

# I M A G I N G

## M a n a g e m e n t

Promoting Management  
and Leadership  
in Medical Imaging

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*the*  
**WORKFORCE**  
*issue*

INSIDE:

.....  
Hiring & Firing

.....  
Skill Mix Issues

.....  
Managing Workload

PLUS:

.....  
Special Insider's Guide  
to CIRSE 2011  
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# The WORKFORCE Issue

Dear reader,

Much is required of Chairmen in the medical imaging department. The skill range required goes beyond the clinical act, and must also incorporate a diverse variety of managerial attributes that are both as important and as challenging as diagnosing patients. One of these is the ability to manage workload in a way that creates a fair and balanced life for your workforce and reduces the chances of low morale or underperformance amongst employees.

Inside, our cover story addresses some of the main human resources and workload issues being dealt with by radiologists. An interview with Dean of the Irish Faculty of Radiologists, Dr. Adrian Brady, discusses his recent study on measuring radiological workload, which proves that a solid evidence base is essential if we are to convince the powers that be to support change.

Also in our cover story, we also take a look at important recruiting skills every Chairman needs to know, with a view to avoiding litigation. When recruiting is, however, not an option, what parallel approaches can you take to solve a shortage of skilled workers in the radiology department and ease workload issues? A paper from the European Federation of Radiographer Societies (EFRS) may have the answer. Skill mix is an increasingly used term amongst leaders and managers in the medical imaging world. Radiographers are increasingly undergoing more and more so-

phisticated education, and continued skill learning. However, the majority state that antiquated departmental policies mean that they are not given the chance to do their maximum in the imaging department. This important paper reveals the ongoing situation.

In addition, Dr. Remy Lim examines why public radiologists are so much more at risk from burnout, stress and lower working satisfaction, compared to their private sector counterparts, and describes a 'hot seat' method applied in his department to ensure that departmental performance does not suffer as a result.

I am also keen to direct readers to a special focus section developed in coordination with Association Partners the Cardiovascular and Interventional Radiological Society of Europe (CIRSE), that showcases recent medical innovations in this growing and exciting specialty. Please visit page 34 and read about their upcoming congress in September, as well as three papers on diabetes, neuro-interventions and oncology from the point of view of the interventional specialist.

To offer your feedback on any of the articles or topics discussed in this journal, please write to [editorial@imagingmanagement.org](mailto:editorial@imagingmanagement.org).



Prof. Iain McCall



Prof. Iain McCall

Editor-in-Chief  
editorial  
[@imagingmanagement.org](mailto:editorial@imagingmanagement.org)

## Workforce Management

A range of skills is needed to best manage your diverse team. This particular knowledge includes hiring and firing sensitively, being able to measure the actuality of workload amongst staff with the aim of initiating reforms, how best to utilise the existing skills in your team and to manage workload in such a way that members of your workforce are not subject to burnout or unbearably high levels of stress. You will find each of these aspects of workforce management addressed by our expert writers in this issues cover story.



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## EMPIRICA WINS EU PROJECT ON REFORM OF FINANCING SECONDARY HEALTHCARE IN BOSNIA AND HERZEGOVINA

“Reform of Financing Secondary Healthcare in Bosnia and Herzegovina” is a project to enhance the efficiency of healthcare services in Bosnia and Herzegovina by implementing a system of provider payments that would create incentives for cost containment and improve provider performance. It is funded by the European Union, represented by the European Commission, Directorate General EuropeAid Development and Cooperation, and the European Union Delegation to Bosnia and Herzegovina (B&H) on behalf of and for the account of Bosnia and Herzegovina, through the Instrument for Pre-Accession Assistance. Project partners are Karol Consulting, Zagreb, Croatia, and Ericsson Nikola Tesla, Zagreb, Croatia.

The project’s aims are to develop an approach towards a Diagnosis Related Group (DRG) hospital reimbursement system, draft a national DRG pricing and contracting methodology for inpatient care, pilot the data collection process, train staff and implement the system in all hospitals. The project will strongly support the long-term reform and sustainability of healthcare services in Bosnia and Herzegovina by facilitating cost containment and, ultimately, contributing towards improved provider performance.

The new reimbursement method, based on outcomes, will provide information on cost-efficiency in the hospital sector. The DRG system will be applied at the level of secondary and tertiary healthcare and then extended to the entire hospital sector, using existing local resources trained under this project.

“Introducing the DRG system will strongly support the ongoing reform of health systems in Bosnia & Herzegovina. empirica, together with its partners Karol Consulting and Ericsson Nikola Tesla, is proud to be part of this significant endeavour,” noted Dr. Rainer Thiel of empirica. The implementation of the new DRG system and the incentives that come with it are expected to lead to a more effective healthcare system and cost-efficient spending of resources.



## FINAL PROGRAMME NOW ONLINE: MANAGEMENT IN RADIOLOGY ANNUAL SCIENTIFIC MEETING 2011

The final programme for the annual Management in Radiology (MIR) congress, to take place September 29 – 30, 2011 in Nice, France, is available on the association’s website ([www.mir-online.org](http://www.mir-online.org)). All Chairpersons, Heads of Departments and/or Imaging Sections, Business Managers, Senior Administrators and those concerned with aspects of healthcare economics, investment and workflow management such as healthcare IT, patient relations and cost-effectiveness, are invited to take part in this annual gathering of leaders in medical imaging.

### Who Should Attend?

The congress will appeal not only to radiologists, but also to physicians and other healthcare workers in all medical disciplines, as well as to radiologic technologists, managers, nurses, informatics personnel and members of the medical industry.

### Scientific Programme

The scientific programme is designed to address the problems and challenges of modern healthcare. At this year’s edition, there will be lectures and debates on requesting imaging studies, coding and budgeting, standards of reporting, location and management, e-health monitoring issues, ultrasound management, managing acute imaging services, and solutions to problems in imaging education and research – all of them offering unique opportunities for audience participation and challenge and solution sharing, amongst a global network of other imaging leaders.

### Accreditation

The MIR Annual Scientific Meeting will be fully accredited by the European Council for Continuing Medical Education (EACCME), an insti-

tution of the European Union of Medical Specialists (UEMS) <http://www.uems.net>.

Further information is available at: [www.mir-online.org](http://www.mir-online.org)



## UPDATE ON 2ND EUROPEAN BOARD OF INTERVENTIONAL RADIOLOGY EXAMS

The second ever round of European Board of Interventional Radiology (EBIR) exams, a newly developed European-level qualification for competence in interventional radiology, will be held during the coming Cardiovascular and Interventional Radiological Society of Europe (CIRSE) congress in Munich. As published previously in this journal, EBIR is an important step in the recognition of IR, as it standardises training and expertise across Europe. CIRSE state

“We anticipate that the EBIR will represent a recognised qualification of high value to interventional radiologists in their career development and assisting IRs in the promotion of their skills and experience in IR when dealing with other clinical colleagues and with the general public”.

EBIR also aims to facilitate the free movement of IRs by providing a recognised qualification to confirm proof of training, supplemental to any national qualifications. EBIR is organised with under the supervision of CIRSE, the European Society of Radiology (ESR) and the UEMS Interventional Radiology Division.

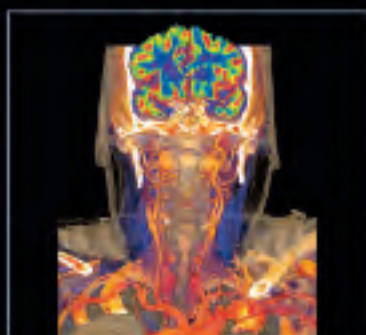
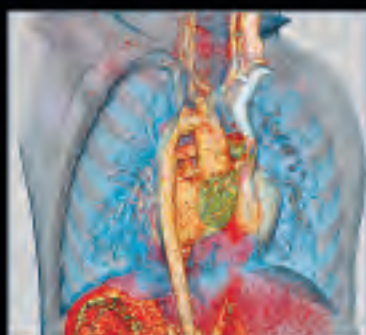
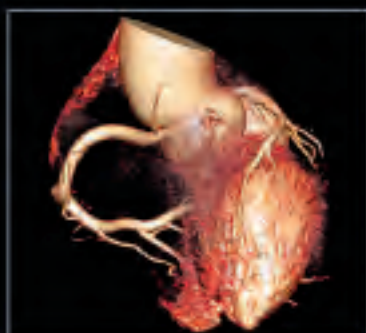
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the fore, the annual four-day CARS Congress was successfully held in Berlin in June 2011, for those who work in the fields of radiology, surgery, engineering, informatics and/or healthcare management covering topics, such as:

- Image- and model-guided interventions;
- Medical imaging;
- Image processing and visualisation;
- Computer aided diagnosis;
- Medical simulation and education;
- Surgical navigation and robotics;
- Model-guided medicine, and
- Personalised medicine.

The four-day congress consisted of invited talks by internationally recognised experts, around 200 paper presentations, as well as exhibits and posters. Tutorials, workshops and special events related to the above topics complemented the regular CARS sessions.

Further information is available at [www.cars-int.org](http://www.cars-int.org)



### **IHE EUROPE CONNECTATHON A SUCCESS**

More than 400 participants gathered in Pisa, Italy from April 11 - 15, 2011, for the Integrating the Healthcare Enterprise (IHE) European Connectathon. During the event, which featured a diverse programme of activities in parallel to the primary focus of intensive testing of health information systems, more than 75 companies and institutions conducted over 2,200 tests of IHE integration profiles. These help assure interoperability in exchanges of patient records and medical information. For the first time the Connectathon in Pisa also hosted a parallel testing event called Projectathon where 13 EU Member States exchanged patient information to prepare for a large-scale cross-border pilot programme.

Further information is available at [www.ihe-europe.net](http://www.ihe-europe.net)

## **CORPORATE NEWS**

### **PHILIPS LAUNCHES PRACTIX 360 MOBILE RADIOGRAPHY SOLUTION**

Philips has launched its new Practix 360 mobile x-ray system, which provides a straight-to-patient radiography system that can be used throughout the hospital setting. The new system is designed to optimise workflow by transporting a mobile x-ray system around a hospital or clinic, to address the issue of access to immobile patients, such as those being treated in the ICU or OR, the Practix 360 features four free-swivelling wheels that allow for 360-degree movement on the spot. It also weighs 30 percent less than conventional systems at just 175kg, making it more compact than conventional mobile x-ray systems and allowing it to be easily transported for use in multiple settings.

### **SIEMENS TO OFFER NEW CONSULTING CONCEPT FOR EFFICIENT PROCESSES**

Siemens Healthcare has developed a consulting model entitled "Act on Radiology" to help improve workflow in radiology departments. Based on models for industry processes, an expert team from Siemens evaluates the maturity level of clinical processes in a hospital radiology department or radiology practice. For example, the experts evaluate the efficiency of workflows from admissions to a completed patient report.

With the help of a database containing international guidelines and the reference values from the world's leading hospitals, the Siemens consultants then develop suitable measures for improvement.

### **HOLOGIC LAUNCHES HANDS-ON PROGRAMMES ON 3D BREAST TOMOSYNTHESIS**

Hologic, a developer, manufacturer and supplier of diagnostics products, medical imaging systems and surgical products dedicated to serving the healthcare needs of women, has announced the first nine U.S. cities for a series of evening events to introduce clinicians to the

Selenia Dimensions 2D/3D breast tomosynthesis system and gain hands-on experience with this new technology.

The Hologic system is the first commercial mammography system with breast tomosynthesis technology for breast cancer screening and diagnosis.

The Selenia Dimensions system gives radiologists the option of offering their patients a 3D tomosynthesis exam in addition to the conventional 2D exam all in one compression, in just seconds. In clinical studies Hologic submitted to the U.S. Food and Drug Administration (FDA), radiologists reading 2D mammography plus 3D breast tomosynthesis images compared to 2D images alone demonstrated superior clinical performance in specificity, the confidence to rule out breast cancer without recalling the patient for further study, and also demonstrated improved sensitivity, the proportion of mammograms which include breast cancers that were correctly diagnosed.

### **SECTRA SECURES ORDER FOR REGION-WIDE PACS**

IT and medical technology company Sectra has been entrusted with delivering the northernmost PACS in the world. The major Norwegian healthcare region, Helse Nord, is set to use Sectra's solution and the eleven hospitals included in the region will share patient information and radiology images. This will facilitate the efficient use of resources and enhance the quality of care. Helse Nord has signed a four-year agreement with Sectra, with the option of an extension.

The order value amounts to 6.3 million euros. Under the agreement, Sectra will deliver its solution for the management of patient information and digital radiology images (RIS/PACS) and the planning of orthopaedic procedures. The solution will be integrated with other IT systems at the hospitals, including the journal systems.

For further industry news, please visit [www.imagingmanagement.org](http://www.imagingmanagement.org) to stay up to date with all the latest company & product updates



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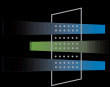
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The European Association of Hospital Managers (EAHM) is proud to invite you to the *IT @ Networking Awards 2012*, a global healthcare IT and medical technology competition.

*IT @ 2012* will recognise and promote outstanding healthcare IT and medical technology projects. 25 nominees from across Europe and beyond will compete in the *IT @ Networking Awards 2012* on January 18 – 19 2012. This high-level competition will see candidates go through two rounds of presentations in an effort to convince the expert audience and panel of judges why their solution deserves to win. If last year is anything to go by, attendees will not hold back in cross-examination of each presenter during the Q&A sessions before placing their vote for their favourite solutions.

## WHY ATTEND THE IT @ NETWORKING AWARDS 2012?

This event will give you the possibility to expand your general and in-depth knowledge on IT solutions. Every presentation is strictly structured according to our presentation cri-

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teria. Such criteria allows for a cross-departmental understanding of each solution.

Uniquely, *IT @ 2012* requires all presenters to talk about the key problems they have encountered in creation or implementation. By highlighting honestly the problems and obstacles encountered, they provide the audience with an excellent tool for advancing similar issues in their own institutions.

IT and medical technology is of key importance to hospital management, especially considering the current financial constraints and increasing pressure our healthcare systems are faced with. Intelligent IT solutions increase cost-effectiveness, productivity and safety.

## HOW IT WORKS

*IT @ 2012* is a two-day event comprising two rounds of presentations. During the first day, 25 projects will be showcased in a Mindbyte presentation. Mindbytes are short and straight to the point. In just five minutes, each presenter will highlight the main advantages of their project and convince the audience they want to know more. After each presentation you, the expert

audience, and our panel of judges will place their votes. The top nine presentations make it through to the second day of competition where they are given the opportunity to present their projects in detail. This Workbench presentation has an allocated time of 30 minutes followed by 15 minutes of cross-examination.

## WHAT SETS US APART

What differentiates *IT @ 2012* from other congresses? The main difference lies in the element of competition. Yes, *IT @2012* features presentations from across the world. But these are presentations with a difference, competitors are presenting to win; they have a completely different mindset. Each presenter will do the best to secure the top prize, to persuade the audience and judges that their solution deserves to win. The Q&A sessions also take on a new dimension with presenters having the opportunity to cross-examine their competitors.

## HOW TO REGISTER

HITM members are eligible for a reduced rate. For this special fee you can enjoy two days of

informative presentations of fully implemented and running IT and medical technology projects. Moreover, you will have a say in who will win the trophy. Refreshments, lunch and evening entertainment are also included, giving ample opportunity for networking.

To register, please visit:  
<https://www.conftool.net/itawards2012/>

## LOCATION

*IT @ 2012* will take place in the famous Theatre de Vaudeville, a most stimulating environment in the Gallerie de la Reine, the centre of Brussels.

Hotel reservations can be obtained through [www.booking.com](http://www.booking.com).

For more information please visit our website [www.itandnetworking.org](http://www.itandnetworking.org) or contact us on +32/2/2868501 or send an email to [office@hitm.eu](mailto:office@hitm.eu)

**We look forward to seeing you in Brussels in January!**

# GETTING THE MEASURE OF RADIOLOGICAL WORKLOAD

## When Service Provision Lags Behind Need



Interviewee  
Dr. Adrian Brady

Dean  
Faculty of Radiologists  
Royal College of Surgeons  
in Ireland

and

Consultant Radiologist  
Mercy University Hospital  
Grenville Place  
Cork, Ireland

interviewed by:  
Dervla Gleeson

Managing Editor

### What prompted your research into the overburdening of radiologists, recently published in *Insights Into Imaging*?

For many years, inappropriate measures of radiologist workload have been in use among many healthcare authorities in Ireland, and possibly in other countries. Some of these methods have been used for purposes for which they were never intended, while others are simply outdated. Employing authorities have often lacked the tools to accurately assess the workload of radiologists in the 21st century, and thus decisions regarding resources have sometimes been based on erroneous assumptions, or on specific pressures arising locally, rather than on verifiable, accurate assessments of actual work performed. Rather than being deliberate, I believe that the inadequate measurement tools used in the past were a function of a lack of clear direction from practitioners as to what should be measured, and a lack of an adaptable method of measurement which could be understood, widely applied and modified for new developments.

Bearing this in mind, the Faculty of Radiologists, RCSI, decided in 2009 to advise the Irish public hospital employing authority (The Health Service Executive, HSE) that measures then in use were not fit-for-purpose, and to propose the introduction of a more accurate measurement methodology. In 2010, the Faculty proceeded to perform a nationwide radiologist workload survey using such a method, which we published in March 2011 [Faculty of Radiologists, 2011].

### Which negative consequences out of those experienced by overburdened radiologists are most troubling in your opinion?

In many jurisdictions, increasing workload in any medical specialty is accommodated by a corresponding increase in staff and facilities needed to cope with demand. In radiology, for example, if workload rises to a level where additional radiologists are needed, additional radiologists are hired. The situation in Ireland (and in the UK, and some other countries) is different: Consultants in the public hospital system are paid a salary, and their numbers are centrally controlled by the HSE. Obtaining approval for additional consultant numbers is a slow and difficult process,

requiring approval at multiple levels for the funding and hiring process. Thus, consultant numbers invariably lag significantly behind need.

### The central control of consultant numbers denies hospital departments the flexibility to deal with local needs

Despite this, demand for radiology services continues to grow: Recent data collection associated with the development of a national RIS/PACS system in Ireland found an annual average growth rate of five percent for radiology procedures and studies. Thus, we work in an environment that demands more year-on-year, without having a robust method of matching supply to that demand. Radiologists have increasingly found that they are expected to cope with whatever is asked of them, without provision being made for the inevitable pressures created, such as longer working days, the requirement to work faster and the continued interruptions to work generated by competing simultaneous demands.

### Are there elements of the Irish healthcare system that make recruiting difficult?

The method by which consultant staff are recruited in the Irish healthcare system places significant pressure on the existing workforce. The central control of consultant num-

#### The Hayes Report

(<http://www.lenus.ie/hse/handle/10147/115794>) This was a Health Service Executive (HSE) investigation into difficulties met by Irish radiologists at Tallaght Hospital Radiology Department, Dublin. Author Dr. Maurice Hayes states that: “*We have made some recommendations. So have others. There have been enough reviews and reports: what has been lacking is action and a sense of direction. The actual road-map used is less important than that all should be marching in the same direction and to the same drumbeat.*”

# Using Tomosynthesis Technology to Find and Diagnose Breast Cancer in Its Earliest Stages

## The Breast Pathology Center at Tejerina Foundation, Madrid, Spain

**The Breast Pathology Center** at the Tejerina Foundation in Madrid, Spain, has been leading the way in women's breast health for over 40 years. It is the only facility in Madrid dedicated exclusively to women's breast health, offering diagnostic services, medical and surgical treatment, and follow-up services.

In 2000, the Center pioneered the use of digital mammography in Spain. In 2010, it led the way again, installing a Hologic Selenia® Dimensions® breast tomosynthesis system, becoming the pioneer among several others in Spain to use the innovative technology to improve the early detection of breast cancer. "We added tomosynthesis because we always want to be at the leading edge of technology," declares Alejandro Tejerina, M.D., breast radiology coordinator. "Tomosynthesis is very useful in characterizing nodules and mammographic distortions. It is also useful in patients with suspicious lesions, symptomatic patients, patients with family history, and high risk patients."

The Center's multidisciplinary staff includes radiologists, surgeons, oncologists, gynecologists, and psycho-oncologists. A team of eleven radiologists and fourteen radiology technicians performs approximately 50,000 breast mammograms annually. In a little over a year, the center has performed approximately 3,000 mammograms using tomosynthesis.

### A New Tool for the Early Detection of Cancer

"Each imaging test has its own indication, and, when used properly and in concert with other modalities, the multiple systems considerably improve the accuracy of diagnoses," explains Dr. Tejerina. "When we decided to add tomosynthesis, we chose Hologic's Dimensions system because of our previous positive experience with Hologic. We studied different options and decided Hologic was the best."

"Tomosynthesis provides very important diagnostic information as well as dif-

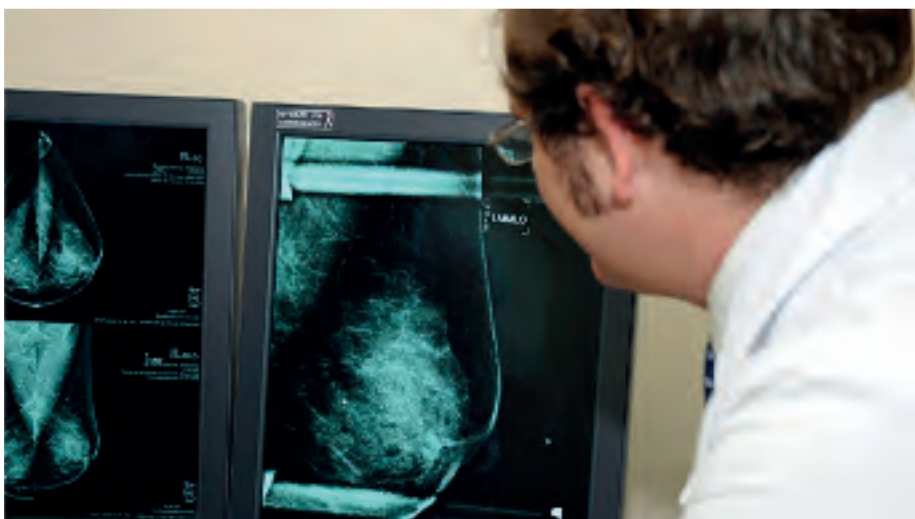
ferent information from that acquired with 2D mammography," explains Dr. Tejerina. "We have been able to diagnose cancers with this new technique, and it has provided us much more confidence when confirming or ruling out malignant processes. Using tomosynthesis, we have also been able to confirm that suspicious lesions have benign features, avoiding unnecessary biopsies."

Radiologists at the Breast Pathology Center always perform both a 2D and 3D exam with the Dimensions system. "We either perform a 2D and then 3D exam at two different times, or we combine 2D and 3D at the same time in a combined study."

**"We have identified cancers using the Dimensions 3D that we wouldn't have found using 2D mammography"**

Dr. Tejerina adds that tomosynthesis provides capabilities not available with other modalities. "Using tomosynthesis, we can carry out millimetric breast incisions and detect small diameter lesions enabling the Interventional Radiologist to reach the lesions from the back," states Dr. Tejerina.

Tomosynthesis is helping the staff at the Center find small cancers earlier and changing outcomes for patients. "We have identified cancers using the Dimensions 3D that we wouldn't have found using 2D mammography. And tomosynthesis helps us distinguish normal structures from pathological ones in dense breasts, identify subtle findings, and in many situations, enable us to make very early diagnoses," concludes Dr. Tejerina.



Dr. Tejerina says that with tomosynthesis they have been able to confirm that suspicious lesions have benign features and avoid unnecessary biopsies.

The comments included in this publication are the opinions and personal stories of the individuals quoted and not necessarily those of Hologic.

bers denies hospital departments the flexibility to deal with local needs. The length of time in-built in the complicated system of consultant post approval and recruitment frequently results in the situation of a replacement for a retiring radiologist being recruited long after the individual has already left his/her post, with a gap in staffing numbers often lasting months or years. Lack of an agreed workload measurement system has heretofore hindered the process of convincing the funding authorities that existing workload requires more staff than are available; we hope that acceptance of the methodology behind our workload survey will convince the HSE of the need to match consultant numbers to the demands placed upon them, and to take account of workload when formulating new policies which bring increased demands with them.

#### **You used a new way of assessing radiologist workload: can you tell us about it?**

We didn't develop the workload measurement method used in our survey ourselves; credit for this must go to the Royal Australian and New Zealand College of Radiologists, and, in particular, to Drs. Alex Pitman and Neil Jones, who published this method first in 2006 [Pitman 2006, Pitman 2009]. When we set about finding a valid method to use in Ireland, we were somewhat surprised to find a relative dearth in the literature of radiologist workload measurement tools that were not primarily driven by reimbursement or influenced by non-radiologist technical elements. This, of course, is a function of the centrally controlled system in which we work. In those countries where radiologist numbers are decided by local needs, tools such as we required are less necessary.

The Pitman/Jones model of measuring radiologist workload was an ideal fit for our purposes. It focuses on radiologist work (as opposed to radiographers and technical aspects of studies). It involves lumping together studies in a relatively small number of categories, to which relative value unit (RVU) measurements are attached, these RVUs roughly equating to the radiologist time commitment to the different study groups. The key element of this method, however, involves recording the amount of radiologist time devoted to those activities which cannot be easily counted in terms of study reports generated; these include interventional and procedural time, preparation and conduct of multidisciplinary team meetings, formal teaching and administrative work. Total departmental RVU activity is then divided by the number of whole-time equivalent radiologists available to produce a Crude RVU/WTE figure; a similar calculation, after allowing for the proportion of the ra-

diologist workforce committed to non-countable activity, produces the Net RVU/WTE figure. These two final figures allowed comparison across radiology departments in different locations, and facilitated establishing national benchmarks of the amount of work being done in 2009 (the calendar year for which data returns were calculated).

*Full details of the calculation method used are available in our papers [Faculty of Radiologists 2011, Brady, Insights into Imaging 2011, Brady, European Radiology 2011].*

#### **In your study, what did you discover about how radiologists' time is divided up?**

Highlights, of which you will find full details in the report, included the following:

- In 2009, the mean Crude RVU/WTE measurement across all hospitals was 57,659 (compared to the Australian measurement of 40,000 from 2006 [Pitman 2006], updated to 45,000 in 2009 [Pitman 2009]), and the mean Net RVU/WTE number was 103,897.
- A mean of 32.47 percent of WTEs were engaged in non-countable activity. This is a very important finding, validating the personal experience of practicing radiologists that a substantial portion of their working lives is devoted to activities which are difficult to quantify in terms of study report output. The role of the radiologist in the 21st century is about much more than sitting in front of view-boxes or a workstation dictating reports of plain films or cross-sectional studies.

The role of the radiologist in the 21st century is about much more than sitting in front of view-boxes or a workstation dictating reports of plain films or cross-sectional studies.

- Of this non-countable activity, more than 40 percent was accounted for by interventional and procedural work and nuclear medicine.
- Plain films accounted for 28 – 41 percent of recorded activity, mammography for 0.8 – 5.8 percent, ultrasound for 16 – 20 percent, CT for 27 – 32 percent and MRI for 5.9 – 15.8 percent. (MR activity was under-reported, given that MR services in many Irish hospitals are contracted by private providers, and such private activity was not included in the calculations.)

### **Was your study, which investigated workload at 28 of the 38 radiology departments in the country, in concordance with the portrayal of radiological overload in the Hayes report (see page 10)?**

The numbers given above, and reported in our survey, indicate that Irish public hospital consultant radiologist numbers are insufficient for the workload currently being demanded and delivered, by comparison to international benchmarks. The Hayes report looked at the situation in one hospital; our survey indicates that understaffing exists across the country, although the severity of the staffing deficit varies from one institution to another.

Since the publication of the Hayes report, efforts have been made, under the aegis of the National Radiology Programme, to deal with some of the issues raised. For example, a policy is now in place to determine what study types may not need the report of a consultant radiologist (when insufficient radiologists are available) and under what circumstances these studies may be reported by other individuals.

### **In your opinion, what role should referring clinicians and hospital managers play in keeping radiologist workload manageable?**

Inflation in radiology demand is not a local Irish phenomenon; it is a worldwide issue. In a recent issue of this publication, data from Canada was cited, showing a 58 percent increase in CT examinations and a 100 percent increase in MR studies since 2003 [Abbott, 2011]. Decision-making tools may assist requesting physicians in identifying when requests for diagnostic imaging studies are necessary, and we are looking at such tools in the Irish context. Notwithstanding such efforts to control demand, we cannot ignore the frequently appropriate role of imaging and radiological intervention in patient management. It is vital that the contribution of radiology departments and radiologists be understood and resourced appropriately. In planning new services, or in developing existing ones, radiology support should be an intrinsic element of resource allocation, rather than, as is often the case, an afterthought, or totally outside consideration.

### **What alternative steps to increased recruitment might contribute towards the alleviation of overburdened radiologists and a backlog in reporting?**

Ireland, fortunately, does not have a shortage of qualified radiologists. The specialist training programme in diagnostic radiology run by The Faculty of Radiologists produces be-

tween 10 and 15 qualified, trained radiology specialists per annum (most of whom then go overseas for further, fellowship-level training), which should be sufficient to meet the needs of the country. The difficulty lies not with the production of qualified specialists, but rather with the provision of funded posts in which to employ them. Equally, should reporting backlogs develop, the issue lies not with supply of appropriate individuals to deal with the demand, but with the supply of posts in which they can be employed.

### **What is your opinion on the delegation of greater responsibility to radiologic technologists in the medical imaging department to cope with demand?**

This is a matter being considered by the National Radiology Programme. Radiologists and radiographers work closely together throughout our health system, and there is undoubted scope for role expansion to deal with some elements of demand. However, given the current shortage of radiographer staff in many departments at present (arising from a number of factors, including recruitment moratoria, non-replacement of staff on extended leave, etc.), attention should first be paid to ensuring that sufficient staff numbers are available to deal with traditional work responsibilities before seeking to expand those responsibilities.

### **What is your advice to other radiologists in terms of dealing with overload, stress and potential burnout?**

Our survey was designed to achieve two main outcomes: establishing an agreed, valid method of measuring radiologist workload in the current era, which could be used in future in our health system, and identifying what the workload was at a given point in time (2009). The next steps are to find a means of translating the method and data into a meaningful basis for provision of adequate resources, and we have been usefully engaged with the HSE since publication of our survey to make this happen.

Radiologists are well aware that demand will continue to increase; this is, to some extent, a validation of the centrality of what we do in patient care, and we should welcome it. My advice to radiologists who feel the pressures of our working life (as we all, from time to time, do), is to concentrate on obtaining hard data (such as we have done with our survey) demonstrating just how much work we are doing, to advocate strongly on the basis of this data for appropriate resources, and at all times to emphasise that the work we do must be safe and at the highest standards for our patients. ■

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# A EUROPEAN PERSPECTIVE ON THE ROLE OF RADIOGRAPHERS IN IMAGING DEPARTMENTS

## Skill Mix on the Rise



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Radiographers do not work in isolation but are part of a highly qualified team, contributing to the health and well-being of patients and acting as mentors for students and trainees. They are the human face of medical imaging and radiation therapy, individually responsible for combining excellent patient care with technological expertise. They carry out more than 85 percent of procedures autonomously and therefore play a key role in radiation protection through the justification and optimisation of ionising and non-ionising radiation exposures to individuals; the optimum setting of parameters; the promotion of a safety culture in their various practice environments and through keeping up to date with rapidly changing developments in the imaging field. In addition, as part of their radiation protection role they are instrumental in tandem with others, i.e. radiologists and physicists, in the selection of appropriate imaging equipment and in quality assurance testing and dosimetry and also in contributing to patient education.

The radiographer takes the lead responsibility for the management and care of patients undergoing the spectrum of imaging procedures including their physical, psychological and emotional needs prior, during and post examination. The radiographer has a duty of care to ensure that the appropriate investigation has been requested and can be justified through questioning the patient and reviewing their clinical history and to challenge any procedure they may deem unsafe or unfit for purpose (SCoR 2008).

A clearly expressed clinical history is the ultimate tool for the radiographer to decide on the most appropriate radiographic techniques and projections and the optimum exposure parameters to employ, which will provide information that ensures that patient treatment and management decisions are correctly informed. Optimum image quality is the responsibility of the radiographer as it provides the means for interpretation accuracy.

In addition, the radiographer's role is to ensure that patients are fully aware of any procedure they will undergo and that they have given their consent. In the UK this is emphasised by the Department of Health's guidance which states that:

"The health professional carrying out the procedure is

ultimately responsible for ensuring that the patient is genuinely consenting to what is being done: It is they who will be held responsible in law if this is challenged later" (DH 2001).

### Restrictions & Barriers to Professional Development

McCall (2010) identified a general lack of awareness of the role of the radiographer in imaging departments by patients. This lack of awareness may be due partially to the profession itself not being more forthcoming in championing radiography to a wider audience and partially due to individuals insufficiently vocalising their skills and range of competencies to others including radiologists and service managers. The scope of practice and thus the role of the radiographer will vary from one country to another dependent as it is on political, cultural and legal contexts.

Radiographers are undertaking advanced practice roles such as barium enema imaging and reporting; ultrasound reporting and mammography image reading

All radiographers, by the very nature of their professional activities, are film/image readers as well as image producers. Radiographers are educated to identify normal appearances in the images they produce and as a corollary thus know when abnormal appearances are present.

Traditionally the interpretation of radiographs has been restricted to medical doctors and in most cases, radiologists. However the expansion in the range of imaging examinations and the advancement in imaging technologies have led to an increase in demand for imaging services and this has resulted in a delay in the interpretation and reporting of many examinations. This expansion varies across Europe dependent on staffing capacity and service delivery structures but has led, in many countries, to the ex-



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tension of the radiographer role to include image interpretation and ultimately radiographer reporting.

In the UK in particular, this type of role extension, supported by radiologists, has two decades of experience and has expanded to include all modalities, examinations and referral pathways (Price 2009). As one might expect, the spectrum of radiographer reporting practice is narrower than that of a radiologist but has resulted in benefits to both referring clinicians and patients. Other countries are embarking on, and still others have yet to extend, radiographer responsibilities to include image interpretation, but are aware of the strength of the evidence that has emerged which recognises the ability of properly trained radiographers in this field (Robinson et al 1999; Brealey et al 2005; Leslie et al 2000).

### Study Shows National Variations in Radiographer Training

Across Europe at present, radiography education is firmly embedded in the Higher Education (HE) system, with just a few exceptions. In a recent survey of European radiographer societies by EFRS in 2011, 23 out of 26 respondent countries indicated that the initial qualification for radiographers was at bachelor level. Variations in the nature, coverage and length of bachelor programmes across individual European countries see graduates emerging with either separate or combined imaging and radiotherapy competencies.

In all European countries, the radiographic curriculum covers a wide range of scientific, humanistic, sociological, ethical and technical subjects tied in with the development of clinical skills. It also includes the development of research and audit skills aimed at improving imaging service quality. Programmes of radiography education are cognisant of the importance of equipping graduates with those subject specific and generic competencies that will provide an optimum service to support local and national needs with the health and well-being of the patient paramount. Curriculum responses to service needs have meant that radiographers in many European countries now graduate with skills, knowledge and competencies in some areas once thought of as being solely within the remit of the radiologist or other medical practitioner.

Whilst some elements of role extension are introduced in bachelor programmes these are further developed following a postgraduate Masters level course accredited by the national professional body (e.g. IV injection/cannulation of contrast agents; image interpretation; supplementary prescribing; pharmacological and exercise stressing in

RNI). These are all courses requiring some element of mentorship by a radiologist.

## Student radiographers from across Europe expressed concern that they were not permitted to practise expanded elements of the education they received

In addition, and also following postgraduate education and training, radiographers are undertaking advanced practice roles in such areas as barium enema imaging and reporting; ultrasound reporting and mammography image reading to name just a few. Research has shown in the UK that more than 50 extended roles are being successfully undertaken by radiographers presently (Price 2008).

However, at a recent EFRS meeting held during the European Congress of Radiology (ECR) 2011 student radiographers from across Europe expressed universal concern that they were not being given the chance to practise expanded elements of the education they received, including image interpretation, ultrasound reporting and the administration of IV contrast agents. Research in other countries indicates that radiographers are increasingly being seen as clinically underutilised (Cook et al 2004) particularly in areas that would improve the efficiency and effectiveness of the service and thus enhance the patient's experience.

### RADIOGRAPHY IN EUROPE

Radiography in Europe is a relatively young profession with origins mainly in medicine and nursing but also in engineering and physics. The first radiographer society was established in the United Kingdom in 1920 and the most recent in Lithuania in 2005; since then the European Federation of Radiographer Societies (EFRS), legally established in 2008 has brought together 32 radiographer societies from 30 countries and 33 educational institutions from 18 countries across geographical Europe to represent, promote and develop the profession of radiography in Europe. Radiographer societies are the professional bodies responsible for, in an increasingly large number of European countries, the appropriateness of practice of radiographers.

## Skill Mix on the Rise

The development of radiographer roles beyond image abnormality detection and interpretation, are part of many skill-mix initiatives taking place across Europe, which focus on changing professional roles to facilitate service development and enhancement for the benefit of patients. The importance of skill mix in the imaging department is not just a necessity due to a shortage of radiologists in some European countries but is because it encompasses such factors as:

- Increasing demand for examinations such as MR and CT;
- Demand for faster access to diagnostic services;
- Need for rapid turnaround for examination reports;
- Changing population demographics with a greater prevalence of chronic disease predicted;
- Better informed patients with enhanced expectations and
- Increased clinicians' expectations from imaging services (RCR and SCoR 2007; Hardy et al 2008).

The prevalence of radiographer reporting and its impact in the UK evidences the collaborative nature of radiologists and radiographers in clinical departments. There are, however, in the UK and elsewhere in Europe, some barriers

which have been identified with regard to radiographers undertaking roles not traditionally thought of as part of their activities. These include lack of support by some radiologists who may be totally unaware of the extent and quality of the educational process that radiographers must undergo to achieve the required competencies. They may also be unaware of the legal, professional and ethical issues that have had to be addressed by radiographers for the role in question (Kelly et al 2008). In addition, it appears that radiologists may neither be available nor willing to provide the necessary mentoring role for extended role training.

Another important barrier is that funding for radiographers to participate in postgraduate courses appears to be limited not just for course fees and expenses but for the back filling of posts in order to release staff for training. The role of the radiographer varies across Europe being dependent on the country and health service in question, as there will also be overlap of roles between the team members within an imaging department. A patient-focused health service in the 21st century should ensure that the available competencies of staff are used to the maximum effect to put the needs of patients and those referring patients for imaging investigations at the forefront and avoid expending energy in defending historical professional boundaries. ■

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- 13.00-14.30 Management in General
- 15.00-16.30 Training and Certification
- 17.00-19.00 Working Environment
- 19.30 Interview Simulations

### Thursday, September 29 Annual Scientific Meeting

- 09.00-09.10 Welcome and Introduction
- 09.10-09.30 Opening Lecture
- 09.30-11.00 Standards of Reporting
- 11.30-13.00 Coding and Finances
- 14.00-14.30 Company Lecture
- 14.30-16.00 Clinical Decision Support
- 16.30-18.00 Location and Management
- 20.00 Cocktail Reception at:  
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### Friday, September 30 Annual Scientific Meeting

- 08.30-09.00 Special Lecture on Failures
- 09.00-10.30 eHealth Monitoring Issues
- 11.00-11.30 Company Lecture
- 11.30-13.00 Controversies in Ultrasound
- 14.00-15.00 Management around the world  
– Poster Session
- 15.30-16.50 Solutions to problems in  
imaging education and research
- 16.50-17.00 Closing Remarks

# LITIGATION-FREE INTERVIEWING & TERMINATION TECHNIQUES

## Hints for Making a Difficult Task Straightforward



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This article provides hints for interviewing prospective employees in a way that complies with anti-discrimination laws and shows sensitivity to the interviewees' backgrounds. It also provides you with guidelines for discharging employees for job-related and nondiscriminatory reasons.

### Interviewing Prospective Employees

It is crucial that the interviewing technique and process is within the bounds of the law, which means that you should avoid doing anything that could lead your interviewed prospective employee to sue you. To avoid being sued when interviewing prospective employees, take a look at the following hints:

#### No assumptions, please

Assuming a particular thing about your prospective employee can lead to a lot of problems, especially if your assumption is based on the fact that your interviewee belongs to a certain class or race. Do not assume that certain classes or races are good at doing something as compared to others, and vice versa. It is preferable to base your assumptions on your observations about the person, and not on your perception about certain classes and races.

#### No discriminatory remarks, please

To some people, statements such as "You look too old to be able to pull off this MRI job" may appear harmless, but can be viewed by some as very discriminatory. Make sure that you ask your questions and direct your observations in a manner that is not offensive and discriminatory in either effect and/or use.

#### Prepare for the interview, please

One way to ensure that you avoid being sued when interviewing prospective employees is by preparing for the interview that you are about to do. There are certain interview skills training seminars and workshops that you can join in order to be able to ensure that you comply with anti-discrimination laws. By joining these interview skills training seminars and workshops, you will also learn to become more sensitive to your interviewee's situation and background.

#### Know the law, please

Before the actual interview, it is best if you or whoever is doing the interview, brush up on local and national employment laws that could help the entire interviewing process. An applicant is protected by both local and national laws, particularly national anti-discrimination laws. The applicant cannot be asked questions related to age, disability, gender, national origin, race, religion, marital status, sexual orientation, or any characteristic of the applicant that the law prohibits from considering in making a hiring decision. The law also prohibits employers from retaliating against applicants who assert their rights under the law.

#### Discharging Employees

From time to time, terminating employees is a necessity – however, it is never a pleasant task, rather an inevitable consequence of managing a business. It is not for the faint of heart, and as a manager, it does not contribute to your popularity among the rank-and-file. Lawsuits today are more common. Anyone and everyone can file a lawsuit. If it gets to court, the judge usually favours the employee.

The decision to terminate an employee may result from a variety of factors including poor performance, inadequate productivity, excessive absenteeism or lateness, dishonesty, insubordination, substance abuse, or illegal conduct. However, the employer must always be careful to ensure that the decision to terminate an employee is for job-related and nondiscriminatory reasons. The employer must ensure the employee's termination does not violate any contractual commitments and that the termination complies with applicable laws, company policies and procedures.

Unfortunately, even the most careful employer may terminate employees for all the right reasons and still be sued. There are, however, various precautions an employer can take to minimise the number of suits that will be brought.

Once you decide to terminate, you must pay special attention to the actual termination process. If you are not sure about issues such as the timing of termination, whether voluntary or involuntary, or about what needs to be paid such as vacation pay, or what can or cannot be deducted, you should consult labour/employment counsel.

## Documentation is Key

As employment lawsuits often focus on the reasons for an employee's termination, the employer's records can be important evidence in the defense of a termination decision. Ensure that you have solid documentation when terminating a person's employment. You must show the employee had a pattern of offensive behaviour that you addressed repeatedly with disciplinary actions. The documentation should include the employer's disciplinary policies and performance standards; eyewitness accounts of serious employee misconduct; the supervisor's memos in which performance deficiencies are recorded objectively; performance evaluations; and warning memos to the employee. An employer's records can be vital evidence in the defense of a disciplinary decision. Termination documentation should show that:

- The employer had a standard or policy governing the behaviour in question;
- The employee knew of the standard or policy and of the consequences for violating it (dissemination of a policy to all employees, including new hires, should be assured);
- Performance problems were clearly communicated and the chance for corrective action existed;
- The employer applied the standard and/or policy consistently and uniformly (documentation of performance-related situations should not be ad hoc or selective as to a person or an event. Uniformity is very important to dispel notions of setting someone up or singling them out); and
- The employee violated the policy or failed to meet the standard or take corrective action.

## Reviewing a Proposed Termination

Because of the potential for the discharged employee to mount a legal challenge, it is generally a good idea for employers to establish review policies for all termination decisions, not so much to restrict the authority of supervisors to make decisions as to ensure that those decisions are legally defensible. It should be the responsibility of the human resources manager to review termination decisions or a higher-level manager or by the employer's counsel.

## Communicating the Termination Decision / Termination Meeting

The termination meeting is going to be stressful and uncomfortable for all involved. To reduce the amount of stress, keep it brief and to the point. Terminating an employee is

one of the most difficult and challenging tasks a supervisor faces. Unfortunately, some supervisors feel such emotional conflict about firing a subordinate that they handle the matter badly. This can cause problems for a number of reasons, but most notably because an employee whose termination has been poorly managed is more likely to take legal action against the employer. The termination meeting is critical because it often dictates the employee's course of action. It is wise, therefore, for the employer to invest in a careful, concerned approach, which would include offering the employee counseling services, outplacement assistance, and even an agreement with a release.

Clear communication of a termination decision begins well before the employee is actually terminated (unless the employee is being terminated for improper or illegal conduct such as theft or assault). Firing an employee who has been repeatedly warned to improve his/her performance is generally much easier for both employee and employer than firing an employee who was totally unaware that his or her job might be in jeopardy. Honest performance evaluations and written warnings about inadequate performance are all-important components of communicating the termination decision. Any communication regarding termination should be confidential and made with a third person present.

Once the hard task of firing an employee is over, the work is not done. Take care not to disparage the employee in front of his or her former co-workers. An attitude like that will rarely be perceived as professional and can be a serious deterrent to employee morale, particularly if the employee was well-liked by co-workers. As part of the termination, the hospital/practice may want to consider providing severance pay. Providing severance pay to terminated employees is generally not a statutory issue. There is a considerable amount of litigation by employees claiming entitlement to severance pay based on a company policy or practice. It is recommended that the company review its policies, letters, etc., regarding severance pay prior to termination.

## Summary

Interviewing prospective employees is not necessarily difficult if you make sure that you stay within certain guidelines and rules in order to ensure that you do not violate any law, and thereby end up getting sued by them. Terminating employees is not an easy or pleasant task. The employer has to ensure that the decision to terminate an employee is for job-related and nondiscriminatory reasons and that the termination complies with applicable federal, state, and local laws and, of course, company policies and procedures. ■

# PUBLIC SECTOR RADIOLOGISTS REPORT LEAST WORK SATISFACTION

## Study Offers Insight into Stress Management Factors



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A survey comparing workload amongst radiologists, gastroenterologists, surgeons and oncologists in the United Kingdom reported the highest level of burnout amongst radiologists. Although it is generally impractical for most trained specialists to simply change their clinical specialty in order to decrease stress levels, identifying the inherent characteristics of the work that lead to work satisfaction or stress is paramount, as these factors are likely to be modifiable. Edwin Locke, a noted expert in the area, defined work satisfaction as "...a pleasurable or positive emotional state resulting from the appraisal of one's job

Radiologists in the public hospital setting experience significantly higher levels of work stress, burnout and lower job satisfaction compared to the private sector

or job experiences". The ability to identify factors influencing work satisfaction, or for that matter work stress, provides the opportunity to develop methods to avoid the resultant risk of burnout. In this paper, we describe some of the important reasons public sector radiologists report higher stress levels than private radiologists, and describe a way of managing this to minimise the risk of burnout in the radiological team.

### Survey on Stress & Satisfaction

We performed a nationwide survey of New Zealand radiologists to identify those work factors that result in either stress and/or satisfaction. New Zealand radiological sector consists of public and private radiology practice operating in tandem. While the public system is entirely funded by central government, the private sector is predominantly driven by a fee-for-service pay structure, with payment of radiological tests covered either by private insurance companies or patients themselves. Generally speaking, the public setting tends to deal with more

complex or emergent cases as well as elective outpatients. In contrary, private radiology tends to manage less complicated, elective cases. As many radiologists work in both environments during the course of their working week, this allowed us a unique opportunity to identify differences in the public and private radiology environment. We concluded that radiologists in the public hospital setting experience significantly higher levels of work stress, burnout and lower job satisfaction compared to the private sector.

### Inappropriate Exams Source of Public Sector Stress

To explore why this might be the case, one has to understand that inherently, radiology is about providing clinical support. By this, I mean that rather than caring directly for patients and making clinical decisions that directly impact on patient care, radiologists are called upon by other physicians when there is a clinical question to be answered by imaging, a causative contributor to work related stress, as we shall see.

Rationing of health resources, especially in socialised medical systems, is common. In a public hospital setting,

### MANAGEMENT SOLUTION: TROUBLESHOOTING THE "HOT SEAT" WAY

To decrease the frequency of inappropriate requests, we created a "hot seat" position in our institution. The radiologist or trainee assigned to the hot seat has the sole task of communicating with clinicians regarding their imaging requests as well as troubleshooting any other patient-related issues (e.g. contrast allergy, preliminary reads, etc.). This resulted in marked reduction in the amount of disruption to other reporting radiologists. Adhering to evidence-based and mutually agreed upon protocol-guided algorithm for imaging requests also helped to alleviate the situation. *optimisation of CT. Phys Med. 2008; 24(2):71-9.*



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where funding is derived primarily through the central or federal government, radiologists often find themselves acting as the gatekeeper to more sophisticated imaging modalities such as CT, MRI and PET/CT. However, radiologists are under increasing pressure to approve scans due to patient expectations and clinician demands. This in turn has to be balanced against the limited availability of essential resources. Indeed, dealing with clinicians' requests for what radiologists deemed as inappropriate examinations ranked significantly higher as a source of work stress in the public setting compared to private sector in our survey. In the private setting, where a user-paid or private insurance-based system is more often the norm, there is greater onus on clinicians and/or patients to justify the examination, thus potentially decreasing the amount of inappropriate requests.

Moreover, in most private practices in New Zealand, there is very little or no inpatient work to contend with. Thus the reporting radiologist is unlikely to be saddled with urgent requests from clinicians to multi-task. Furthermore, the current trend towards shorter hospital stays has resulted in greater pressure on clinicians to diagnose or otherwise exclude important medical conditions in order to facilitate prompt discharge. Consequently, there is an expectation that radiological investigations will be available on an almost emergent basis.

### Chronic Understaffing & Conflicting Demands

Conflicting demands on radiologists' time ranked as the highest source of work stress for those who work in public radiology. We postulate that chronic understaffing in the public sector is likely to be the culprit. Radiology workload has increased worldwide, but this has not necessarily been compensated for with an increased number of consultant posts. In an understaffed public radiology department, existing radiologists are usually expected to cover the additional workload. This creates a vicious cycle where the stressed radiologist is burdened with greater demands, resulting in increased work stress and decreased job satisfaction.

Furthermore, additional tasks such as chairing multi-disciplinary conferences or teaching obligations all add to radiologists' daily schedule. At our institution, conference cases are submitted at least 24 hours prior, to allow adequate time for case review. A dedicated time slot is crucial for adequate preparation on the radiologist's part and frequently adds additional value beyond the official radiology report. Non-clinical sessions are also allocated and the time used to pursue research interests or catching up on administrative matters.

### Sources of Work Satisfaction in Private Sector Imaging

We identified some of the most significant sources of work satisfaction for radiologists in the private sector, which include having a high level of clinical autonomy, satisfactory remuneration and having the necessary staff to perform the task at hand. Clinical autonomy stems from the ability to control and impact on one's work environment. In the private sector, radiology practices are often set up as partnerships. Therefore, radiologists usually have a say in the day-to-day running as well as the long-term goals of the practice. In contrast, public, hospital-based radiology departments are generally administered by business managers.

### Dealing with clinicians' requests for what radiologists deem as inappropriate examinations ranks significantly higher as a source of work stress in the public setting compared to private sector

Facing today's ever-expanding demand for radiological procedures and imaging studies, practice managers have a difficult task keeping departmental cost within the prescribed budget. Maintaining an open channel of communication and scheduling regular departmental meetings to resolve problems and obtain feedback are some steps that can be taken by business managers to empower clinical staff. Radiologists and managers need to understand each other's viewpoint, to be able to compromise and cooperate in their common goal of providing the best radiological service to patients and clinicians alike.

### Conclusions

Although it would seem from our survey that private sector radiology provides a superior work environment in terms of work stress and satisfaction, all is certainly not lost in the public radiology department. Finding the solutions to minimise the sources of stress in a public radiology department requires regular consultations between business administrators and radiologists, having an open mind as well as the flexibility to adapt to new approaches. Implementation of these solutions will go a long way towards improving radiologists' job satisfaction and ultimately, their mental health. ■

#### Further Reading

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# Journées Françaises de Radiologie



## THEMES A L'HONNEUR

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# MARKET OVERVIEW: PACS

## A Market Tripping Towards Desaturation



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Industry Analyst  
Medical Technologies  
Frost and Sullivan

### Introduction

The market on a European level has been on a growth curve since almost five years now. The growth rates differ across geographies as the rates of adoption, implementation and regulations are not consistent. It is a good sign for the imaging industry in the developing markets on the whole, as the need for good technology is well recognised in such markets.

### Market Cadence

The total European non-radiology PACS market is small when compared to the radiology PACS segments. The market size represented here is the value of only the total cost of the non-radiology PACS project, inclusive of software components, hardware, networking and implementation, consulting, training and professional services. It includes both departmental and enterprise-level non-radiology PACS applications. The total market size is determined by accounting for the revenue generated from installations in public and private hospitals, private imaging centres and clinics. The market is diverse across all the seven geographic regions that are covered under this study. This is due to the fact that each region is growing at a different rate. Moreover, the amount of IT penetration in the healthcare industry determines the level of non-radiology PACS implementation in healthcare facilities. The total European non-radiology PACS market stood at 83 million dollars in 2010. This value represents revenues from hospitals and imaging centres, where non-radiology PACS has been installed in the base year.

The penetration rates in these countries are increasing with the total number of non-radiology PACS installations rising with the number of hospitals.

The major reason for Germany and France having the largest non-radiology PACS market is the fact that they have a well-established hospital infrastructure. Non-radi-

ology PACS has been installed in most of the larger facilities. The United Kingdom has been a growing market since the NHS took up new initiatives with the CfH programme. The IT penetration rate in the United Kingdom is high at about 50 per cent. The non-radiology PACS penetration is the third largest with over 15.3 per cent of facilities bearing the installations. Similarly, in countries, such as Germany and France, the non-radiology PACS market share of the HIT market is larger with 33.8 per cent and 21 per cent respectively. The penetration rates in these countries are increasing with the total number of non-radiology PACS installations rising with the number of hospitals. The markets of Scandinavia and Benelux have the highest rate of IT penetration in healthcare. This is due to their healthcare infrastructure and the quality of healthcare assured by the government. The markets for radiology PACS is already saturated and these markets are looking forward to post-processing and advanced-scalable PACS solutions. The smallest market for non-radiology PACS in Europe is Spain with a total market of 2.9 million dollars. The total European non-radiology PACS market is likely to grow at a CAGR of 8.1 per cent and is estimated to reach 122.9 million dollars in 2015.

### Technology Trends

In recent years, there have been major changes that have had a great impact upon image acquisition, storage requirement options, as well as display and network requirements. When introduced initially, many healthcare units could not afford PACS due to exorbitant costs. However, rapid advancements in technology and the development of communication standards and open architecture have led to a dramatic decrease in costs, which have enabled many institutions to implement PACS in order to ensure an efficient workflow and decrease in waiting times, faster diagnoses and throughput. The major reason is the dynamic process of image acquisition, which is witnessing changes with imaging modalities, such as multisided computed tomography (CT) and magnetic resonance imaging (MRI), CR and direct radiography (DR), PET and digital mammography, and this, in turn, is changing the way PACS technology is planned. Such changes are expected to impact image-storage requirements to a great extent.

Some of the recent technological changes include the system featuring a multi-vendor DICOM interface that integrates lab images into the PACS, broker-less direct-access RIS and electronic patient record (EPR). With the growth of web utilisation and wireless technology through the use of portals and virtual private networks (VPNs), there have been improvements in image access and security. Wireless technology, which pertains to PACS, looks highly attractive for greater image access flexibility. Moreover, direct integration of SR (speech recognition) technology within PACS and RIS applications in the future may eliminate the need for a separate interface. Post-processing and 3D capabilities are going to be the future of PACS. Most of the matured and saturated markets going through the replacement cycle are looking for these value-added features.

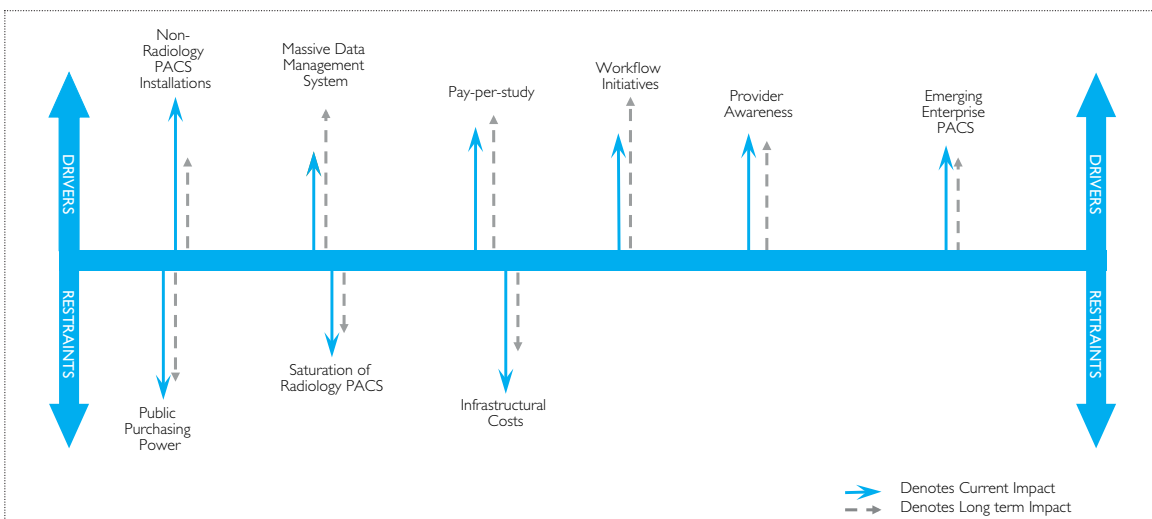
### Competitive Landscape

The European market for non-radiology PACS can be divided along three tiers of competition. Tier one consists of the multi-modality manufacturers, the large multinationals whose core business is the complete portfolio of imaging modality. They have competency in both departmental as well as enterprise suites, including non-radiology applications. Tier two features companies that approach PACS from an IT perspective. They are adept at developing their own workflow set-ups as well as handling the wider connectivity issues of end users. Tier three belongs to the small vendors and PACS integrators, which are companies that offer consulting for the successful integration and implementation of a full-fledged PACS.

These are generally local market participants that have

grassroot-level contacts and often a threat to the bigger participants with pirated versions and competitive pricing. When analysing the competitors, it is difficult to establish a consistent market share due to the nature and scalability of the PACS project. The market fluctuates every year due to new technology and possible mergers and acquisitions as well as due to the entry of new market participants. The non-radiology PACS market is fragmented with 15 participants active in Europe currently.

Tier one consists of Agfa Healthcare, Rogan Delft, GE Healthcare, Sectra AB, Philips Medical Solutions, Carestream and McKesson. These companies offer products trusted by the marketplace and the market for modality is strong because of its solid workflow configurations. The second tier consists of companies, such as Vepro, Fujifilm and Siemens Medical Solutions. Some of the smaller vendors have also gained a good portion of the market for specific application PACS with the introduction of innovative solutions. The third tier companies include NDS Surgical, Visus and others. These companies are expected to increase their market share significantly over the forecast period. Provided price issues can be addressed, a strategic alliance with companies in Eastern Europe can also help penetrate the market. Another factor that is essential for success in the European non-radiology PACS market is the ability to compete on price. This has particularly affected the major PACS vendors that have had to substantially reduce their profit margins in order to remain competitive against the increasingly attractive low-cost product offerings of smaller PACS vendors. The major problem faced by large companies in the European markets is the presence of local participants, which provide PACS solutions at a lower cost. ■



PACS Market: Drivers and Restraints (Europe), 2010

# TeraRecon's iNtuition Cloud

## Making Virtual Radiology a Reality

### A Modern Solution For Today's Imaging Workplace

The modern imaging professional operates within an extended network of referring physicians, colleagues, and partners, all of whom participate in the care of a patient, and all of whom are connected by the Internet and private wide-area networks. Today's iNtuition solution has been carefully equipped with a host of innovative features to manage the needs of such a multi-site enterprise, the virtual workplace of every physician involved in imaging today.

The challenge of working between multiple sites is compounded by the various bandwidth limitations that exist, which is why iNtuition is specifically designed with an array of features that avoid the need to transfer thousands of images across wide area networks or the Internet, when the necessary bandwidth is not available. The iNtuition UNLIMITED solution can be configured to deliver local processing and image distribution for sites with limited bandwidth, while allowing remote interactive streaming, even via the Internet-based iNtuition CLOUD if required, for sites with adequate available bandwidth and network responsiveness.

### Intelligent Routing Capabilities

Sites with limited connectivity can relay images for distributed review during off-peak hours with efficient lossless compression using iNtuition intelligent routing capabilities, while making them available via remote thin-client access before the delayed transfer has occurred. The iNtuition solution is thus fully equipped to cope with the imaging workflow challenges of multi-site enterprises, offering an unmatched, unified platform for advanced visualisation, to support the goal of optimal patient care.

TeraRecon's two key innovations: iNtuition MOBILE and iNtuition CLOUD are technologies that complement the existing iNtuition UNLIMITED portfolio, which already includes AquariusWEB for zero-footprint review of images and reports via a browser, and the core iNtuition UNLIMITED solution which provides limitlessly-scalable advanced visualisation and decision support for the most expansive multi-site healthcare enterprise.

The iNtuition portfolio can now be deployed in any manner of configurations, from single-site, to multi-site, to fully Cloud-based deployment with seamless, zero-footprint interoperability with other healthcare informatics technologies.

### Unmatched Breadth of Clinical Applications Addressed

While no client-server advanced visualisation solution exists today which can address all possible clinical applications, none can match the breadth of clinical applications addressed directly by iNtuition, and we are confident that with TeraRecon, modality workstations will be depended on the least, while the vast majority of clinical needs will be directly addressed, with smooth, uniform and optimised thin-client/server workflow, without reliance on dedicated workstations, with all their associated disadvantages.

As a result of such flexibility, the iNtuition solution from TeraRecon has been proven in over 4,300 installations globally, including multiple multi-site deployments, such as the County Radiology Clinic of Gävleborg Hospital, Sweden's first county-wide, multi-site server solution supplied by TeraRecon, and Bollnäs hospital, where they chose iNtuition when the county bought CT and MR, and now have a common system in Hudiksvall and Gävle hospitals for all CT and MR examinations.

### Key Features That Differentiate iNtuition

#### All-server-side rendering:

All iNtuition applications are supported with server-side rendering. TeraRecon does not offer or require any standalone workstation to deliver any part of the iNtuition solution.

#### Minimum hardware requirement:

Thanks to unique and patented rendering technology, TeraRecon can host more advanced



### What do Users Say?

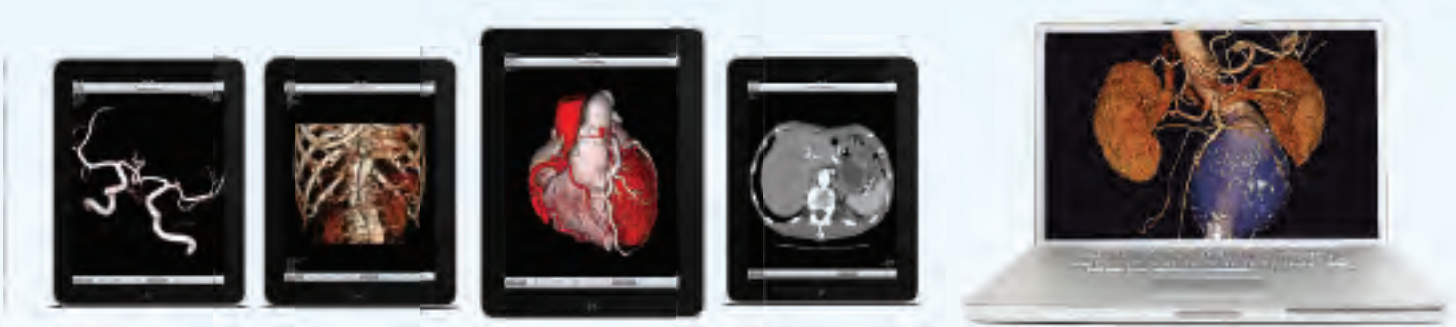
*"It's the ease of use and reliability of the TR-WS that makes reading and interpretation of CT coronary angiograms a routine task rather than the tedious necessity that it used to be. And it's iNtuition CLOUD that finally made virtual radiology a reality, allowing for the first time to fully disintegrate the diagnostic part of radiology's value chain into the separate tasks of image acquisition, data storage, 3D-postprocessing, image interpretation and finding presentation"*

— PD Dr. Med. Christopher Herzog,  
MBA Radiologie München



**All it takes is a browser.**

Infinitely scalable all iNtuition tools, secure upload, accessible from anywhere.



users for a smaller hardware footprint, than any competitive technology. iNtuition can support multiple users rendering up to a total of 48,000 slices concurrently, from a single 2U server without any external power requirement beyond the server's standard power input. Only 3U is required to include all routing, intelligent preprocessing and rendering for up to 48,000 slices.

#### **Virtualization, VMWare™ Ready**

iNtuition is certified VMWare Ready, proven with Citrix XenApp™, and is thus well suited to appropriate virtualisation of the applicable client applications.

#### **Intelligent Pre-Processing and Routing**

The AquariusAPS intelligent pre-processing server automatically analyses, processes and prepares volumetric metadata immediately after scan completion, providing uniquely powerful workflow and decision-support for the interpreting physician or 3D technologist. For medium-volume applications, it can also handle all scheduled and rules-based image routing tasks, while for high-volume applications, the dedicated AquariusGATE intelligent DICOM router can be deployed.

#### **Broad support for clinical research**

iNtuition is used widely by research programmes around the world, who enjoy its broad range of features for research, including a framework for plugging in home-grown processing algorithms, customizable measurement and reporting protocols, with export to

AIM, XML and CSV, automated rules-based anonymisation, and much more.

#### **Clinical Continuity**

For clinical continuity, iNtuition can be operated with a cluster of two or more servers, which are "Mutually Aware", and tolerant of the failure of any one server, provided data is stored to at least any two servers in the group.

#### **Mutual Awareness and Limitless Scalability**

All iNtuition Servers are aware of each other and work intelligently as a team, whether within one facility, or across multiple facilities. iNtuition is designed and proven for the largest, most complex, multi-site enterprises.

#### **Mobility and Interoperability**

iNtuition features iNtuition MOBILE, delivering interactive, contextual 3D 'Scenes' to mobile devices such as Android™ and iPhone™ / iPad™ / iPod Touch™. iNtuition MOBILE supports URL integration with other mobile applications such as EMR for in-context launch with the patient record.

#### **Zero-Footprint Web Access**

AquariusWEB offers browser-based access to images and reports with industry-standard SSL security, and without requiring any download, plugin, or VPN link to the rendering server. URL integration with EMR is supported.

#### **Open Standard Integration**

Proven integration with the widest range of PACS, RIS and EMR solutions and an open in-

terface to allow any third party company to integrate to and launch the iNtuition solution, in-context.

iNtuition CLOUD requires no new hardware investment, nor does it require the use of any existing hardware in a facility, and the requirement for internal IT support and resources is minimal. As an Internet-based service, all it takes is a browser, accessible from any Mac or PC, to make use of the tools. Traditionally, to justify the deployment of an advanced visualisation solution, a site needed a sizeable volume of studies that require such processing, but with iNtuition CLOUD, since there's no hardware or IT support investment required, it's possible to enjoy the benefits of a full deployment, but to pay one study at a time. This makes advanced visualisation far more accessible to sites that would otherwise not be able to offer such procedures as a part of care delivery.

Communication between sites, affiliates, partners and experts is easily achieved when the images are relayed through the Internet with iNtuition CLOUD. Registered users are granted a unique, secure account login, which can be used to upload DICOM data and then to log in via a web browser to access the full, interactive application for real-time review and processing.

**Free Trial Available Immediately**  
iNtuition CLOUD is available immediately, free of charge, for evaluation by prospective users at [terarecon.com/cloud](http://terarecon.com/cloud)

# BUYER'S GUIDE: PACS

## PICTURE ARCHIVING AND COMMUNICATION SYSTEMS



### Visage® 7

#### Thin Client 3D PACS for Distributed Environments

Visage 7 provides efficient interpretation, review, 3D processing, and archiving of large volumes of images, including thin slice volumetric data from CT, MR, PET-CT, and other 3D modalities. Since Visage is entirely based on thin client streaming technology, it scales easily from a single radiology practice to large distributed healthcare enterprises. Instead of copying image data to multiple locations and workstations, images are streamed instantly, on demand.

Visage natively supports both Windows and Mac OS client computers, and allows to perform all interpretation and post processing functions remotely via Internet, on workstations, office PCs, laptops, and mobile devices.

Visage can be deployed as a standalone PACS or as a "universal viewing" solution on top of an existing IS/PACS infrastructure.

For more information visit [www.visageimaging.com/visage7-overview.html](http://www.visageimaging.com/visage7-overview.html)  
Contact Visage Imaging in Berlin, Germany: +49 30 70 09 68 0

## PHILIPS

sense and simplicity



### Philips iSite PACS

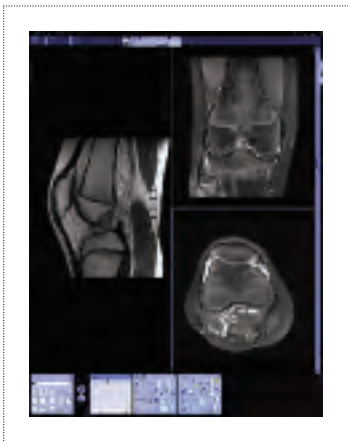
#### Clinical depth anywhere, anytime

With iSite, Philips simplifies PACS for your organization with an approach that works for clinical needs across the entire enterprise, coupled with a service delivery model adaptable to organizations of all sizes, now and in the future. iSite PACS delivers the following advantages:

- Full-resolution images, information, and clinical applications to practitioners wherever and whenever needed to facilitate healthcare, patient outcomes and reduce costs
- Open platform offers clinicians a complete view of patient information at one workstation
- Advanced visualization enhances efficiency across key areas of clinical workflow
- "Per study" service delivery model presents a low-risk, scalable model that ties costs to activity
- Intrinsic advanced visualization tools provides embedded 3D tools for multimodality visualization

For more information visit  
or call 800-285-5585 or 425 487 7000.



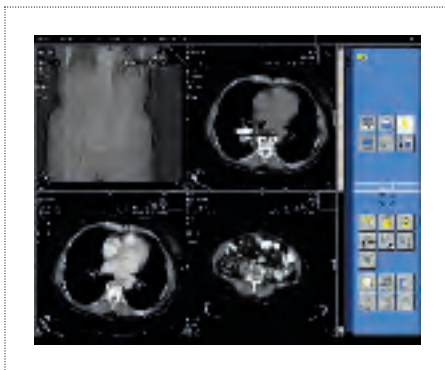


## syngo.plaza

syngo.plaza is the agile PACS solution for the clinical routine. With this PACS solution from Siemens 2D, 3D, and 4D reading come together in one place. It is a flexible solution that is scalable from single workstation up to a full-blown PACS system.

- Wide application range at one workplace with functionalities like Cross Reference, Spine Labeling, CTR, DSA, and optional Mammography workflow support
- Easy access to advanced visualization with syngo.via I thanks to tight integration
- Intuitive user interface with tools like Findings Navigator for fast navigation through findings. Wide range of personalized tools and display layouts to support efficient diagnosis.
- Complete Patient Jacket based image access to further and prior studies incl. multi archive access
- syngo.plaza Web for cost-effective, easy, and secure image access
- Cost saving opportunities through flexible infrastructure: available as software-only<sup>2</sup>, virtualization, etc.

For more information please visit: [www.siemens.com/syngo-plaza](http://www.siemens.com/syngo-plaza)

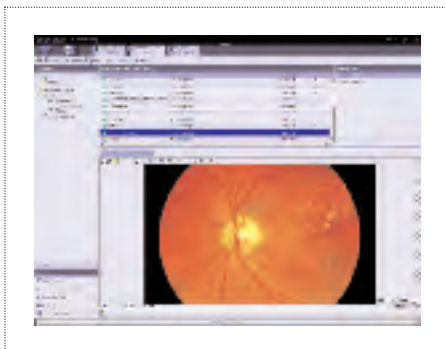


## syngo.imaging

syngo Imaging helps to make a busy day of image reading more productive – wherever you are, inside or outside the medical facility. It also offers advanced functions like comprehensive administration and monitoring tools

- Efficient case preparation with Quality Assurance (QA) functionality enables effective reporting workflow and by this saves reading time
- Faster loading performance contributing to time savings<sup>3</sup> in accessing images from your reading or viewing workplace
- Easy access to advanced visualization with syngo.via I thanks to tight integration
- Efficient archive and storage management thanks to effective resource utilization, e.g., temporary storage of images (e.g. scientific case studies or external patient CDs)
- Easy remote installation without the need for administrative rights and efficient administration with integrated User management

For more information please visit: [www.siemens.com/syngo](http://www.siemens.com/syngo)



## syngo.share

syngo.share is a unified, patient-centric clinical image management and sharing system. It empowers healthcare institutions to efficiently manage and share clinical imaging data – DICOM, non-DICOM and multimedia formats.

- Patient-centric view with universal viewer for convenient access to imaging data in one location, even across multiple external locations of a hospital
- Can act as the information management backbone for the whole enterprise potentially addressing all imaging data types in a single archive strategy
- Multimedia archive capabilities literally support more than 300 arbitrary data formats including JPEG, TIFF, AVI, PDF or even proprietary formats, greatly extending PACS systems like syngo.plaza
- Flexible deployments as multi-PACS and multi-ology data management covering e.g., radiology, cardiology, pathology, ophthalmology, endoscopy, and surgery
- Full-fledged IHE-XDS and XDS-I compliant repository
- Modular and scalable solution allows to pick from departmental, enterprise-wide up to regional sharing deployments

For more information please visit: [www.siemens.com/syngo](http://www.siemens.com/syngo)



### MediaWriter

**MediaWriter** is a cost-effective solution that burns DICOM files to CD/DVD and USB media. Customers can create CDs/DVDs from any PACS or modality user interface. Direct access is provided through the MediaWriter client application or web client. Additional features:

- Multi-disc spanning or auto-detection for large studies
- Burn data for multiple patients to media
- Customized splash screens and CD/DVD labels
- Anonymize patient information
- Optional AES 256-bit encryption technology
- DICOM viewer options for PC/Mac
- User interface in 13 languages
- Optional HL7 report integration
- IHE workflow

The **MediaWriter D35 System** is designed for customers burning up to 35 discs per day; **MediaWriter D200 System** is for customers burning up to 200 discs per day.

For more information about **MediaWriter** contact us at +49 (0)89 450 807 600, email [sales@pacsgear.com](mailto:sales@pacsgear.com) or visit us online at [www.pacsgear.com/mw](http://www.pacsgear.com/mw).



### iNtuition

TeraRecon, a global leader in advanced image processing and 3D visualization techniques, provides advanced imaging systems for medical applications based on its patented image processing technologies. iNtuition is TeraRecon's flagship offering for advanced visualization and decision support. With iNtuition, TeraRecon delivers an intuitive, interactive experience anywhere in the healthcare enterprise through a true Thin-Client server based solution.

iNtuition offers the most in terms of power, concurrent users and applications, with the smallest hardware footprint, compared to any other solution in the industry.

iNtuition is offered in many forms: as a turnkey server-based solution, including hardware, implementation, training and support servers; as an enterprise software license with unlimited scalability; or as an Internet-based service managed by TeraRecon itself. iNtuition's flexible licensing allows the solution to be purchased for a given rendering capacity, a given number of concurrent users, or on a subscription basis where fees scale with the amount of data processed.

A six-time winner of Frost and Sullivan awards, including European Company of the Year in the category of Medical Imaging & Advanced Visualization Applications, TeraRecon provides a comprehensive suite of imaging tools via client-server technology and now expands these tools through iNtuition CLOUD, the iNtuition solution in the form of a web-based service. TeraRecon's Cloud leverages the powerful iNtuition architecture, which from inception has been a fully scalable, client-server solution, capable of delivering a full spectrum of advanced visualization capabilities to any client computer.

For more information please contact us: [info@terarecon.com](mailto:info@terarecon.com)

Please visit our website: [www.terarecon.com/cloud](http://www.terarecon.com/cloud)

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**TERARECON**

# INTRODUCING CIRSE 2011

## Interventional Radiology at the Fore



Author  
Ciara Madden

Cardiovascular and Interventional Radiological Society of Europe (CIRSE)  
Vienna, Austria

This year, CIRSE, in collaboration with IMAGING Management, bring you an exclusive preview of some of the highlights of the coming congress. The CIRSE annual meeting has undergone dramatic changes in recent years, introducing a more varied and interactive programme. Although the congress has managed to encompass the vast spectrum of IR procedures, this increased quantity has not been at the cost of quality. Hands-on workshops and interactive discussions allow for in-depth analysis of individual topics, with small groups engaging in lively and often practical learning.

This year's programme features new, interactive session formats such as the new hot topics symposia, where structured debate is followed by a panel discussion, allowing a thorough appraisal of controversial subjects. The inaugural session debuts with a look at "Is CCSVI a real entity? Should we treat MS patients with CCSVI by venoplasty?" (Sunday, 14:30), followed on Tuesday by "Image-guided ablation replaces surgery in resectable liver tumours" (Tuesday, 13:00).

Following a successful reception at last year's CIRSE, the European Board of Interventional Radiology (EBIR) will once again offer more than 50 young IRs the chance to certify their expertise. An improved student programme is offered, with the aim of increasing awareness of IR among undergrads.

### Ongoing Research

Another important element of CIRSE is discussion of fledgling therapies. "Ongoing research in IR" (Saturday, 11:30) will showcase many promising new areas of investigation such as treatment of chronic diseases via intra-arterial delivery of stem cells, the applications of anti-angiogenic drugs, resorbable microspheres and bioabsorbable and cell-coated stents, as well as the latest breakthroughs in islet cell transplantation.

### Treating Resistant Hypertension

Another important development in IR is the use of "Renal denervation for resistant hypertension" (Monday, 10:00). Hypertension is prevalent among the adult population, and is a major cause of cardiovascular mortality and morbidity. Medical management is not always sufficient, and it has been suggested that selective denervation of the renal artery could help regulate blood pressure in such patients. This session

addresses the theory behind the procedure, tools and basic techniques, as well as an in-depth look at the results of trials and studies into this promising therapy.

### Chronic Back Pain

There can be many causes of chronic back pain, and IR now provides solutions to many of these. IR's range of treatments extend well beyond treating vertebral fractures, as will be demonstrated during "Percutaneous treatment of chronic back pain" (Wednesday, 08:30). Topics under discussion include the role of MR imaging in back pain, and IR solutions to sciatic back pain, facet joint syndrome and sacroiliac joint syndrome.

### Honorary Lectures

CIRSE 2011 will celebrate the achievements of luminaries in the field through honorary lectures from renowned experts. The prestigious Gruentzig Lecture will be delivered by Prof. Jonathan Moss (Sunday, 15:30), current President of the British Society of Interventional Radiology. His lecture, "Evidence-based Interventional Radiology – not how, but if and when" will address the need for continuing to gather solid data on minimally invasive therapies. Prof. Małgorzata Szczerbo-Trojanowska from Lublin, Poland, will deliver the honorary Roesch Lecture (Tuesday, 14:00) on the latest developments in "Evidence-based medicine and carotid stenosis treatment".

### A World of Science Waiting

The sessions highlighted above are but a small sample of what CIRSE 2011 has to offer. A world of science awaits attendees, in both new and established medical fields. Detailed coverage of the extensive oncology, neurology and diabetes sessions are featured in the pages of this journal in a special focus section, on pages 35 – 43, and the full programme can be found on the CIRSE website, [www.cirse.org](http://www.cirse.org). Minimally invasive therapy will play a key role in the future of medicine, and the CIRSE annual meeting is a good place to find out why. ■

*We hope you will join us in Munich on September 10th for the opening ceremony!*

# MANAGEMENT OF DIABETES COMPLICATIONS AT CIRSE 2011

## Prevention & Treatment in Focus

CIRSE's coming annual congress in Munich will explore interventional radiology's growing role in reversing the effects of diabetic complications. Diabetes mellitus is a pandemic of our time. There are more than 220 million people with the illness worldwide and this number is increasing. The systemic nature of the disease produces wide-ranging complications that are responsible for incalculable loss in quality of life and a tragic number of deaths. While lifestyle changes and medication may be effective in alleviating symptoms or preventing them from worsening, the long-term consequences of diabetes, particularly if poorly managed, mean high costs for healthcare systems and much suffering for patients.

### IR's Role in Diabetes Management

One of the most serious complications in patients with diabetes is the development of peripheral arterial disease. In combination with neuropathy, another severe complication of the disease, this can lead to a diabetic foot, which requires emergency treatment to prevent eventual amputation of the foot or even the leg. It is now clear from the literature that minimally invasive revascularisation by an IR has the same outcome as bypass surgery in preventing amputation. Moreover, the IR technique is low-cost, much less invasive and does not entail long hospitalisation. Diabetic teams in which IR is included, can potentially reduce the number of amputations by 50 percent.

For diabetic foot conditions in particular, interventional radiology can help salvage a limb, where it may otherwise be sacrificed. This can be done by specially trained IRs using advanced image guidance, allowing accurate recanalisation in vessels below the knee of less than 3mm diameter. Patients prefer IR as it is minimally invasive, and they experience shorter recovery times and fewer negative side-effects. IR is also valuable for those in a weakened condition, when open surgery may be physically impossible.

### Treating Diabetes: On Show at CIRSE

For all these reasons, CIRSE recognises the vital importance of including sessions in its annual congress on the preven-

tion and treatment of diabetic complications. As well as supporting the growth of the IR community and informing attendees of the latest updates in minimally invasive therapies, CIRSE 2011 offers experienced IRs refreshers on practical techniques and training for IRs looking to enhance their experience. The hands-on masterclasses in particular, focusing on small group interactive training, are a superb opportunity to build skills and competence using life-like simulations.

### Featured Sessions at CIRSE

- The diabetic foot: An integrated IR approach
- BTK recanalisation
- Imaging of the BTK circulation: State of the art
- Conceptual approach to recanalisation of crural arteries
- Treatment of pedal occlusive disease
- Retrograde tibial artery recanalisation
- BTK vascular interventions
- Techniques and new tools for the skilled and the novice
- Outcomes of BTK recanalisations
- Outcomes of angioplasty and bare stents
- Outcomes of drug eluting balloons and stents
- How to manage complications
- Guidelines for management of the diabetic foot

### Making a Difference

In diabetic vascular disease, amputation can be the all-too-often consequence that may have been prevented by earlier intervention. It is estimated that every 30 seconds a leg is lost somewhere in the world due to diabetes. Those who undergo below-the-knee amputation have a poor prognosis. 10 percent of below-the-knee amputees die in the peri-operative period and 30 percent die after two years. In many cases IR can offer a solid alternative.

### A Wide Range of Options

Some of the main vascular complications of diabetes can be treated with the following minimally invasive image-guided methods:



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- Percutaneous transluminal angioplasty (PTA) employs a balloon-tipped catheter which is guided to a narrowed artery through a small puncture in the patient's groin. The balloon is inflated to expand the blocked artery and then removed. A stent may be inserted to hold the vessel open if needed.
- Subintimal angioplasty uses the loop-wire technique to create a new passage through the vessel wall, as opposed to re-opening an existing vessel blockage. With this technique longer occlusions can be treated.
- Percutaneous endarterectomy (atherectomy) may be used to re-open larger vessels by removing atheroma with the aid of specially designed catheters.
- Cryoplasty combines the technique of angioplasty with a cooling effect. The balloon is inflated with liquid nitrous oxide rather than saline. The cooling is thought to prevent some of the complications of angioplasty such as vessel scarring.
- Laser recanalisation uses laser light to widen vascular occlusions. The optical fibre delivers the laser to the required location through a catheter.

Although specialised in the treatment of vascular complications, IR also features in other areas of diabetes management. For patients with brittle diabetes, islet cell transplantation, though still experimental, may offer stabilisation of blood glucose control and allow improved quality of life. This promising procedure, in which pancreatic islet cells are infused

into the liver through the portal vein, will be one of the topics discussed at CIRSE 2011 in the special session, "Ongoing Research in IR" (SS 304). This is not yet a curative option, the desired outcome being better diabetic control and reduced insulin dose. Although the transplanted islet cells do secrete insulin, they often need support from a daily dose of the hormone, albeit a smaller amount than the patient previously needed. Emphysematous pyelonephritis (EPN) is a rare but potentially fatal renal infection in which the build-up of toxic gas can eventually lead to multiple organ failure. The condition is more common in diabetics. Formerly, nephrectomy was the standard treatment, but percutaneous drainage is possible in some cases, allowing kidney salvage if performed in time.

### Economic Advantages

The economic evaluations of current therapies may only examine procedural costs, and can omit the associated expenses. A great proportion of the costs of diabetes are attributable to prolonged hospitalisation and amputation. Over 10 million Type 2 diabetics in Europe produce 29 billion euros of associated costs (see figures).

Multidisciplinary diabetic foot clinics are available in some European countries and have proven to be the most effective way of treating diabetic foot disorders, the most costly of all diabetic complications. However, in many European countries the organisation of diabetic foot care is regrettably

## WIDER COSTS OF DIABETES TO THE ECONOMY AND INDIVIDUAL

### Medical Costs

- Homecare nursing
- Transportation to and from a clinic
- Follow-up procedures
- Recurrence of a condition

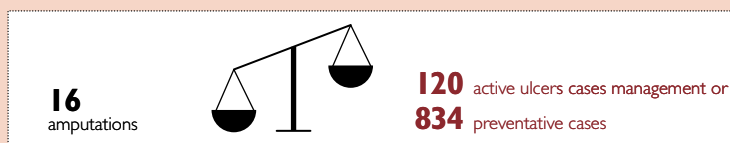
### Non-Medical Economic Impact

- Loss of earnings due to hospitalisation, recovery or disability
- Disability pensions
- Social-service support
- Impact on the family (further loss of earnings/study time)
- Potential reduced purchasing power of the individual or family due to altered economic circumstances



The high cost of amputation compared to multidisciplinary prevention and management

There is strong evidence that a multidisciplinary approach can reduce amputation rates by a sizable percentage



Produced with information from:

Assal J.P., 1995 in Van Acker K., *The Diabetic Foot*. Antwerp 2001, p.93; and Apelqvist J., et al, *The global burden of diabetic foot disease*. *Lancet* 2005; 366: 1719-24

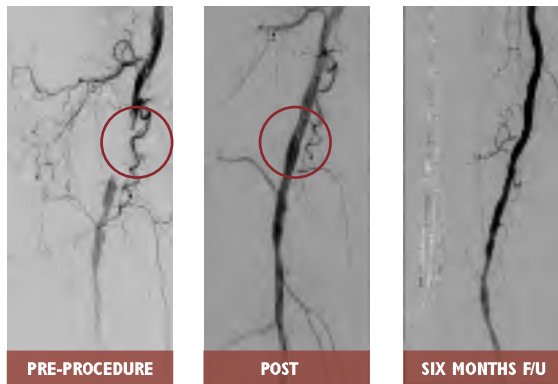
still poor. The Foot and Ankle Clinic of the Abano Polyclinic, Italy is one example of an effective multidisciplinary set-up where the first choice is a minimally invasive technique whenever possible: treating the complication from within the blood vessel and minimising collateral damage.

This has sound economic advantages for the clinic. Dr. Manzi, Director of its interventional radiology unit, calculates that the average cost-per-patient of materials used in revascularisation is 1,170 euros, whereas in the U.S, an elective amputation alone costs 6,000 dollars (around 4,300 euros), and one following a bypass failure will cost 28,000 dollars (around 20,000 euros), without taking into account any wider socioeconomic costs.

### The Future

With diabetes affecting an ever-growing segment of the population, the solutions that IR offers are more relevant than ever. For individuals, this means a chance to avoid disability and ultimately death. For wider society and healthcare providers it means lower long-term costs and a reduced burden of disease. IR is a continuing source of innovation and, as the natural progression of medicine will logically favour less invasive procedures, these techniques are becoming more prevalent in the management of an increasing range of diabetic complications.

The value of IR is being recognised on all fronts with the discipline now included in guidelines for the treatment

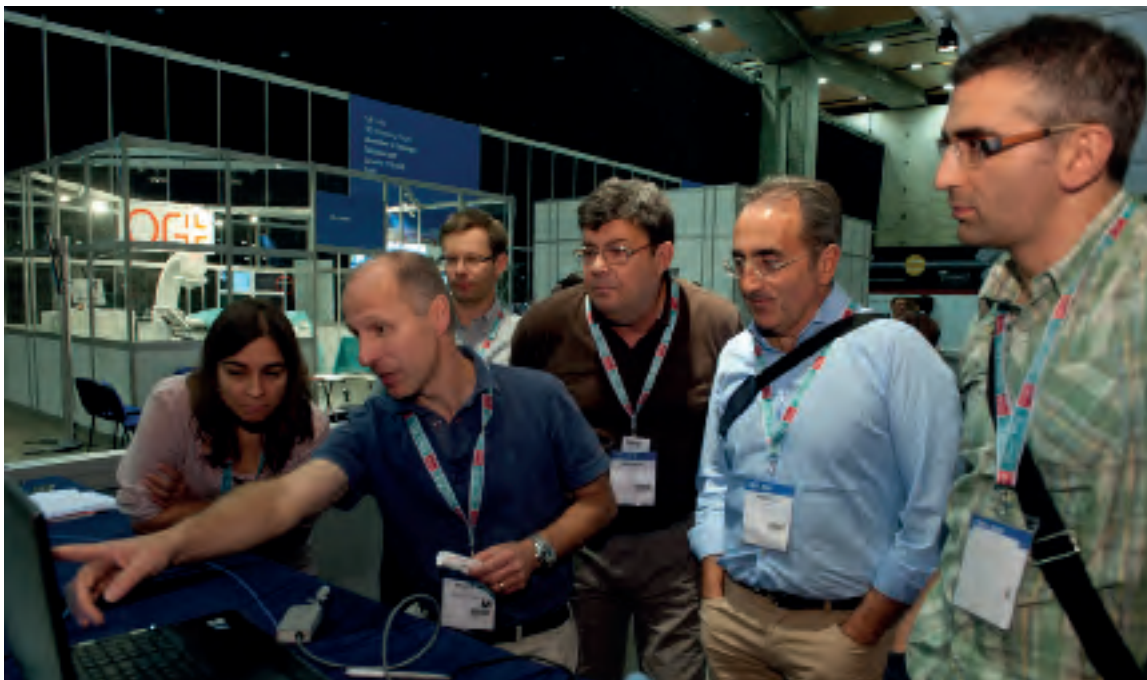


Stenting of the Superficial Femoral Artery

© Cordis Corporation: 'Action' (Atherosclerosis and Circulation Training and Information Network)

of diabetic complications. For example, during the 2011 meeting of the International Working Group on the Diabetic Foot (IWGDF), which establishes the consensus guidelines for diabetic foot management, there was a strong IR presence.

In these new guidelines IR is recognised as a true alternative to bypass surgery. Also, the multidisciplinary approach to the disease, with teams in specialised foot clinics offering the latest techniques, is mandatory for better patient care and preventing amputation. Every patient with diabetes and a foot ulcer should join a complete diagnostic pathway to look for peripheral arterial disease as early revascularisation may be essential to prevent later sequelae. It is vitally important that the benefits of these treatments are recognised, developed and made available to patients. ■



CIRSE 2010 Hands-On Course

# SOLUTIONS TO STROKE AT CIRSE 2011

## Showcasing the Latest Research and Therapies



Research aimed at increased understanding of stroke and its therapy has made huge strides, but the attendant time-window between the incident and the initiation of treatment remains one of the most significant challenges for those who seek to make effective treatment available to all. Thankfully, interventional radiologists, along with their diagnostic, neurologist and management colleagues, have come up with solutions to these problems, and accordingly, stroke therapy will once again form a central theme for this year's annual CIRSE congress.

### Emergency Imaging is Vital

As any radiologist knows, the most pressing thing in a stroke emergency is to diagnose the type, location and severity of the stroke, and CIRSE will devote several sessions during the congress to imaging and diagnostics. Strokes can manifest as either ischaemic or haemorrhagic stroke, and each requires a distinct treatment pathway. High quality imaging modalities can give further clues as to the location and impact of an ischaemic event, and how best to salvage as much brain tissue as possible. It is widely agreed that CT imaging must be available for the normal functioning of any stroke unit, and MRI may be beneficial in some cases. Modalities such as these allow for accurate risk/benefit calculation and good patient selection.

Also at the CIRSE congress, a number of lectures and discussions will take place on imaging and indications in stroke management, as well as the detection of vulnerable plaques of the carotid arteries, which might be a cause of stroke. The benefits of different imaging modalities, such as diffusion- and perfusion-weighted MRI and perfusion- and angio-CT, will be discussed at sessions that cater for interventionists, diagnostic radiologists and radiographers.

### Imaging Sessions

- RWS 2906 Interventional Neuroradiology – the role of the radiographer
- SS 1604 Introduction to acute stroke management
- SS 3103 Preventative stroke management

Recent research has shown that combining diffusion (DWI) and perfusion (PWI) imaging can show which areas of the

damaged tissue are still salvageable, allowing doctors to streamline their treatment. However, other data suggests that a CT/CT-angio combination can provide all the information necessary to define the most appropriate therapeutic strategy, along with patient history and clinical symptoms.

### Preventative Measures

According to the WHO, treating hypertension can reduce the risk of stroke by up to 40 percent. Being aware of the modifiable risk factors (such as smoking, poor diet and lack of exercise) and taking appropriate measures can help people lower their risk of stroke. Medications such as antihypertensive drugs, antiplatelets, anticoagulants and lipid-lowering drugs can also help reduce the risk of stroke.

For patients exhibiting significant carotid stenosis, mechanical unblocking of the artery may be needed to counter the risk of stroke. While carotid endarterectomy is widely used to great effect, trial data released in early 2010 indicates that stenting is a safe and efficacious alternative, and many patients have benefitted from this therapy.

CIRSE 2011 will dedicate a multitude of sessions to recanalisation and/or restoration of the arteries supplying the brain by means of angioplasty and stenting. Sessions will discuss the evidence for and application of not only carotid stenting, but also the infant field of intracranial stenting, as well as management of intracranial aneurysms. A cliché it may

### THE BURDEN OF STROKE

Stroke is one of the most common medical emergencies today, and is the third greatest cause of death worldwide, after coronary heart disease and cancer. Equally sobering are the outcomes for those who survive: according to the WHO, stroke is the leading cause of long-term disability worldwide, as well as being the second most important cause of cognitive impairment after Alzheimer's disease. Experts agree that "time is brain" - up to two million brain cells can die every minute that oxygen perfusion is cut off.

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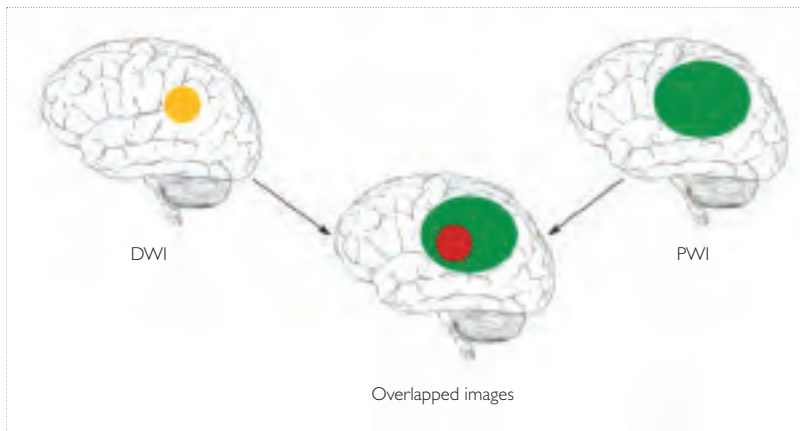


Figure 1

- Area of restricted diffusion on DWI
- Area of restricted perfusion on PWI
- Penumbra / Diffusion-perfusion mismatch are when DWI and PWI are overlapped

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be, but “prevention is better than cure” is as relevant today as it ever was, and CIRSE will highlight the role IRs can play in stroke prevention.

### Prevention Sessions

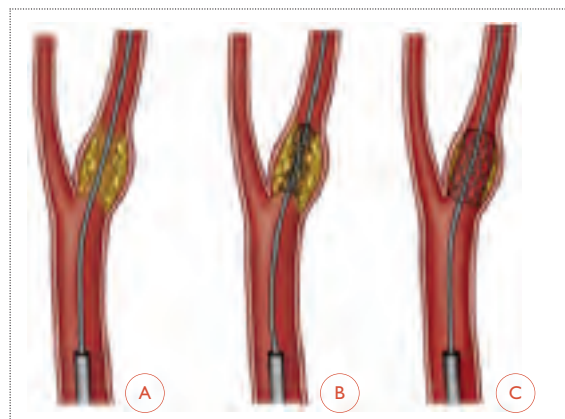
- WS 503 Endovascular treatment of intracranial aneurysms and AVMs
- SS 1005 Carotid lesions
- WS 2904 CAS for carotid lesions
- Rösch lecture – Evidence-based medicine and carotid stenosis treatment
- SS 3103 Preventative stroke management (intra- and extracranial stenting)

### Time is Brain

Of course, not all strokes are preventable, and very few are predictable. Effective treatment must be on hand to treat acute stroke cases, and thanks to interdisciplinary cooperation, a number of options now present themselves. CIRSE 2011 will offer a wide range of sessions and workshops addressing the tools and techniques used in these therapies, as well as clinical evidence supporting them.

Figure 2

- A. Guidewire deployed to the site of plaque build-up
- B. Stent delivered over catheter
- C. The stenosis is eliminated after the stent has been deployed



### Ischaemic Stroke

For ischaemic stroke, intravenous thrombolysis (IVT) has proven an enormous boon, but it is still hampered by a restrictive time-window, and some patients will require additional or alternative treatments. Luckily, interventional radiologists have adapted their catheter delivery systems to allow for local delivery of clot-busting drugs, which can be administered very precisely thanks to image-guidance. This method of delivery has a longer window of opportunity, as it can be effective up to six hours after the initial event, as opposed to the maximum 4.5-hour window of intravenous delivery. Many centres also use bridging - a two-step thrombolytic treatment where the first dose is delivered intravenously and the remaining one intra-arterially.

Recent clinical experience has shown that intra-arterial thrombolysis (IAT) more efficiently removes the large clots occluding basal cerebral arteries compared with IVT. In addition, it has also been shown that mechanical clot removal is more effective and probably less risky than IAT. Consequently, many centres use mechanical clot removal as the first interventional step in patients with middle cerebral artery occlusion who would be candidates for IVT.

Other clots prove impervious to any thrombolytics at all. Large clots are particularly hard to break down, and while many centres routinely deliver IVT before deciding upon follow-up options, some centres will immediately embark upon mechanical clot removal should the clot be deemed unlikely to respond. This treatment method has been found to be effective up to eight hours following the initial infarction. Interventional radiologists have a number of options for mechanically removing a clot, including retrievable stents, balloon thrombectomy, aspiration thrombectomy (using special suction catheters) and pincer equipment that can grab the clot, allowing it to be pulled out along with the instrument.

### Haemorrhagic Stroke

Haemorrhages within the skull are difficult for any specialty to treat, but treatment of subarachnoid haemorrhage has greatly improved in recent years. The traditional surgical method of cutting off the blood flow to the aneurysm with a metal clip has been all but replaced by the interventional alternative of coil embolisation. While coil embolisation is a more costly alternative, studies such as the ISAT trial clearly demonstrate a clinical advantage to the minimally invasive procedure. Surgery performed on the brain region is risky and entails a long recovery process, but delivering devices such as coils via catheter to block the blood flow gives the

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**MAIN TOPICS**

- Vascular Interventions
- Transcatheter Embolization
- Non-Vascular Interventions
- Interventional Oncology
- Neuro Interventions
- Clinical Practice
- Imaging

Figure 3

Ischaemic figures according to the Trial of ORG 10172 in Acute Stroke Treatment (TOAST). The incidence of these stroke subtypes varies according to the population under investigation.

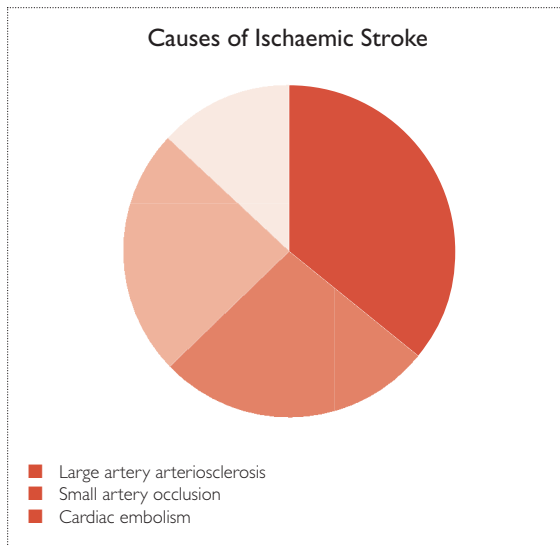
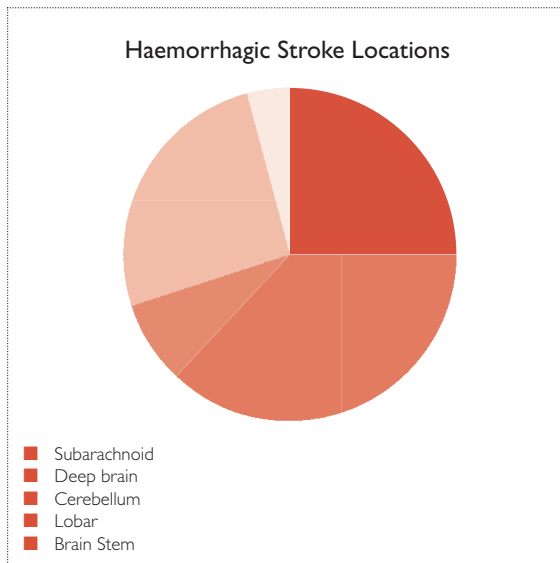


Figure 4

Subarachnoid haemorrhages account for 25 percent of haemorrhagic strokes, according to a population study of 1041 ICHs.



patient a less invasive option. Further research in the field has also developed a promising new liquid embolic agent.

**Treatment Sessions**

- ICS 1005 Stroke management
- WS 1402 Revascularisation tips in acute stroke management
- SS 1704 How to treat an acute stroke patient
- ST-HoW1/ST-HoW2 Stroke therapy
- WS 503 Endovascular treatment of intracranial aneurysms and AVMs

**Clinical Set-Ups: How Best to Manage Stroke Patients**

With time being of the essence, it is essential that clear and straightforward protocols exist for diagnosis and referral.

Awareness campaigns informing the public, GPs and paramedics of the need to treat stroke as an emergency have led to an increase in patients seeking emergency attention. These increased patient volumes have enabled hospitals to dedicate resources to this patient population. Many hospitals are establishing dedicated stroke units, which adhere to increasingly uniform treatment protocols and standards for ensuring swift and suitable treatment.

Larger hospitals often offer IR techniques such as intra-arterial thrombolysis and thrombectomy as part of this treatment protocol, but smaller hospitals will, understandably, often lack the appropriate staff to enable 24-hour coverage. To ensure that as many patients as possible can access appropriate treatment, a Comprehensive Stroke Centre (CSC) concept was introduced in 1995, allowing for a more cost-effective and productive use of IR manpower resources. The “time is brain” imperative demands that stroke care occurs as swiftly as possible. For this reason, CSCs should ideally be located in a centralised geographic location to allow for multiple stroke centres to efficiently transfer such patients after local evaluation.

It goes without saying that patient outcomes improve in centres that receive a case volume that ensures a threshold level of technical and clinical experience. Of the total number of stroke patients who present to a stroke centre for acute therapy, an estimated 10 – 20 percent require IR intervention – a sizable minority that underlines that importance of round-the-clock access to these brain-saving active treatments. The CIRSE annual conference will address many of the issues surrounding clinical management of stroke, including how best to set up protocols with colleagues in other departments, and how an interventionist can become involved in this life-saving branch of IR. ■

**CLINICAL ADVICE SESSIONS**

- WS 2202 *How to get started in stroke management - Interactive discussion*
- SS 1604 *Introduction to acute stroke management*

**STROKE-RELATED IR TREATMENTS:**

- Carotid artery stenting
- Intra-arterial thrombolysis
- Clot retrieval (pincers, cork-screw devices, retrievable stents)
- Intracranial stenting
- Coil embolisation (for haemorrhagic stroke)
- Hypothermic neuroprotective therapy (intravascular cooling – still in development)

# SOLUTIONS FOR ONCOLOGY AT CIRSE 2011

## IR Providing Vital Support for Oncology

As cancerous cells often spread beyond their site of origin, a whole-body approach to treatment is vital, and multidisciplinary collaboration is the only way to provide the best care. IR began its work in oncology decades ago and since then the scope of involvement has gone from treating the complications of cancer to treating the tumours themselves.

### Learn More About IR & Oncology

The broad and multi-faceted nature of cancer care is a central theme at CIRSE 2011 with numerous sessions covering the current status, role and value of various IR interventions in oncology. Special sessions relevant to daily practice will inform about the latest developments from the world of interventional radiology and hands-on workshops will provide live demonstration of techniques, reinforced by guided practice. Further opportunities for building knowledge and experience are offered during interactive case sessions, in which the audience will take part in discussions on the challenging cases presented. As well as enhancing diagnostics with image-guided minimally invasive biopsy techniques, IR is strengthening the armamentarium of therapies for cancer. IR treatments have many benefits arising from a localised approach, which can avoid the systemic side-effects common to classic cancer treatments.

Interventional oncology is typified by the various forms of embolisation and ablation, some of which will be highlighted during “Oncologic IR under the microscope”, a special session where the value of these techniques will be discussed in the context of the observable cellular changes and clinical outcomes. A newer ablation technique that offers the exciting prospect of non-invasive intervention is high-intensity focused ultrasound (HIFU). The promising development of HIFU techniques applied to bone tumour and breast cancer treatment will form part of the special session on “High intensity focused ultrasound”.

Interventional oncology plays an especially valuable role in the numerous cases where surgical removal of a tumour is not feasible or the patient is too weak to undergo surgery. Such scenarios can often occur due to kidney, lung, and liver cancers and their metastases. Special sessions on these diseases will discuss, among other things, the advantages and applications of radiofrequency ablation and cryoablation, as well as the virtues

of IR compared to image-guided radiation therapy.

### The Growing Role of IR

IR is set for expansion in the field of cancer management and renowned radiology researcher, Dr. Hedvig Hricak, Chair of the Radiology Department at Memorial Sloan-Kettering Cancer Centre, New York, U.S, is certain of the advantages of the specialty and its growing role in oncology: “The advances in minimally invasive medicine have been among the greatest successes in healthcare. They reduce complications, shorten or eliminate hospital stays and are increasingly being applied in surgical interventions. The demand for image guidance for biopsy and therapy is becoming more and more important. At this particular time, image-guided minimally invasive therapies are used predominantly for metastatic disease, but I am certain that treatment of primary tumours by interventional radiologists will increase in the near future.”

### The Future of Interventional Oncology

Interventional oncology’s potential for new developments in the therapeutic arena is impressive. Continuing breakthroughs in reaching difficult-to-access tumours with microcatheters may provide future opportunities to treat cancers that, today, are often incurable; and developments in nanotechnology may open unique possibilities for the discipline. Some of the up-and-coming areas of IR in oncology, including new applications for HIFU and new non-thermal ablation techniques, will be presented in a “New frontiers in oncologic IR” special session.

IR has evolved into a specialty that is providing its own contributions to oncology and its indications are sure to widen. Nevertheless, the central importance of imaging to IR’s unique approach is clear and the session on “Image guidance and assessment of tumour therapy” will detail the use of various imaging techniques in intervention guidance and tumour assessment. By combining existing methods and future medical innovations, IR is devising more sophisticated therapies for cancer care, offering patients not just the possibility of more effective treatment but also of reduced side-effects and a better quality of life. ■



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## INTERVIEW

# PROFESSIONAL CHALLENGES FOR MEDICAL IMAGING IN ROMANIA



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### **Please give us an overview of the department of radiology where you work.**

Our hospital is the largest in the north eastern part of Romania, with 1,200 beds. In the radiology clinic we perform almost every type of imaging examination – conventional, ultrasound, CT, MR and interventional radiology (abdomen and periphery, except for cardio and neuro). In 2010 we performed 37,000 radiographies, 30,000 ultrasound examinations, 1,200 mammographies, 400 angiographies, 4,500 CT and 3,000 MR examinations.

### **Are radiologists and technologists adequately financially compensated in Romania in comparison with other European countries?**

Unfortunately, the answer is no. We joined the European Union in 2007 but we are still far off concerning salaries in our healthcare system. In my opinion, the real problem is that our politicians are not able to understand that it is important to invest much more in medicine in order to have a competitive system. Radiology is an extremely expensive specialty and health is not for free.

### **What impact did the worldwide recession have on Romania's spending on health?**

At the start of 2009 the healthcare budget was dramatically cut, and now represents less than 3.6 percent of Romania's GDP. In 2010 it was the same situation and we don't see any improvement for this year. Major new medical developments are in doubt today. Budgeting for radiological equipment is not based on a clear model and therefore replacement of old machines is not planned. This is the subject of controversy. We are still seeing the negative side effects of the global financial crisis. Solutions? The healthcare system's management must be honest, visionary and follow efficiency guidelines.

### **Are waiting lists for certain imaging exams a challenge in Romania?**

Yes, today in Romania we have waiting lists, especially in university medical centres. In our department there are wait-

ing lists for US, CT and MR examinations. Emergencies are examined the same day, no matter the modality. For US the waiting time is up to three days, in CT and MR for up to three weeks. As long as the Ministry of Health isn't buying new machines and we can't appoint new doctors in our department, I unfortunately don't see any solution in the public sector.

### **How is growth in the private imaging sector impacting radiology service provision and what regulations are needed to better organise this?**

The private imaging sector is growing rapidly in Romania and this could be a viable solution for the provision of efficient services, so long as the state does not understand that investments in radiology ought to be mandatory. In our country, radiologists are allowed to work both in the public and private sector. It is a tough battle and in my opinion the private sector will win due to its ability to offer better conditions, new machines and better salaries. As usual, the market will decide the rules. Finally medicine is a business, despite the fact that I do not completely agree with this philosophy.

### **How is quality control of Romania's departments of radiology carried out?**

Every year the National House of Medical Insurances audits imaging departments in order for them to continue to receive financing. The criteria were modified last year and are still subject to change. I really hope these criteria will be modified according to the rise in the quality level of our work. On the other hand, last year the Ministry of Health approved guidelines in every specialty and we are waiting, in the near future, to release control modalities.

### **What role does the national radiology society play in promoting education and training?**

According to its statutes, the aim of SRIM is to increase the scientific level of its members by giving access to facilities and organisational, functional and material re-

quirements. The national structure of the society consists of six local branches, founded in the traditional university centres: Bucharest, Iasi, Cluj, Timisoara, Craiova and Targu-Mures, each led by a local committee. These branches coordinate scientific activity in their area and have autonomy in developing scientific projects. SRIM organises a biennial congress and edits a journal entitled "Imaging" four times yearly. According to European trends in subspecialties, since 2003 we developed the Group of Sectional Imaging (CT and MRI), the Romanian Society of Breast Imaging, the Romanian Society of Musculoskeletal Imaging, the Romanian Society of Neuroradiology and Interventional Radiology and the Romanian Society of Paediatric Radiology, all of them affiliated to the Romanian Society of Radiology and Medical Imaging. These societies are totally autonomous, led by their own boards and their Presidents included in the Board of the SRIM. The Romanian Society of Radiology and Medical Imaging is the body responsible for provision of postgraduate training in diagnostic radiology in Romania. The Board of the Romanian Society of Radiology and medical imaging last year adopted the European curricula for training in our specialty. After completion of four years of training, having passed the final exam, the resident becomes a radio-diagnostic specialist and is eligible to apply for a post as radiologist in the public or private sector.

### **What is the Romanian approach to dose management & patient safety?**

Since we joined the EU, it is mandatory to give each patient a paper in which we fill in the DAP and DLP for conventional radiology and CT exams respectively. According to Romanian law, it is the duty of the radiologist to accept or reject patient examinations depending on dose management criteria.

### **What are the most difficult challenges you experience in your professional life?**

We, as radiologists, must seek greater cooperation with our colleagues from other clinical specialties. To improve practice it's extremely important to have clear and honest feedback from our colleagues. This is a real challenge and communication is the key to its success. In addition, due to the low salaries here, many of our radiologists are choosing to go to work abroad. I am extremely proud of my team and very lucky that no one wants to leave it. It is a challenge to keep this team together, but by learning every day from one another and offering respect we will succeed. As head of the department, the medical and administrative activities intermingle every day. This is sometimes difficult as long as we try to make things work properly. By having a good team and a very strict schedule we can solve almost every problem. ■

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Find out more about radiology in Romania by visiting [www.srim.ro](http://www.srim.ro).

## **HOTTOPICS IN MEDICAL IMAGING IN ROMANIA**

### **The Increasing Role of Ultrasound in Medical Diagnosis**

#### **Why is ultrasound growing at such a rapid pace? Is this equally the case in Romania as in the rest of the world, in your opinion?**

Ultrasound is safe, non-invasive, quick, inexpensive and accurate. These reasons are good enough for the growth of any imaging technique. However, US has more to it. Direct contact and interaction with the patient makes the method attractive for the majority of clinicians. The real-time character is not to be neglected. After all, beside fluoroscopy, US is the only wide scale available real time imaging technique. On the other hand, US is useful and used

in so many medical specialties that, in this field at least, turf battles ceased a long time ago. Constant technical innovation, the emergence of new technologies as well as the availability of contrast media contribute to the amenity of an already mature imaging method. Romanian doctors are just as interested in US as doctors all over the world, if not more. The perception of US both as an extension of clinical senses and as an advanced diagnostic tool is accurate in Romania as well. Much of what has been recently developed by ultrasound professional and scientific international bodies, including professional competence classification, is already implemented and active in Romania.

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Interviewee  
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### **How active is the Romanian government in funding research in medical imaging?**

Until 2008, a comprehensive national government programme was active that financed a research grant framework, in a greater range of areas. Imaging was not a specific topic of interest but it found its way in many of the other major fields such as cancer, ageing, etc. Unfortunately, major cuts in research funding were effectuated in the last two years, even for ongoing grants.

### **Do you agree that other medical specialties should have equal access to ultrasound technology?**

Other medical specialties should definitely have equal access to US. The reality is that many non-radiologists perform excellent US in their field of expertise, many times better than radiologists. I would rather emphasise that radiologists should not abandon US for the sake of CT or MR. This is the real danger. And if radiologists don't act and show professional interest in this method, there should be no cause for surprise, if later on doors start closing for them in different niche applications of US. Let us just think of what happened with echocardiography, obstetric and ophthalmic US. US is not and should not be the turf of radiologists but the risk that other medical specialties might become excessively possessive with these slices of US is real.

**Radiologists shouldn't abandon US for the sake of CT or MR... and if radiologists don't take action, there should be no surprise if later on, doors start closing for them in different niche applications of US**

On the other hand, I strongly support the idea that access to ultrasound practice should be controlled. Not by the medical specialty but by the existence of thorough knowledge and reasonable expertise, acquired through formal education and proven by formal accreditation of professional competence in the field of US. In other words, it does not really matter who does it, as long as that person is knowledgeable and accredited.

### **Why is specialisation in ultrasound increasing so much and is this a good or a bad thing?**

Because the application of and amount of knowledge ac-

quired in every area of US is increasing exponentially. There can no longer be "universal" ultrasonologists, similar to what happened in radiology. Specialisation in US is also associated with the penetration of the method in clinical wards. Medical specialties will focus on their limited field of interest, taking US across new boundaries in that specific domain. In the end, specialisation in US is neither good, nor bad: it is simply unavoidable.

### **What is your opinion on the usefulness of elastography – is this a commonly used diagnostic technique in Romania?**

Elastography is the new, still promising child of US. Exciting as a research tool, elastography has its own areas of already proven usefulness. Much is still to be done and understood in this field and, most of all, standardised, since, on the market, there are at least six different approaches to US elasticity assessment and image formation and at least four different ways to express stiffness numerically. Personally, I have been using elastography since 2006 and I feel comfortable including this technique in the general armamentarium of US diagnosis the same way as with compound scanning, harmonics, Doppler, contrast and 3D. In other words, I press the "elasto" knob every time I feel stiffness information might be relevant for the diagnosis. Most university hospitals but also many private practices operate US scanners with elastography. I would say that, in Romania, elastography is commonly used in teaching and research centres as well as in top-level private institutions.

### **How is formal training in ultrasonography organised in Romania and what role does the society for ultrasound play in this?**

Formal courses in US have been running in Romania since the early Eighties, governed by the fathers of Romanian US, Professors Gheorghe Badea and Gheorghe Jovin. From the first exam held in 1991, three types of US competencies were tested: general, echocardiography and obstetric/gynaecology. From that point on, formal training was offered in seven teaching centres spread across Romania. Only graduates of accredited teaching centres are accepted, as a prerequisite for registration at the national examination of competence in US. Formal training extends over a period of six months, and is composed of formal courses, hands-on sessions, clinical observation, case reports and supervised practice. We have a national curriculum, programme and course directors accredited by governmental decision.



The SRUMB produces and keeps the curriculum up-to-date and advises the governmental bodies. It also has a major role in accrediting new teaching centres or course directors. The SRUMB site is the centre of information about competence and postgraduate courses. In conjunction with EFSUMB, it organises an annual Euroson School Course jointly with the national congress of SRUMB.

**Please tell us about the CERIS study you are involved in to promote non-invasive imaging in musculoskeletal ultrasound in young adults and children.**

The CERIS project aims to develop complex non-invasive imaging assessment protocols for some musculoskeletal disease in children and young adults. The focus is US and MR. It is funded by a national research grant and runs mainly due to the enthusiasm and perseverance of young academics. It already expanded be-

yond its original purpose, as new applications of the protocols emerged. More information on the CERIS project is available on the website of the university.

Non-invasiveness is, in the end, one of the major goals of imaging. We want to get as close to the complete diagnosis as possible, without harming the patient. We only stick needles or wield a scalpel to make a diagnosis when there is no other choice left. Even when we have the diagnosis there is still need for follow-up. On the other hand, even with “noninvasive” imaging, repeat x-ray exams are limited in number. If all the above criteria are true for adults, they apply even more to children and young patients. Non-invasiveness brings greater comfort to the patient and is, therefore, better accepted. It bears no complications. Yet, it is not always the least expensive approach to solving a problem. The main concern about using non-invasive techniques is that they should be reasonably accurate. And this is the justification for all the research that is being done. ■

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- 21 – 26** EIBIR School on Neurology Imaging  
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- 26 – 29** WFUMB Congress  
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### SEPTEMBER

- 07 – 10** Erasmus Course Breast & Female Imaging  
Chios, Greece  
[www.emricourse.org](http://www.emricourse.org)
- 09 – 11** Argentinian Society of Radiology  
Buenos Aires, Argentina  
[www.congresoar.org.ar](http://www.congresoar.org.ar)
- 10 – 14** Annual Meeting of CIRSE  
(Cardiovascular and Interventional Radiology Society of Europe)  
Berlin, Germany  
[www.cirse.org](http://www.cirse.org)

- 18 – 22** 21st Congress on Ultrasound in Obstetrics & Gynaecology  
Los Angeles, U.S.  
[www.isuog.org/worldcongress](http://www.isuog.org/worldcongress)
- 29 – 30** Annual Scientific Congress: Management in Radiology (MIR)  
Nice, France  
[www.mir-online.org](http://www.mir-online.org)

### OCTOBER

- 05 – 08** 14th European Health Forum Gastein  
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[www.ehfg.org](http://www.ehfg.org)
- 06 – 09** RANZCR Annual Congress  
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- 15 – 16** Essentials of Emergency & Trauma Radiology  
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