extra patients before and after official working hours or providing weekend ultrasound lists. The concept is customer friendly due to ease of parking and no impact on their work. Sometimes patients regard the weekend date as a mistake and turn up on Monday.

A more serious downside of this solution is extra cost for the hospital. A simple estimation for delivering a 7 day service is a 40% increase in staffing, if the existing level of weekday service remains the same (Ultrasound Training Group 2010).

Traditionally hospitals have employed locums to cover gaps and provide extra cover. It is more difficult to persuade stakeholders for this temporary and costly solution under pressure of limited funding.

As well as providing more scanning time, radiology departments can increase productivity by looking at equipment use, referral efficiency, timetabling and the department's workforce.

## Equipment

Providing equipment uniformity in the department results in instant readiness to work in each room for everybody involved. It also ensures more efficient technical support. However, it is not always strategically possible to change all machines in the department at once.

Some inpatient US may be performed on the ward by radiologist or sonographer using portable ultrasound units. In my experience of this patients loved the comfort while

clinicians appreciated our swift reaction to their requests, all done on the same day. Following an audit we decided that only straightforward indications (such as pleural effusion, gallstones, renal stones or renal obstruction) could be included on the mobile list.

The advantages of mobile US are flexibility and a reduced number of patients on the list. Using portable US clashes with the equipment uniformity suggestion, but if you have it use it to full capacity if you have enough staff or skilled radiology registrars. The downsides of using mobile US are too much light in the wards, back pain for the operator and lower diagnostic value for patients with high BMI.

## Workforce

If you can, delegate wisely. This can be achieved by training more sonographers and by supporting specialists (from the emergency department, intensive care and surgery) in attending certified courses and thus enhancing their professional abilities. This solution may sound ideal, but it carries risks.

Mentoring is time consuming for the radiologist as it slows current clinics with only the prospect of help in the future. It takes approximately three years to train a fully qualified sonographer, and a course of at least one year to enhance specialist skills with US. By this time the sonographer may decide to move on or join an agency. The specialist may stop using a new skill or still formally refer patients for an ultrasound with a radiologist for a double check.

Ultrasound equipment purchased for enhancing other specialists' skills is spread out around the hospital and used only occasionally. Hence US machine use time by non-radiologists might be below any profitable standards.

## Influencing Request Form Flow

Referrals can be made more productive by educating and providing feedback for primary care doctors and hospital physicians about referrals. The downside is that this is time-consuming and very often good advice will be ignored.

Online referral can be used to highlight usefulness of the referral in red (low utility), amber (marginal utility) and green (indicated), in association with appropriateness criteria (as outlined by Professor Charles Kahn in a paper at the



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Management in Radiology 2011 Annual Scientific Meeting). Apart from the obvious downside that not everybody has such sophisticated online programmes, it is also possible that it might encourage referring doctors to modify the truth. Rosenthal's study found that the main reasons for referrers to proceed with tests indicated as having low utility were that it was recommended by a specialist, or that the referring doctor disagreed with the guidelines (Rosenthal et al. 2006).

Authorising referrals and checking against protocols is time consuming for the radiologist. Some departments have performed audits that demonstrated that it brings no benefits and now let all requested US examinations be booked. Other hospitals argue that authorising practice helps to ensure that the patient will have the most appropriate examination with no unnecessary double examinations booked and valuable radiologist/equipment time will be well spent.

**Time**

Session scheduling can also assist productivity. For example, one hospital I worked in made a small revolution by splitting four hour radiological programmed activity sessions into

blocks of two hours and adjusting the weekly work plans. The major commitments of all radiologists are respected, but the fluidity and adaptability of new arrangements ensured no void time at the beginning or end of the session, during lunch or due to colleagues on leave. Certainly such arrangements put extra pressure on this particular radiology manager, but she is happy with how it all worked out.

**Conclusion**

There are a number of ways to maximise the use of ultrasound in a hospital. There is no one solution to fit all, but this article has outlined various factors which radiology managers should consider. A key concern is whether US should be used by other specialists as well as radiologists and whether equipment should be centralised. ■

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# TRICK OR TREATMENT?

Access to powerful drugs for personalised medicine is hampered by EU legislation that is creating a radiopharmaceutical lottery, argues the EANM's Dr Clemens Decristoforo.

Advances in drug developments and new insights into genetics and the diversity of diseases – in particular cancers – have generated a trend towards personalised medicine: using drugs and treatments ideally suited for an individual patient's need. Additionally, the high costs of drug development and of new drug treatments have stimulated both the pharmaceutical industry and regulators to look into ways to select the right drug for the individual patient.

Essential tools in the attempt to personalise medicine are so-called 'imaging biomarkers', which specifically uncover the characteristics of diseased tissues and cells. One of the most successful technologies to utilise imaging biomarkers is Positron Emission Tomography (PET), whereby a radiolabelled compound (radiopharmaceutical) is injected and accumulates in cells based on certain specific properties, such as glucose metabolism, receptor expression, proliferation or oxygen supply. These properties are the basis for detecting diseased tissue, characterising its biological status, and selecting and monitoring treatment on a molecular basis with unprecedented sensitivity.

In recent years, PET has become an important tool both in patient diagnosis and for research in clinical trials. More than 100 different radiopharmaceuticals are used in clinical routine, not only for PET applications, and they are defined as medicinal products in the current European pharmaceutical legislation based on directive 2001/83.

PET radiopharmaceuticals contain a radionuclide with an extremely short half-life, such as fluorine-18 (F-18) with 110 min, C-11 with 20 minutes or Ga-68 with 68 minutes. This requires the radionuclide to be produced in a cyclotron, or so-called radionuclide generator, close to the application site and the patient. The radionuclide is transformed in a subsequent chemical process, incorporated to form the biologically active radiolabelled compound and formulated for administration to the patient. Due to their short shelf life, many of these radiopharmaceuticals are prepared 'in-house' – in the hospital or academic centres where they are used within minutes or hours of preparation. Highly specialised teams of radiopharmacists and chemists provide this service in many centres throughout Europe, and the number of applications is growing rapidly.

## The Effects of a Limited Market

As radiopharmaceuticals are embedded in the European pharmaceutical framework, the standard way of making these

drugs available is via marketing authorisation (MA). This is cost intensive and requires the submission of an extensive drug dossier to regulatory authorities, usually by a commercial manufacturer.

Even though a small number of PET radiopharmaceuticals have gained MA, a great number of established products are used outside the MA track, in particular those prepared at hospitals and academic centres. The number of applications at one production site is often very limited, typically serving only one hospital department, making the high-effort application for MA economically unviable. In some European countries, the application is possible based on a medical prescription for the individual patient (magistral preparation) while others deny this possibility within their national regulation.

The option to apply for a clinical trial application for the preparation and use of radiopharmaceuticals has been hampered by the EU Clinical Trials Directive. In particular, academia has great problems complying with the high efforts to conduct clinical trials. This leads to the current situation in which, in certain countries, patients may have access to certain radiopharmaceuticals, while in other nations they are denied the most recent developments in the field. A typical example of this is the use of peptides labelled with Ga-68 in oncology for imaging special liver and gut tumours. In central Europe (including Germany) PET clinical use of Ga-68-radiopharmaceuticals are widely established, whereas in Western Europe (for example, Spain and France) only a handful of highly specialised units have managed to implement this technique.

## 'Big Pharma' Standards for Small-Scale Preparation

The second challenge to the use of radiopharmaceuticals is the way that these have to be prepared. Pharmaceutical manufacturing is standardised by Good Manufacturing Practices (GMP), which are defined in the European EU-DRALEX. These standards are driven by the pharmaceutical industry with high production capacities and highly centralised, large-scale production sites.

Recent years have seen an ever-increasing pressure to comply with GMP standards, even in the small-scale production of radiopharmaceuticals. Hospitals and university centres have spent millions of euros installing dedicat-



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ed cleanrooms with the adequate radiation protection required for the handling of radioactive drugs.

Moreover, an ever greater number of highly specialised staff is required to prepare a decreasing number of products to comply with GMP requirements on documentation, monitoring processes and quality management. The implementation of GMP varies throughout Europe, depending not only on the particular national exemptions, but also on different ways of interpreting such a high specialisation by the pharmaceutical inspectors.

Despite the use of radioactivity, radiopharmaceuticals are very safe drugs. They normally contain only a microdose of the compound, usually in the range of micrograms or less, and adverse reactions are extremely rare. Additionally, they are used typically only once in a patient's lifetime and under highly controlled conditions within a clinical department.

Notwithstanding the importance of GMP regulations to ensure adequate safety and the quality and potency of medicinal products, it also has to be considered that their current application to the non-commercial production of radiopharmaceuticals, mainly for in-house use, is imposing excessive hurdles on the everyday work of thousands of nu-

clear medicine practitioners across Europe. Furthermore, exercising a legislation framework designed for the industrial production and marketing of non-radioactive medicinal products over the whole radiopharmaceutical community is creating great difficulties for the development and research of the new products that patients are demanding.

### Towards Common Standards

The current mandates of European and national legislation have led to the situation where the availability of radiopharmaceuticals and applied standards show an extreme variability throughout Europe. This is in striking contrast to the U.S., where the Food and Drug Administration guides both the commercial and small-scale preparation of radiopharmaceuticals. Specific European guidelines that harmonise and support the small-scale, local preparation and use of radiopharmaceuticals, together with a better understanding of this special field by regulatory bodies, would help to bring novel radiopharmaceuticals to the patients that need specific diagnosis and have the right for personalised medicines for optimal treatment. ■

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Pour les membres de la Société Française de Radiologie, le journal fait partie des avantages liés à leur adhésion.



# GETTING AHEAD BY GETTING ALONG

## Managing Challenging Conversations in the Radiology Department

Many guides to effective leadership in radiology and other disciplines in medicine concentrate on structure. How the department should be organised and how authority should be delegated are frequently addressed. Other advice dispensers rightly focus on the formation and implementation of the realisation of your mission. Their purpose is to provide helpful suggestions to formulate goals and objectives that derive the most benefit for the department in general as well as to meet the aspirations of faculty, the education of trainees and the care of patients.

These suggestions and directives are often overarching, elevated at a metaphorical height above daily activities. They are unconcerned with the constant daily hubbub happening on the 'ground'. There the chair will be confronted with a continual stream of conversations, some trivial, others more significant and a few others surprisingly crucial even if they are informal and ad hoc in presentation.

But it is just these colloquies in which your mettle as a leader can and will be tested. How to proceed without deflecting from your aims and how to frame these encounters are just as much a part of the job as the planning for and the effectuating of grand strategic initiatives.

### Keeping Control

First, a word of caution. Your effectiveness as chair depends on the maintenance of control. It is established and perpetuated not so much by maintaining an ironclad monopoly on agenda, because in a seemingly casual conversation, the agenda is provided by the supplicant or the critic who beseeches you. But, very soon in any exchange, you must project and protect your ethos or you will lose control and as such your capability to manage the situation will erode.

An example: a faculty member or a resident accosts you with the complaint "I have been placed on duty during the afternoon of the annual picnic held on Monday afternoon. It is unfair!" You could acquiesce and find a weaker person to switch with him. Or you could inform him otherwise, by saying, "It is not unfair - no-one is at fault for your being unable to attend. It is merely unfortunate." No redress is required. "Next time someone else will be assigned". Making clear the unfair-unfortunate dichotomy provides you with a position on the high road. The complainer is then seen as selfish not only by you but also by

him. Next time he will take into account that distinctive disjunction before challenging you because his complaint no longer has moral heft.

### Coping with Exaggeration

Another problem to parry is the use of hyperbole as a persuasive device. You are told, "The situation I have been placed in is a 'disaster'. If you allow that word to define the discussion, you will be manipulated by the exaggeration. It is then incumbent on you to restore the advantage by saying, "Wait a minute, that is not a disaster. Chernobyl and the Northern Japan tsunami and flood were each disasters. Rather, you are telling me about a difficulty not a cataclysm. Let's try to resolve or ameliorate it by placing it in the proper context." It is often amazing how the tenor of the conversation can become less strident when you have set the appropriate terms.

In that regard, one of the underemphasised but requisite capabilities that make a leader successful is his or her skill in metaphor management. In the first presidential campaign of George Bush, the Republican Party framed the economic debate in terms of 'tax relief'. As Steven Pinker in *The Stuff of Thought* has pointed out, the tax then was portrayed as a disease, the relief the cure. The Democrats only responded within the context of Bush's metaphor and thus could not convince the electorate that the purpose of taxes is not always punitive but rather a necessary way to supply services, more often a boon than a bane.

### Receiving Suggestions

As a leader, you must listen not only to complaints but also, at times, to suggestions to improve things. Typically, they are presented as putatively well-reasoned, seemingly reasonable offerings to make things better. Often they are stated as conferring no special advantage to the author of the remarks, even though you know that most of the time hidden somewhere in the proposal, the promoter of the supposed opportunity is not entirely altruistic.

Many of these suggestions are hare-brained or at least unrealistic while a few are truly beneficial if implemented. You know too that very often the unintended consequences



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will be more profound than the realisation of the stated objective. Yet those insidious and frequently counterproductive happenstances will not immediately disclose themselves. What to do?

Should you summarily dismiss the idea and then have to deal with the hurt feelings of the idea's promoter? Should you uncritically accept it, swayed by the power and earnestness of the suggestion or the enthusiasm of the staff member who articulated it? Or should you ponder it for a while?

After that, when you have allowed yourself to think it through somewhat you might follow this protocol of engagement by channelling the dialogue according to a programmatic schedule of tenses.

First, ask him (or her) to recast the idea not in declarative terms, but rather in the subjunctive, "if this, then that", instead of permitting him to declare it without qualification forcing you to accept it or reject it without qualification. With a subjunctively offered proposal, you can perceive and discuss apparent consequences hypothetically.

And those consequences are more likely to emerge when it is no longer a take it or leave it proposition. If the ill effects of the idea become prominent at this stage it is likely that the proposer will go away disappointed, but he will not go away mad.

If on the other hand there seems to be merit in the notion, continue the analysis by now invoking the conditional tense allowing for further consideration without necessarily giving your assent. The dialogue may then be "if this would occur, then that would happen, would it not?" At this stage you can still reject it without fomenting ill feel-

ings. And if you then decide to proceed further, move to a hortatory formulation, such as, "Let us now do the following to test it out." No decision is rendered even at this stage. However, along the way you have respected the enthusiasm of the proposer but you have not yet agreed to embrace the proposal. And by the concern and consideration you have shown you have established a congenial relationship you can then build upon to heighten the esteem by which you wish and need to be held.

Learning to manage conversations is a skill you can acquire by thinking tactically, listening and speaking tactfully and deciding cautiously

### Conclusion

Learning to manage the conversation then is not merely an option. For your success it is an obligation and a skill you can acquire by thinking tactically, listening and speaking tactfully and deciding cautiously. ■

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# RSNA 2012 Review

More than 53,000 delegates descended on Chicago in November for the 98th Radiological Society of North America Annual Meeting 2012. As well as scientific research, the future of radiology was a common theme, with new applications of technology, clinical research and the need for radiologists to become more visible all covered.



## Putting Patients First: Rhetoric or Responsibility?

"Patients first" was the theme for this year's Annual Meeting. RSNA President, George Bissett set the tone in his address, noting that recent developments in US healthcare gave even more compelling reasons for radiologists to demonstrate their patient-centredness. In the United States there are immense changes coming in an increasingly consumer-driven and value-based healthcare environment, Bissett noted. If radiologists are invisible to patients, then they are vulnerable.

Said Bissett, "We have become focused on conveying information to the clinician for diagnostic purposes. We have developed fabulous technical capacities, instantly sending images all over the globe. In all of this it is easy to forget that a human being, with emotions and fears, is attached to the body parts we are studying. Patients have tremendous respect for our technology. However they are frustrated by things that many of us don't have to deal with when we are study-

ing the images - long waiting times, lack of information about procedures.

He urged his audience to walk a mile in their patients' shoes and "step out from behind the curtain and put a face to the radiologist." He himself had spent time in his own facility's waiting room and recommended the audience to do the same, to talk to waiting patients, to look for ways to introduce themselves to patients. Eighty to ninety percent of radiologists never meet their patients, he noted. Other ways to become more visible are to provide information materials or add features to reports to help patients better understand their results.

Bissett strongly argued that the future for radiologists depends on their capacity to develop a new kind of shared ownership of their patients' needs and expectations along with primary care and specialty colleagues. It was time, he said, to stop referring to 'the patients' and instead talk about 'our patients.'

RSNA launched its Radiology Cares campaign at the meeting. The campaign is designed to help radiology professionals be-

come more comfortable interacting directly with their patients, and to help patients become more comfortable with their radiology experiences. Radiologists are invited to take the Radiology Cares pledge. RSNA released a hard-hitting video series to illustrate what might happen if radiology did not become more patient-centred. The tenets of the campaign are that radiology professionals:

- Care for and about our patients.
- Treat every patient as we would a neighbour, friend or family member.
- See the patient behind the image.
- Align radiologic practice to serve our patients' best interest.

In the opening session panel on putting patients first, two lung cancer survivors, Sheila Ross, an advocate for the Lung Cancer Alliance and Dr. Karen Arscott spoke eloquently of their experiences with radiology. Both made the point that they never met their radiologist, but met their radiation oncologist countless times. Ross urged radiologists to help get guidelines on lung cancer screening. She carries a small ball with her to show the size of what a chest X-ray can miss, but a CT scanner can pick up. Dr. Arscott recalled her diagnosis with lung cancer, when she re-

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ceived her diagnosis by post – “nobody called, nobody ever told me I had cancer.”

## Radiology in Facial Transplantation

Professor Bohdan Pomahac presented on the remarkable facial transplantations performed by his team at Brigham and Women’s Hospital, work which relied on the highly expert radiology provided by his colleagues. He calls these highly advanced techniques facial restoration. Professor Pomahac told his audience, “We need your help to guide us to see what we can do, how far we can push and hopefully in the future, even intraoperatively guide where we can go and what can be done.”

## Radiology Informatics

When Professor Paul Chang’s father retired from radiology, Chang was surprised when his father accused him of ‘killing radiology’. While Chang junior thought his father alluded to laziness, he was in fact looking back to the time before PACS when medicine and surgery rounds started in radiology in the morning, when radiologists were the ‘doctor’s doctor’.

Professor Chang presented one of the Eugene P Prendergrass New Horizons Lectures. There is no going back, Chang acknowledged, even though digitisation has facilitated commoditisation and outsourcing. As radiology moves towards the third generation of PACS the emphasis is still on images, but with little discussion on the value added by radiologists. “Rarely do we interact”, Chang said, “It is easy to be commoditised and devalued when we are not seen.”

Chang suggested that the opportunity is there to be valued as radiologists managing the role of imaging in a capitated aligned system. Radiologists have to add value by optimising quality, safety and efficiency. IT is the way to do this – more capable and agile solutions are needed to provide measurable value in patient care. Intelligent business analytics can assist colleagues upstream and downstream and connect with health consumers. IT can enable electronic protocolling;

the modality can also be treated as an IT device. Intelligent agents can use natural language processing to extract information from the electronic medical record (EMR).

“Radiology will not return to the personal contact of the pre-PACS era, but IT can enable radiologists to virtually collaborate with colleagues and patients”, Chang said. He suggested radiologists view the radiology report as a portal. For example, the information in there can be hyperlinked to other systems, and presented in graphical or text form, e.g. contrast or radiation dose. Chang closed by saying the challenge is to re-engineer ourselves as radiologists. “The technology is easy”, he acknowledged. “Changing human behaviour and legacy workflow is much harder.”

Chang and colleagues from the University of Chicago presented on their Annotation and Image Markup (AIM)-based lesion tracking tool. The tool is integrated into PACS and has shown significant improvements in oncologic lesion measurement efficiency and error reduction.

Professor Keith Dreyer of Harvard University and Massachusetts General Hospital presented the second Eugene P Prendergrass New Horizons Lecture on the future of imaging informatics. Dreyer explored changes in healthcare and the informatics innovation necessary to remain relevant and effective in the rapidly evolving healthcare system. He argued that previous payment models have determined business models for radiology in the United States. Fee-for-service has incentivised volume, while being neutral on value. Business models have determined innovation, maximising productivity and value while reducing the cost of doing business. Innovation is different depending on whether the incentives are for volume or outcome. In the context of patients first, why not extend functionality to your patients? The meaningful use programme in the U.S. provides incentives for radiologists to participate and promotes the use of certified electronic health record technology (CEHRT) to improve the safety, quality and cost of health care. Dreyer noted that there are opportunities for innovation in the current healthcare climate, in access, com-

munication and utilisation. Currently imaging information is too compartmentalised, and he looked forward to RIS and PACS being converged into the electronic health record. He anticipated a future of structured, multimedia, interactive communication. Structured reporting with clinical decision support will enable actionable findings and actionable recommendations. There are limited ways for radiologists to participate in management and ordering of examinations. However, the EHR linked to the American College of Radiology (ACR) Appropriateness Criteria enables communication between the ordering physician and the radiologist. For the future, he said, image sharing, structured reporting in the EHR and personal health records will increase quality, and most importantly, the radiologist’s presence and importance.



Professor Richard Gunderman

## The Story Behind the Image

Professor Richard Gunderman from Indiana University talked eloquently about the need to delve deeply to find the story behind the image. He recalled reading the CT scan of an 89 year old man with dementia and a history of falls. It turned out that his patient was the Nobel Prize winner, Charlie Huggins.

Said Gunderman, “Radiology like all human endeavours makes it possible to get the technical aspects right. We can be extraordinarily precise and utterly inaccurate. We can get the little things right and completely neglect what matters most. We can develop a perfect industrial model of clinical radiological practice and end up laying waste to the humanity of radiologists and more importantly the patients we serve.”

Gunderman urged radiologists to focus more time and attention on the human excellence of radiologists, and asked, “When



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was the last time you heard a great story about what it means to be a radiologist?"

He acknowledged that although radiologists do not have time to delve deeply into each image we should treat each as possessed of the degree of preciousness that he found in the head CT scan of Charlie Huggins.

He concluded, "We cannot put patients first unless we first know our patients, and that means being acutely attuned to the story that lies behind the image."

### The Visible Radiologist

The need to become more visible was underlined by recent research in Indiana, which showed that only 53.5% of patients surveyed after undergoing a CT scan knew that a radiologist was a doctor. Study author, Dr. Peter Miller, of Indiana University School of Medicine, said, "We need to better understand what patients want to know about radiologists in order to improve service and patient care. In my experience, people who've had the opportunity to interact with radiologists appreciated the chance to talk with them and get their thoughts on the imaging results."

### Medicolegal Issues

Dr. Leonard Berlin gave the keynote session on "To disclose or not to disclose." Delivered entirely in rhyming couplets, his presentation poetically urged radiologists to disclose errors completely, regardless of type, severity, cause or frequency. Healthcare has moved from the era of 'doctor knows best' to an era of patient individualism, participation and shared decision-making where doctors should inform but not influence. Concern about liability should not diminish this duty. Doctors should be concerned and sympathetic following an error and be apologetic if it is their fault. "Avoid the appearance of wrongdoing; would that stop the patient from suing?" he said. In closing, he said, "Remember, an apology is not an elegy."

A mock jury trial mediated by Dr. Berlin presented a fictitious case of a radiologist sued by the widower of a woman who had

died from breast cancer after five CT exams and a CT coronary angiogram.

Did the jury decide that the radiologist was negligent for not alerting the referring physician and/or the patient that radiation exposure from CT scans may cause breast cancer? The radiologist's defence was that the evidence for a link between diagnostic radiation exposure and cancer is unproven. The trial ended with a split jury.

And the take-home message? Professor Rebecca Smith-Bindman, who testified for the plaintiff, recommended that radiologists should not only ensure that all exams are performed at the lowest possible dose needed to achieve a diagnostic quality image, but they also should ensure that there are processes to identify questionable exams and communicate the possible risks to the referring doctor.

### Imaging of Inpatients

Dr Shima Aran presented a study comparing wireless direct radiography (DR) and computed radiography for portable chest radiography (CR) in the intensive care unit. The researchers concluded that portable chest radiography using wireless DR in the ICU setting provides similar or superior information on clinically significant findings while retaining the image quality of CR. Visualisation of some anatomic landmarks and tubes and lines was superior with DRw compared to CR. The wireless system enabled faster turnaround time and smoother workflow, and with no wire, reduced risk of breaking the sterile field.

Dr Arielle Lutterman and colleagues at Emory School of Medicine looked at cumulative radiation exposure of hospitalised patients due to imaging and image-guided procedures. Many patients are unaware of these risks, and their cumulative exposures are not being tracked. Their study looked at the records of 200 inpatients in two urban university hospitals.

They found that hospitalised patients are experiencing high levels of radiation exposure during a single hospitalisation. 62% of hospitalised patients underwent CT scanning,

and the majority (82%) of inpatient radiation exposure was attributable to CT scans. The mean dose estimate per patient for one hospitalisation was 14.76 mSv with 82% of the radiation exposure due to CT examinations.

In their study eleven patients (5.5%) received >50 mSv, two received >100 mSv. Fifty-one patients received 20-49 mSv. They recommend that radiologists should be vigilant in terms of monitoring CT imaging protocols so that when a CT is ordered, the resultant radiation exposure will be as low as is reasonably achievable. Consideration should be given to alternative forms of imaging such as magnetic resonance imaging when possible and based on a given institution's expertise.

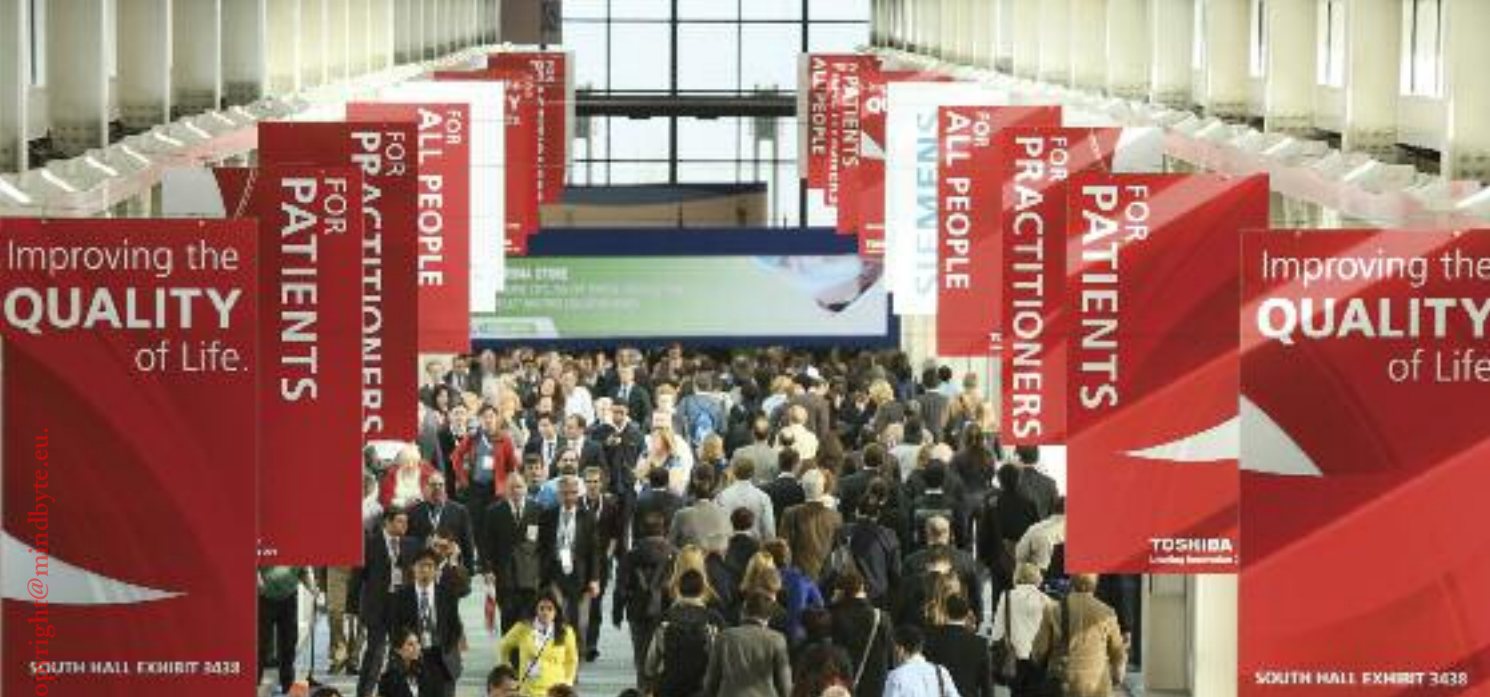
### Breast Cancer Risk from CT and Nuclear Imaging

Researchers who reviewed the records of approximately 250,000 women enrolled in an integrated healthcare delivery system between 2000 and 2010 found that increased CT utilisation could result in an increase in the risk of breast cancer for certain women, including younger patients and those who received repeat exams.

"Young women receiving several chest and or cardiac CTs had the greatest increased risk of developing breast cancer at approximately 20 percent," said Diana Miglioretti, Ph.D., study coauthor and senior investigator at the Group Health Research Institute. "A 15-year-old girl with no risk factors for breast cancer would double her 10-year risk of developing breast cancer at 25."

To lower imaging-related risk of developing breast cancer, senior author Professor Rebecca Smith-Bindman said imaging providers should analyse the radiation doses associated with each exam, reduce the use of multi-phase protocols and employ dose-reduction software wherever possible to minimise exposures.

"If imaging is truly indicated, then the risk of developing cancer is small and should not dissuade women from getting the test they need," she said. "On the other hand, a



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lot of patients are undergoing repeat chest and cardiac CT, many of which aren't necessary. Women, and particularly young women, should understand there is a small but real potential risk of breast cancer associated with cardiac and chest CT, and the risk increases with the number of scans."

The researchers found a wider than expected variation in dose for exams. The dose for certain paediatric and adult exams was more similar than expected. For nuclear medicine however, there was an appropriate lower dose for paediatric patients compared to adults.

## Industry Show

### Agfa Healthcare

Agfa showed its new Impac Radiation Exposure Monitoring (REM) system. It is a work-in-progress, software set up to automatically collect and analyse radiation exposure data. The product is designed to give healthcare providers access to dose-tracking information, regardless of equipment or PACS vendor, across multiple modalities, hospital departments, and healthcare institutions.

### Carestream

Carestream's MyVue software offers patients access to their own images. A trial of the technology in Houston with 2000 patients saved cUS\$7 per image compared to CDs. Patient satisfaction was also very high.

### GE Healthcare

GE demonstrated its Silent Scan MRI (510k pending) with a live link-up to its testing facility. The decibel level of conventional MRI scanners can be more than 100 decibels. The noise from the new scanner, which uses a new pulse sequence, is comparable to having an inkjet printer running in the room next door.

GE launched DoseWatch 1.2 which has a size specific dose estimate, and compares scan time to conventional scan times. It is integrated with radiology dictation software.

Universal Viewer is an advanced workstation embedded in the PACS. It is designed to aid informed decision making by providing historical data. It includes unified web tools for productivity, enables cross enterprise collaboration and consolidates patient history.



### Philips

Philips presented several new products, including:

- The latest version of its IntelliSpace Portal, an advanced visualisation solution for the analysis and

interpretation of medical images designed to simplify the way radiologists work with the vast amounts of imaging data sets.

- iPatient, an advanced platform for its family of CT and PET/CT scanners. iPatient allows for easy and efficient communication between the CT system and the injector in order to deliver appropriate contrast dose and consistent image quality.
- The launch of a cost-effective alternative to provide digital broadband MRI. The revolutionary dStream broadband technology, which Philips introduced with its Ingenia MR systems, provides enhanced image quality, improved workflow, easier coil handling and better patient comfort.
- With the next generation Ingenia MR-OR solution for intraoperative neurosurgery, Philips is further expanding its MR offering in the interventional MRI area. An MR-OR suite for intraoperative MRI adds value to neurosurgical facilities, supporting resection procedures that can save precious time for both surgeon and patient.
- The next generation of MicroDose with Single-Shot Spectral Imaging (SI) together with the first clinical application – Spectral Breast Density Measurement. The new Philips MicroDose SI, a full-field digital mammography system, brings the



potential of non-invasive spectral imaging to clinical practice without exposing women to additional examinations or X-ray radiation.



### Siemens

Interest was high in Siemens' world-first wireless ultrasound, the ACUSON Freestyle™. With a range of up to three metres, the ability to control the device via an ergonomic interface enables remote control of scanning parameters from within the sterile field. The system's innovations include acoustics, system architecture, radio design, miniaturisation and image processing.

"Siemens Healthcare is the first company to introduce an ultrasound system that enables physicians to work with cable-free transducers," said Jeffrey Bundy, CEO of the Siemens Healthcare Ultrasound business unit. "The ACUSON Freestyle system facilitates the use of advanced ultrasound technology into clinical fields requiring a sterile environment, such as interventional radiology, anaesthesiology, critical care, cath lab, or emergency care."

The ACUSON Freestyle system employs advanced synthetic aperture imaging technology, an integration of proprietary hardware and software that was specifically developed for the wireless signal transmission of full-resolution digital image data at very high data rates. Focusing on each pixel in the image, this method produces excellent image quality throughout the field of view. This design reduces the transducer's power requirements, increasing battery life. The battery can be sterilised. Wireless real-time ultrasound data transmission is further enabled through the proprietary development of a novel ultra-wideband radio technology, which, operating at a high frequency of 7.8 Gigahertz, is not susceptible to interference with other electronic equipment. The system includes exam presets, automated features including focus and it enables image save and clip save. It has 16GB storage, DICOM capabilities and wifi built in.

Three wireless transducers are available for the ACUSON Freestyle system, covering a range of general imaging, vascular, and high-frequency applications such as musculoskeletal and nerve imaging. The ACUSON Freestyle system has a 38-centimeter, high-resolution LED display.

The ACUSON Freestyle is 510k cleared and is expected to ship in summer 2013.

Siemens' works-in-progress imaging systems include:

- MAGNETOM Prisma, a 3 Tesla MRI scanner designed to combine high gradient strength and fast gradient slew rates with a significantly

higher signal-to-noise ratio to tackle demanding clinical and research challenges. It is a Diffusion Spectrum Imaging (DSI) application designed to resolve fine anatomical details of the brain.

- Cios Alpha, a mobile C-arm system designed with greater power output and a larger field of view in the operating room (OR) than conventional C-arms. It is intended to create high-quality images in the field of vascular
- MAGNETOM Essenza with Siemens' MRI workflow solution Dot (Day optimizing throughput), which helps enhance productivity in MR scanning.
- MAGNETOM Trio, Verio, and Avanto upgrades with Siemens' MR workflow solution Dot (Day optimizing throughput), which helps enhance productivity in MR scanning, as well as Tim (Total imaging matrix) 4G - the latest generation of Siemens' integrated coil technology.
- syngo.via WebViewer VA11, which is intended to perform diagnostic reading directly on the iPad as well as provide access to images from computed and digital radiography (CR and DR), positron emission tomography (PET), and PET/computed tomography (CT) devices.<sup>1</sup>

**RSNA 2013 will be back in Chicago from December 1-6, with the theme of "The Power of Partnership."**



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## KEY CONFERENCES & EVENTS

### FEBRUARY 2013

9 – 14 **SPIE Medical Imaging**  
Florida, US  
[www.spie.org](http://www.spie.org)

### MARCH 2013

7 – 11 **European Congress of Radiology (ECR)**  
Vienna, Austria  
[www.myesr.org](http://www.myesr.org)

### APRIL 2013

14 – 19 **113th Annual Meeting of the American Roentgen Ray Society**  
Washington, US  
[www.arrs.org](http://www.arrs.org)

15 – 19 **13th Annual IHE-Europe Connectathon**  
Istanbul, Turkey  
[www.cat2013.org](http://www.cat2013.org)

### MAY 2013

1 – 4 **Global Embolization Symposium and Technologies (GEST) Europe**  
Prague, Czech Republic  
[www.gest2013.eu](http://www.gest2013.eu)

2 – 5 **14th World Congress of the World Federation for Ultrasound in Medicine and Biology (WFUMB) including Latin American Foundation for Ultrasound**  
São Paulo, Brazil  
[www.wfumb.org](http://www.wfumb.org)

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### JUNE 2013

4 – 7 **European Society of Gastrointestinal and Abdominal Radiology (ESGAR) Annual Meeting**  
Barcelona, Spain  
[www.esgar.org](http://www.esgar.org)

19 – 22 **European Conference on Interventional Oncology (ECIO)**  
Budapest/Hungary  
[www.ecio.org](http://www.ecio.org)

26 – 29 **CARS 27th International Congress and Exhibition**  
Heidelberg, Germany  
[www.cars-int.org](http://www.cars-int.org)

### SEPTEMBER 2013

14 – 18 **CIRSE**  
Barcelona, Spain  
[www.cirse.org](http://www.cirse.org)

### OCTOBER 2013

3 – 5 **European Society for Magnetic Resonance in Medicine and Biology (ESMRMB) Annual Scientific Meeting**  
Toulouse, France  
[www.esmrm.org](http://www.esmrm.org)

10 - 11 **Management in Radiology (MIR) Annual Scientific Meeting**  
Barcelona, Spain  
[www.mir-online.org](http://www.mir-online.org)

11 – 12 **European Society of Breast Imaging (EUSOBI) Annual Scientific Meeting**  
Rome, Italy  
[www.eusobi.org](http://www.eusobi.org)

19 – 23 **EANM'13 Annual Congress of the European Association of Nuclear Medicine**  
Lyon, France  
[www.eanm.org](http://www.eanm.org)

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