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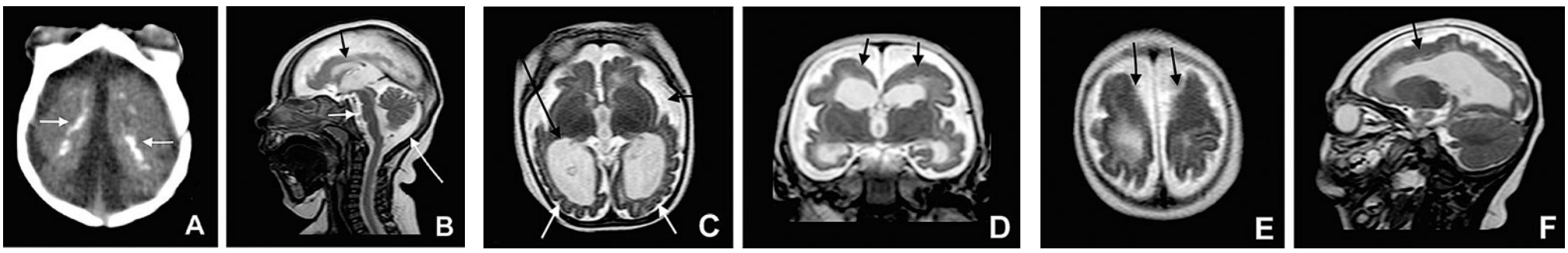


Microcephaly, cortical malformation, and brain calcification; Axial CT image (A) shows many small dystrophic calcifications in the junction between cortical and subcortical white matter (white arrows) and noticeable reduction of the brain parenchyma thickness. Sagittal T2 weighted image (B) shows hypogenesis of the corpus callosum (black arrow), enlarged cisterna magna (long white arrow), and pons hypoplasia (white arrow). Axial T2 weighted image (C) shows simplified gyral pattern (white arrows), ventriculomegaly (long black arrow) wildly open Sylvius fissure as well as enlargement of subarachnoid space (black arrow). Coronal T2 weighted image (D) shows pachygyria in frontal lobes (black arrows). Note the bilateral cortical thickness in the pachygyric frontal lobe (black arrows), shown on axial and sagittal T2 weighted images (E and F).

Zika birth deffects decrease, but…

ECR 2017 Guest Lecturer Maria de Fatima Vasco Aragao, a radiologist from Pernambuco state, Brazil, has been tracking the Zika virus ever since it broke out in her country in 2015. She will highlight how CT and MRI can help reach diagnosis, especially in the absence of microcephaly. In an exclusive interview with European Hospital correspondent Mélisande Rouger, the radiologist warned there might be more to come regarding the spectrum of Zika syndrome, with possible outcomes such as epilepsy and cognitive impairment.

'We do not follow patients routinely in order to prevent sedation of infants and ionising radiation. Control studies are only indicated after identification of clinical signs of a complication, for instance hydrocephalus and seizures. 'Microcephaly and brain malformations can be diagnosed with ultrasound during pregnancy.'

'When a baby is born with microcephaly in an epidemic area, the paediatrician and neuropaediatrician usually suspect congenital Zika syndrome, whether or not the mother recalls a rash during pregnancy. But we are beginning to see cases in which neuropaediatricians don't suspect congenital Zika syndrome, because the babies don't have microcephaly, but have.normal-size heads.' They undergo MRI examination due to unspecific neurological signs, e.g. delayed neuropsychomotor development and motor deficits. Here, radiologists must be alert, as the indication is not Zika virus or microcephaly, and microcalcifications may be subtle, so could be missed. 'Not only the presence of calcification, but also its location at the cortical subcortical white matter junction needs to be identified, as it is highly suggestive of congenital Zika syndrome.

'Another suggestive finding is malformation of cortical development predominant in the frontal lobes. In addition, these children are around one year and, therefore, specific IgM test for Zika virus can be negative, even if the child has the disease. Therefore, the radiologist's responsibility is even more important in case of congenital Zika syndrome without microcephaly, to suggest the diagnosis to the paediatrician and neuropaediatrician. In these cases, radiology is the only tool we have to make the diagnosis. So radiologists must be alert. '

'Imaging is important, especially in less severe cases, for early detection of congenital Zika syndrome, allowing rehabilitation to start quickly, to help improve their development. If microcephaly is absent and clinical signs appear when infants are several months old, the most important way to diagnose the syndrome is through imaging studies, so radiologists need to detect microcalcifications at the cortical subcortical white matter junction, which can be difficult on MRI, and malformations of cortical development, predominant in the frontal lobes.

Radiologist **Maria de Fátima Viana Vasco Aragão** is president of Pernambuco Radiology Society, professor of radiology at the Maurício de Nassau University and Scientific Director of the Multimagem Diagnostic Centre in Recife.

'Imaging is also important in identifying complications of the disease, such as hydrocephalus, in which the indication for surgery for ventricular derivation is important, to prevent neurological deterioration.'

How many cases are there?

'Since its peak in October/November 2015, new cases of congenital Zika syndrome decreased throughout 2016. Two possible explanations: t the population is gradually becoming immune to the virus in north-east Brazil and prevention has become more intense, with people knowing how to protect against the Aedes aegypti, the mosquito responsible for Zika infections.. 'The WHO revealed that, as of 14 December 2016, 75 countries and territories, especially in Latin America, reported evidence of mosquito-borne Zika virus transmission. Up to then 29 countries, particularly in Latin America, had reported microcephaly and other central nervous system malformations; four were without endemic transmission. After Brazil, Colombia ***(67)*** and the USA (37) had most cases.'

Observational studies to understand the spectrum of this syndrome onginud. 'The fact that some children do not present with microcephaly but image alterations raises questions of great importance for public health. Perhaps we've seen the tip of the iceberg with the most severe brain damage cases associated with microcephaly.' Researchers want to know the real size of what is submerged, where minor changes without microcephaly could cause future problems, e.g. epilepsy and cognitive impairment..

'Other groups are trying to evaluate prospectively the risk of developing microcephaly and other abnormalities after Zika infection during pregnancy. Besides congenital microcephaly, neurologic complications have been found in adults.' According to the WHO, up to 14 December there was an increase in Guillain-Barre cases and/or laboratory confirmation of Zika virus infection among Guillain-Barre cases in 20 countries. Myelitis and encephalitis have also been identified. 'As radiologists, we try to help the scientific community to understand the pathophysiological process of the disease.'

Is there hope of a treatment?

'There is neither specific treatment nor a vaccine. Although vaccination can be developed, a treatment for the lesions caused by the virus is extremely unlikely. This does not mean there is nothing to do. Once the disease is recognised, rehabilitation must begin immediately, especially in less severe cases, to provide the chance of better neuro-psychomotor development for the children and support for their families.

'Treatment and support must also be directed towards other disease manifestations, – seizure, ophthalmologic and auditory deficits, arthrogryposis and possible complications, e.g. hydrocephaly.'

Demands for high quality education

ECR focuses on youth

'Youth' is the central theme of this year's ECR. More than 25,000 delegates from over 100 countries are expected for the 29th conference at the Vienna's Austria Centre to take part in the annual meeting that promotes science and innovation.,

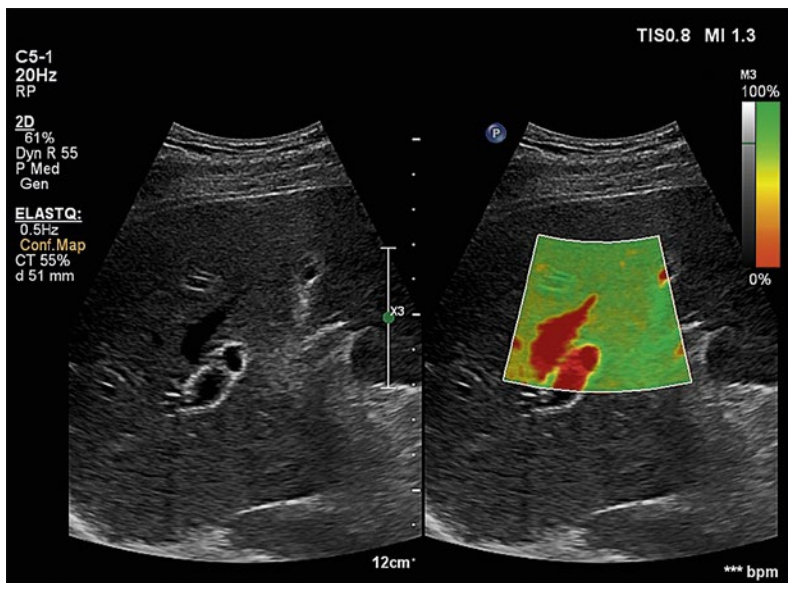
The Youth focus is reflected throughout the 2017 program, to which end the planners considered the demands of a young generation of radiologists for high-quality education, delivered in an efficient and customer-friendly way. The more interactive session will attract junior radiologists.

Professor Paul M Parizel is the first person to occupy the new role of a combined ESR and ECR presidency. The participants expect a varied program. There will be three state-of-the-art symposia, 10 professional challenges sessions, 19 special focus sessions, more than 70 refresher courses and four multidisciplinary sessions, which feature radiologists, oncologists, gynaecologists and surgeons involved in the interdisciplinary treatment of patients. The good relationship between the ESR and the European Federation of Radiographer Societies (EFSR) also has a strong impact on the program. 'The quality of our performance depends on the strength of the entire team,' Parizel observed. 'I am so happy that the ECR collaborates closely with radiographers, and the scientific program for 2017 will reflect this growing symbiotic relationship.'

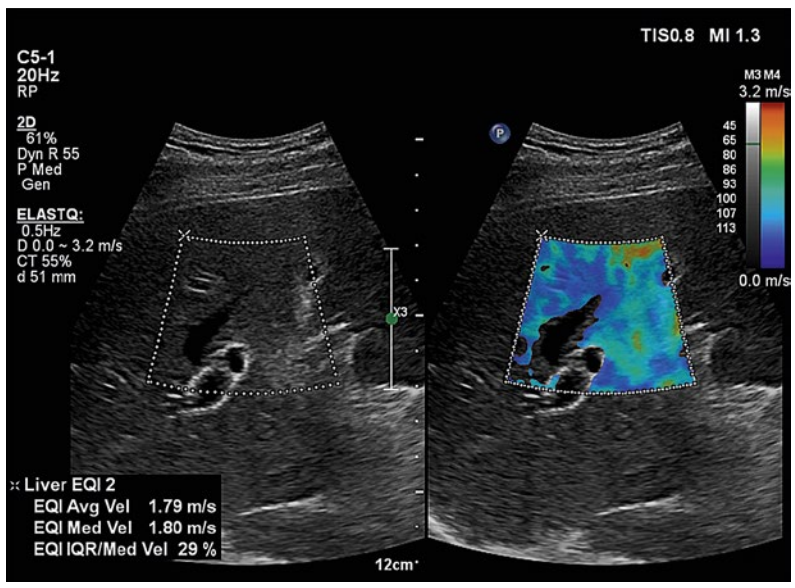
Neurologist Professor Paul M Parizel, who leads Antwerp University Hospital's radiology department, has been appointed the first ESR/ ECR President

New ElastQ Imaging, real-time shear completes Philips solution for liver a

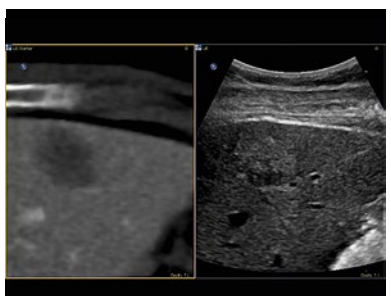
NEW: Evolution 3.0 EPIQ ultrasound upgrade offers high-res PureWave crystal transducer technology, shear wave elastography, contrast enhanced ultrasound, and image fusion. Could you ask for more?



The confidence map captures areas with high (green) and low (red) measurement accuracy. Shear waves cannot propagate through liquids, so the veins captured are coded red

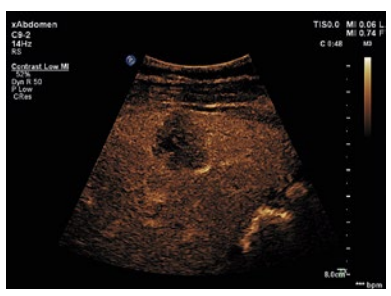


Shear wave elastography shows clearly increased liver stiffness, with the medium velocity of the shear wave propagation around 1.79 m/s, indicating cirrhosis. The colour gaps in the measurement box correspond with a hepatic vein and a branch of the portal vein



The CT scan has detected a suspected liver lesion. Good CT-Ultrasound fusion imaging with definition of suspected, hyperechoic liver lesion

Increased vascularisation of this liver lesion cannot be defined in the colour coded duplex ultrasound scan



In the contrast-enhanced ultrasound examination the liver lesion shows a distinct wash-out after around 50 seconds, indicating a liver metastasis

Philips has released the EPIQ Evolution 3.0, an upgrade to its range of high-end ultrasound scanners – and a device that combines a number of innovative technologies to improve image quality and processing. Professor Dirk-André Clevert, head of the Interdisciplinary Ultrasound Centre at Munich University Hospital, explains what sets this new system apart from any competition.

Asked why the specific focus in development of the EPIQ-platform was liver imaging, he pointed out that the liver is the largest and central metabolic organ, with many pathological processes manifesting within it. 'This applies primarily to tumour metastasisation but also to parenchymal changes other than liver cancer, such as fibrosis or cirrhosis. The liver is therefore an organ of great interest to all medical disciplines for oncological, inflammatory, vascular and parenchymal questions.'

What does Evolution 3.0 mean in this context?

'The special feature is the combination of different advanced elements in one system: *high resolution PureWave crystal technology, shear wave elastography technology (ElastQ Imaging), contrast enhanced ultrasound (CEUS) and image fusion*. This covers all four mainstays of liver imaging.

'The first is image quality, i.e. the B-mode image, which diagnosis hinges on, and for which we require high resolution transducers that can detect even the smallest, deep-lying lesions. Newly developed data processing algorithms additionally ensure fast image reconstruction.

'The second mainstay is contrast enhanced ultrasound, because only the use of contrast media enables us to fully utilise the diagnostic relevance of ultrasound images. The system offers high frequency transducers, providing optimal resolution with sufficient depth of penetration, which can additionally be combined with contrast-enhanced ultrasound.

'Elastography is the third mainstay. ElastQ Imaging is a colour coded, quantitative measuring system to evaluate tissue elasticity in real-time. Rigidity measurements indicate potentially pathological changes not yet visible on the B-mode image, and whether the tissue is becoming softer or harder after treatment. Image fusion is the fourth mainstay. This procedure can sonographically detect pathological changes seen on CT or MRI scans and can substantiate a firm diagnosis.'

Other medical device manufacturers offer Ultrasound/CT/MRI image fusion. Does EPIQ have unique capabilities?

Moving centre stage in liver interventions

3-D simulation includes haemodynamics

New 3-D simulation models that include haemodynamics enable better treatment of hepatic tumours via radio-embolisation, according to eminent Spanish radiologist José Ignacio Bilbao Jaureguizar

Report: Mélisande Rouger

In radio-embolisation, an endovascular technique currently used almost exclusively in liver cancer therapy, particles are liberated in the arterial flow of a vessel feeding hepatic tumours, to deploy the particles within the arterial tumoural network.

Interventional radiologists use a microcatheter through which they inject particles loaded with yttrium-90, which emit radiation in a diameter between 2.5 and 11 mm for about 64 hours.

Crucially, the particles must be placed within the tumour, so that the total radiation goes only there. However, doing so remains a challenging exercise, mainly due to the blood stream.

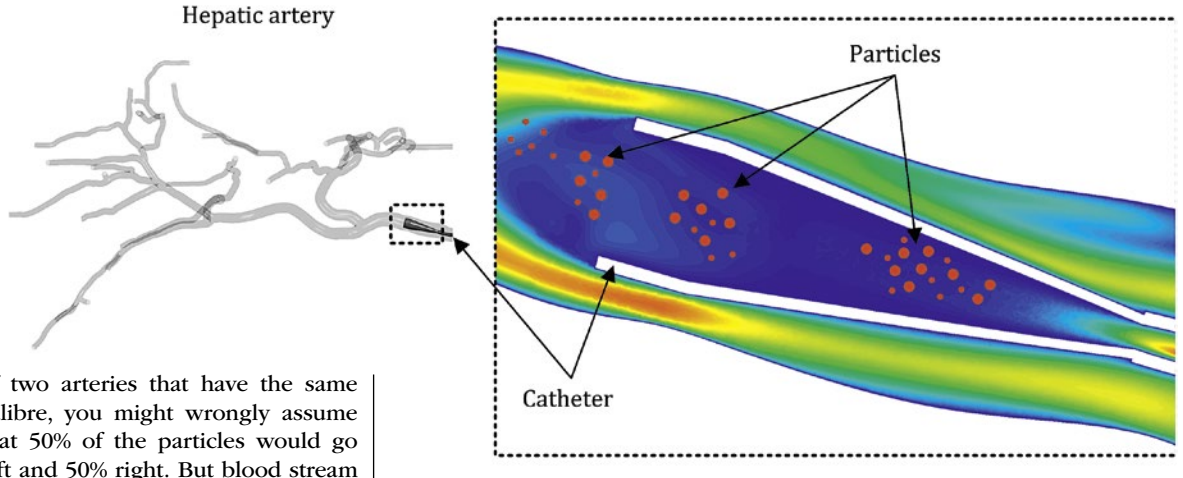
Depending on the arterial flow, areas of the tumour may receive more or less particles, according to José Ignacio Bilbao Jaureguizar, professor of radiology, head of interventional radiology and consultant radiologist at University Clinic of Navarre in Pamplona, Spain.

'This is one of the problems we have,' he explained. 'We use angiography and selective catheterisation techniques to homogenously distribute the particles, but it all depends on blood flow in the end. So some areas will be treated appropriately, and others won't – or not as much.'

Because they needed to understand vascular flows better, Bilbao's department decided to team up with the University of Navarre (UN) School of Engineering in neighbouring San Sebastian, to help develop a computational simulation model based on the anatomy, to study all possible scenarios of particles distribution. (See: Numerical investigation of liver radio-embolisation via computational … https://www.ncbi.nlm.nih.gov/pubmed/27751569).

The simulation model takes into account all the available information, such as what kind of catheter will be used and its shape, or its distance from the next arterial bifurcation.

'There are many parameters to factor in and countless scenarios in which particle distribution is not as homogenous as it should be,' Bilbao explained. 'For example, if you place a catheter close to the bifurcation of two arteries that have the same calibre, you might wrongly assume that 50% of the particles would go left and 50% right. But blood stream is a complex physiological process, and a catheter, even if only a 1mm calibre, may interfere with it,' he said. 'You may also obtain different results if you place the tip of the catheter close or further to the bifurcation, in a central or lateral position in the vessel, or if you liberate particles at high or low speed.'



Anterior view of the patient-specific hepatic artery modelled by Jorge Aramburu Montenegro in his thesis for computational simulations and a detail of the particle–haemodynamics in the vicinities of the injection

The UN researchers came up with a large amount of possibilities and findings using and analysing real-sized 3-D models, according to Bilbao, who compared particles distribution to cars in highway traffic. 'We are learning a tremendous set of things. Simulation models enable us to test new catheters and see if they work, or not, understand how our equipment works, and issue appropriate user recommendations, among others. It opens up a lot of possibilities.'

Radiology began to take an interest in haemodynamics study a few years ago, when a team in the USA showed the value of studying blood flow in prosthesis placing to correct aneurysms in the aorta (Basciano CA. Computational particle-haemodynamics analysis applied to an abdominal aortic aneurysm with thrombus and microsphere-targeting of liver tumours. PhD Thesis, North Carolina State University, Raleigh, NC, 2010.)

Studying smaller mobile vessels in the liver is just as interesting an option for radiologists, but they must learn to focus on functional imaging, Bilbao believes. 'We can't work with morphological criteria alone any more; we need function. Radiology is a wonderful morphological technique and we're particularly fond of studying microanatomy in depth. However we must get

wave elastography, ssessment

'The platform offers a large range of transducers, with three different transducers available for abdominal scanning alone. This choice of transducers makes it possible to utilise the technology developed for the liver for other applications and organs as well. For patients with acute stroke, CT and ultrasound data can be fused to check for any severe brain damage, and for patients with prostate cancer it facilitates precise positioning of lesions detected on the MRI scan to help carry out biopsies.

'This means that the technology promotes the interdisciplinary utilisation of image data that would otherwise go to waste. Instead, doctors can feed radiological image data into their systems and use it for progress monitoring. Viewing a CT or MRI scan next to an ultrasound scan makes it possible to track whether a lesion has become smaller, larger or has remained the same over longer periods of time.'

Which trump cards does the new shear wave elastography offer?

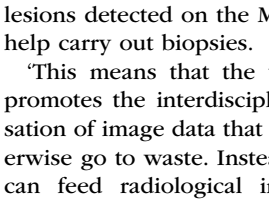
'This technology is primarily used on the curved array transducer. The large measurement window makes it possible not only to view and measure partial liver segments but also larger areas of the parenchyma.

'Along with colour coding, which indicates whether tissue is hard or soft, a mean numerical value can also be determined. This can be used to monitor treatment and see whether the values are changing. The system edits the data and converts it directly into a structured patient report, which simply needs to be printed.

'Another special feature is the ability to acquire more data within the field of view during post-processing, in addition to the data sets already stored. This means that specific smaller, partial segments of interest, within a larger field of view, can be evaluated and documented later on.

'The system also makes a so-called confidence map available during the examination, which indicates the quality of the signal by colour: green means high, yellow means moderate and red means low. It's therefore always possible to get the best out of the images.'

Professor Dirk-André Clevert MD heads the Interdisciplinary Ultrasound Centre at Munich University Hospital (founded in 2004), where all ultrasound activities in the hospital converge. He is also head of the Radiology Section of the German Society for Ultrasound in Medicine. As course director and president, Clevert organises numerous national and international ultrasound courses and congresses. On the 80th anniversary of the founding of the Medical Faculty at Tbilisi State Medical University, the professor, as head of the Interdisciplinary Ultrasound Centre, received an honorary doctorate.



José Ignacio Bilbao Jaureguizar is professor of radiology, head of interventional radiology and consultant radiologist at University Clinic of Navarre (UCN) in Pamplona, Spain. He is also former chairman of UCN radiology department. He gained a medical degree at Navarre University's medical faculty. Training followed in interventional radiology at MD Anderson Cancer Centre, Houston, USA and he received his PhD, cum laude, at Navarre University. His research interests are percutaneous treatment of tumours including chemotherapy and embolisation, especially in liver tumours.

involved in function and find out more about fluid dynamics.'

In the future, 3-D simulation models should be tailored to every patient. This would prove of tremendous help in brain cancer surgery for instance, Bilbao added. 'We still have a lot of work ahead. Developing a simulation model takes thousands of hours on a super computer. It's not only about money, but also techniques. It could take years, but things go so fast now, so who knows?

Seeking a quick route into healthcare management

Big firms forge a new partnership

An alliance between Siemens Healthineers and IBM Watson Health aims to support service providers in the healthcare system, such as hospitals, health networks and other providers. A top-class technical solution consisting of three main components is to help ensure better treatment for many, at lower costs per head. 'I believe we can make an important contribution towards evidence based medicine,' says Arthur Kaindl, General Manager for Digital Health Services at Siemens Healthineers

Report: Julia Geulen

Enterprise Performance Management is one key component and can be compared with a storage archive. Looking at a group of hospital patients, the management system is used to analyse classic performance indicators, such as average duration of patients' stay, or the adherence to standard guidelines during treatment. The data required is networked between the different in-house IT systems, consolidated and evaluated. It forms the basis for reimbursement of the services provided on the part of the health insurers and other operators and it can also be utilised to optimise processes and reduce costs.

Looking at the individual

A further component, i.e. the Watson Care Manager, comes into play when the issue is not the analysis of a defined group but the individual care of patients. Example diabetes management: This platform consolidates and processes all available patient data. This includes data from the hospital information system along with image and laboratory data. Based on this data, the system can then help doctors and nurses to choose the best treatment. The high added value of this solution, and – unique on the market to date – the combination of all image, laboratory and pathology data, complemented by information from the patient file, is analysed in real-time.

'The treatment path is available immediately after the image has been generated,' Kaindl points out. This is a big advantage during the diagnosis and treatment process, especially when there is an acute problem, such as a potential stroke. In view of the increasing number of chronically ill patients the extension of this solution to out-patient care is a declared objective. The plan is to network in the individual, vital data generated at home so that it can be integrated and analysed – to achieve better out-patient management.

One vital requirement is adherence to the necessary data protection regulations. Siemens has a clear competitive advantage in this field because the company holds two certifications for a cloud-based networking solution: ULD for Germany and EuroPriSe, which corresponds with the new European data protection regulation.

Technical challenges

Several hurdles must be overcome during implementation of the solution: Quantitative analytics has not yet been sufficiently implemented in radiology, for instance. However, the prerequisite for clean data analysis is the supply of discrete data based on a structured, quantitative evaluation. Although there appears to be a change in awareness, Kaindl says, because it is recognised that the referring practitioners often do not have time to read pieces of prose, and because inconsistencies are also dangerous.

A further requirement for effective implementation is the clean networking of different IT systems, with one to two dozen of these systems usually found per hospital. Networking can easily and quickly be achieved with standard interfaces. However, without these interfaces the process is more time consuming and sometimes also requires assistance from other IT companies.

Nothing works without curation

When data from the respective IT systems has been aggregated it must be curated. Kaindl: 'This is a complex as well as unavoidable step to ensure we actually receive comparable data. Curated data is a must.' This process is carried out manually during development of the hospital database and takes a certain amount of time. It must be ensured that all information is input correctly into the data structure envisaged. This can often take several months.

The actual analysis of the data can only be carried out afterwards. 'Otherwise there would be a danger of "rubbish in, rubbish out"', which must be avoided at all costs.' Initially, standard analytics is carried out with the help of known algorithms.

After licencing, the data is later specifically evaluated with the help of a new deep learning engine.

Arthur Kaindl MSc PhD is General Manager of Digital Health Services at Siemens Healthineers. He first worked for Siemens after gaining his Engineering Diploma at Friedrich-Alexander University, Erlangen-Nuremberg (1988-95). In 2001 he received a PhD in Electrical Engineering from Leibniz University, Hanover. Following this, he held various magnetic resonance management roles and then, in 2005, was awarded an MSc in Ceramics Engineering at Alfred University, New York.

Jumping on the train

Siemens Healthineers are looking for a quick route into healthcare management. IBM Watson Health is delivering important components. The newly established partnership is based on a distinct win-win situation. 'The respective strengths and domains ideally complement each other – ultimately also to the advantage of our customers,' Kaindl is convinced.

There is optimism regarding competition in this field. Although Google, for example, is trying to position itself with respective projects and the resulting predictive analytics, there appears to be a lot of distrust amongst consumers – particularly regarding healthcare data.

European and USA radiology societies unite to validate reporting templates

Devising structured reports

Report John Brosky

Structured reporting in radiology is easier to say than do. Initially radiologists must agree on the structure of the report itself. Then they need to agree on what to report. Those two very different challenges help to explain why migration into the Digital Age of radiology reports is moving at Ice Age speed.

The expectation, according to Emanuele Neri MD, Chair of the eHealth and Informatics Subcommittee for the European Society of Radiology (ESR), is that templates for structured reports should be reviewed by diverse specialty professional societies aiming to validate a format for each specialised practice area.

In 2013, the ESR announced a collaborative initiative with the Radiological Society of North America (RSNA) to accelerate the process of developing complementary templates, and to open up that process for a wider participation by European national societies of radiology as well as specialist and subspecialist societies.

In 2015, the ESR and RSNA signed a Memorandum of Understanding that includes the creation of a common working group called the Template Library Advisory Panel (TLAP) to serve as a bridge between the two societies to create and review proposed structured reporting templates.

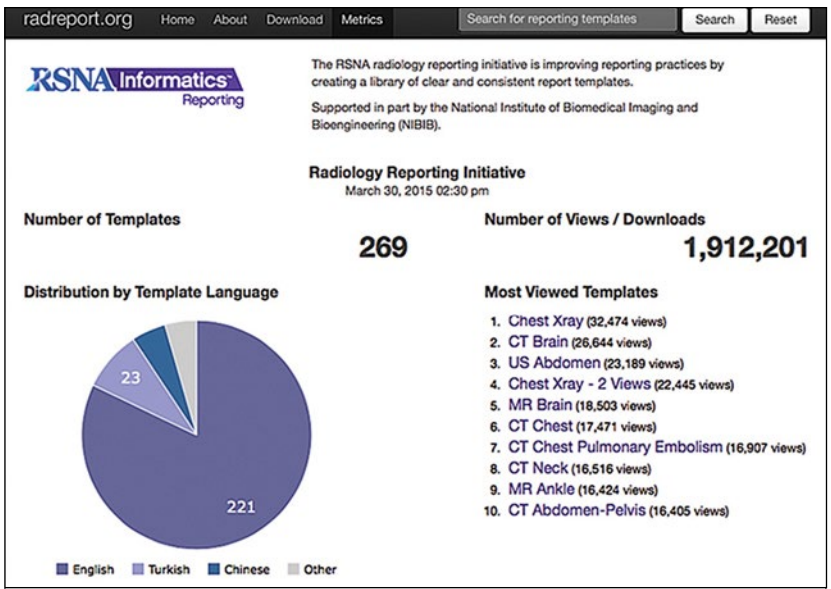
The TLAP wish that many ESR subspecialties societies will step forward to collaborate, working through the open, online template library established by RSNA to select and then validate clinical content and technical formatting for their respective practice areas.

Through the agreement, ESR members have full access on the RSNA website, and not only the ability to download and review materials, but also to upload templates as a credential member.

'We find ourselves at an intermediate stage where the separate elements, such a reporting templates for different specialised practices, are increasingly available but have not yet come together,' said Neri, who is also a member of the RSNA Informatics Committee. 'There are many subspecialty societies federated by ESR, whether abdominal, neural or cardiac,' he pointed out. 'And it becomes extremely important that each society with its expertise reviews and validates those templates created for a specific area of expertise, that they agree with it.'

Validation of templates by European professional societies and the subsequent publication of the template will mark a milestone, he said allowing the initiative to expand and advance toward adoption of templates.

Neri outlined three strategies for the implementation that will unfold in parallel to this.



First will be the promotion of templates by ESR through its diverse activities, and targeted promotion by the specialty societies to its members.

Many of these societies are committed to structured reporting, he said, citing as examples the European Society of Gastrointestinal and Abdominal Radiology, the European Society of Oncological Imaging and the European Society of Medical Imaging Informatics.

Concurrently, there will be a progressive integration by manufacturers of validated templates into imaging equipment. 'Today when a hospital buys a CT scanner, the manufacturer has already pre-loaded imaging protocols, which facilitates the work for a clinician with validated, predefined parameters for an examination programmed into the console. PACS vendors can do the same with reporting templates, which will encourage and motivate radiologists to use appropriate reporting formats,' Neri believes.

A third push toward wider implementation will come through multidisciplinary interactions, such as a radiologist participating on tumour review boards. 'In these settings, the use of structured reporting is growing because, with the reports, the radiologist improves communication with other clinicians asking for specific information for tumour measurement or staging of the disease. In this oncology context a structured report provides specific information to respond to specific clinical questions. And it is very effective.'

Yet, there remain multiple challenges to widespread adoption, some of which are uniquely European. 'The difference from the United States is that different countries in Europe not only have different healthcare payment systems,' Neri pointed out, 'there is also a language issue, which is one of the major challenges we face for implementation.'

Here the advantage of structured reporting is that it standardises reporting formats so that even where the language changes, the same information is presented in the same order.

As a pan-European group, he said, ESR can help diverse societies establish structure, provide guidelines, and give direction.

'Still, reports must be translated,' he added. 'Here's where we find the challenge.'

Beyond language there is the challenge of ontology, the terminology used to describe an imaging finding.

'The risk is having a report with the correct structure, but with a wide variation in the terms. For this

Mobile X-ray around the globe

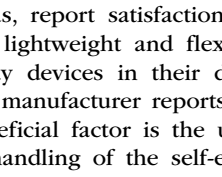
medical ECONET radiography solutions are equipped with a worldwide unique hybrid-powered technology

Since launching meX+ DR solutions in 2009 the imaging and X-ray solutions producer medical ECONET has installed the range internationally. Physicians in diverse areas and fields of expertise, medical crews on ships and oil-rigs, paramedics in military ambulances, as well as disaster relief forces in conflict areas, report satisfaction regarding the lightweight and flexible meX+ X-ray devices in their daily work, the manufacturer reports. 'A highly beneficial factor is the user-friendly handling of the self-explanatory meX+ Image acquisition software, which contains a full integrated positioning guide and proposals for adequate dose values.'

With a specific focus on mobility and flexibility, medical ECONET explains it 'supplies radiography solutions that are equipped with a worldwide unique hybrid-powered technology. This smart technology allows operation of the meX+ portable X-ray generators by the integrated battery, or by an external power supply, while charging the battery. These durable lithium-ion batteries can produce over 500 exposures, with only one full charge, and generate clean diagnostic images by high frequency technology.'

In addition, the firm's range of wired and wireless digital radiography detectors come in three imaging sizes (10x12, 14x17, 17x17 inch) and can be provided as customised solutions for mobile, stationary and retrofit applications. 'And,' the company adds, 'due to the equipped wireless file transfer and the Automatic Exposure Detection (AED), the user can work in a most comfortable way without any disturbing cables.'

Details: www.medical-econet.com



Professor Emanuele Neri chairs the eHealth and Informatics Committee of the European Society of Radiology (ESR), and the ESR EuroSafe CT Dose Repository, he is also a delegate for Imaging Biobanks of ESR Research Committee and member of the RSNA Radiology Informatics Committee. At the University of Pisa, Neri is Associate Professor of Radiology, devoting most of his research focus on Gastrointestinal and Oncologic imaging and Imaging Informatics, with special interests in Structured Reporting, Imaging Biomarkers and Biobanks.

reason in parallel with development of standardised reports is an effort to arrive at standard terminology, a lexicon,' Neri said. 'RadLex, developed at RSNA, will probably be the example to follow,'

Finally, reports are not just a matter of text but also convey a wealth of quantitative information, such as measurements of volume, length, density, or contrast uptake. Some of this data may be captured and reported automatically where software vendors can reliably transfer the measures into the report.

'But,' he added, 'this will not always be the case.'

12-year population imaging stu

Age-appropriate disease? Doesn't exist

What can we learn from population studies? According to Gabriel Krestin MD PhD there are things that we can un-learn, as well as learn, from population imaging studies.

Interview Daniela Zimmermann

The Chair of the department of radiology & nuclear medicine at Erasmus University Medical Centre, Krestin also leads the European Population Imaging Infrastructure (EPI2), an initiative of the Dutch Federation of University Medical Centres and Erasmus University.

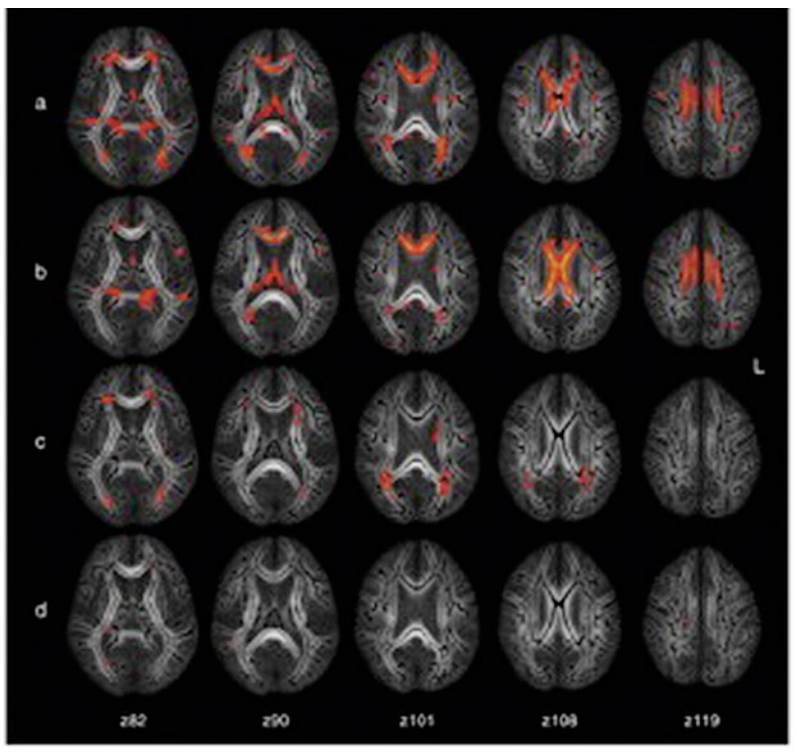
Population imaging is the large-scale application and analysis of medical images to find imaging biomarkers that enable the prediction and early diagnosis of diseases. The EPI2 coordinates data acquisition at diverse locations and times and is a flagship node of the Euro-BioImaging initiative, one of the large distributed life-sciences infrastructures on the European Strategy Forum for Research Infrastructures Roadmap. Pan-European participants include radiologists and research organisations from Austria, Finland, France Germany, Norway, Sweden, and the United Kingdom.

At the Garmisch MR 2017 Symposium, held in January, Krestin focused on brain imaging in the Rotterdam Scan Study to challenge the widely held concept that there is an age-appropriate approach in medicine. 'There is no such thing,' he stated during our EH interview, defying this largely accepted idea in what he acknowledges is a provocative talk.

'In the past the term "age-appropriate" has been used to relate a lot of alterations to the process of aging. The changes that we attributed to age are, in fact, caused by symptomatic and sometimes pre-clinical or asymptomatic disease. Aging is not a so-called normal process. There is no such thing as a normal aging of the brain. It is not normal that you lose or deteriorate in your brain function with age, that the brain becomes senile.

'What we see is the influence of many external factors, many risk factors, many related diseases, or perhaps of genetic predispositions. But it's not necessarily the number of years you have lived that lead to these changes.

'In population studies, when we started we were looking for very simple things, such as the different volumes of the brain across subjects of different ages. We were taught in medical school that, after adolescence, the number of neurons in



Effects of age, global white matter atrophy and white matter lesions on fractional anisotropy values of normal-appearing white matter. Images are shown in the Montreal Neurological Institute (MNI) stereotactic space, with MNI coordinates for axial levels (z) depicted for each column. The white matter skeleton (black) is projected onto the axial MR images. Yellow-to-red colors represent normal-appearing white matter regions with reduced fractional anisotropy (FA) in relation to (a) increasing age, adjusted for sex only, (b) global white matter atrophy, adjusted for age, sex and white matter lesions, (c) white matter lesions, adjusted for age, sex and white matter atrophy and (d) increasing age, adjusted for sex, white matter atrophy and white matter lesions. With increasing age, multiple regions show significant decreases in FA (a). However, after adjustment for white matter atrophy and white matter lesions, only few regions remain (d). Global white matter atrophy (b) relates to decreases in FA in the hippocampal region (z82), fornix (z90), corpus callosum (z90 to z108) and along the cingulate bundle (z119). In contrast, white matter lesion burden (c) is associated with reduced periventricular FA (z82 to z108).

M.W. Vernooij, M. de Groot, A. van der Lugt, M.A. Ikram, G.P. Krestin, A. Hofman, W.J. Niessen, M.M.B. Breteler: White matter atrophy and lesion formation explain the loss of structural integrity of white matter in aging. NeuroImage, Volume 43, Issue 3, 2008, 470–477. http://dx.doi.org/10.1016/j.neuroimage.2008.07.052

New system helps physicians to choose suitable devices

Simpler MR-conditional cardiac device selection

The ProMRI Configurator made by Biotronik is an online tool that enables physicians to select from a series of MRI requirements for a patient and subsequently generates a recommendation of all suitable MR-conditional cardiac device and lead combinations available in a particular country, thus helping physicians to choose the most suitable MR-conditional cardiac systems for each patient.

Many of the firm's implantable cardiac devices are not only MR-conditional but also take advantage of the company's award-winning MRI AutoDetect functionality, Biotronik reports. 'This feature allows a device's built-in sensor to detect an MR environment automatically (within a programmable window of up to 14 days) and to switch the device to and from MRI mode for the duration of an MRI scan. This means that patients implanted with a cardiac device can receive optimal therapy for the maximum amount of time without requiring multiple visits to their physician for manual configuration for MRI scans.'

Its portfolio of MR-conditional devices and systems is extensive, so possible combinations for physicians

dy produces provocative insights

Professor of Radiology **Gabriel P Krestin** chairs the radiology and nuclear medicine department at Erasmus MC, University Medical Centre in Rotterdam, the Netherlands. A graduate of the University of Cologne, Germany, his residency in radiology was completed in 1988. He was later appointed radiologist and head of the MRI Centre in Zürich University Hospital, Switzerland, where he became associate professor of radiology and head of the clinical radiology service, before moving to his present position.

the human brain is decreasing with age. Yet, when we were looking at volumes of brain structures, measuring grey and white matter, what we saw was that, with increasing age, the grey matter is not changing in volume. It's the white matter that changes in volume. If we look deeper we find that it is not the grey matter that atrophies so much as the white matter.'

'Another process that we relate to age is the formation of white matter lesions. With some sequences in MRI we can identify those small, high-signal intensities, even if we don't know exactly the histopathology and pathophysiology of these lesions.

'We assume that these white matter lesions are related to degeneration, and at the same time, we know that the number and the load of white matter lesions increase with age.

'From population imaging studies we learned that white matter lesions are associated with a certain number of risk factors. For instance cardiovascular risk factors, like smoking, hypertension, or diabetes, lead to an increased white matter lesion load. And, finally, we also learned that these white matter lesions are also predictors of certain outcomes, of dementia, but also of stroke.

'Still, all of this is only the tip of the iceberg. There's a lot more that we cannot see with our eyes that are under the water line, let's say. Today we can measure with sensitive tools such as diffusion weighted MRI, the microstructural integrity or damage of the white matter. With these measures, what we find in longitudinal population studies is that even in the non-affected white matter, which appears to be completely normal on conventional MRI images, a change in these diffusion metrics appears long before the white matter lesion becomes visible – years later. On the other hand the microstructure of the white matter is linked to cognition, and damage is associated with impairment of cognition.

'We have also done functional connectivity studies and we can see these white matter damages that we attributed to aging are quite extensive. Yet they have nothing to do with age. When we correct for all the risk factors, and a lot of other factors that can play a role, we see that there's not much remaining. Instead of a change with age these aging people are increasingly affected by other diseases or impairments related to cardiovascular risk factors, diabetes, decrease of brain perfusion or impaired microvasculature.

'Again, my message is that what we relate to age is not, in fact, due to the so-called normal aging process but is part of a process that has to do with some disease pathophysiology.

'The reason that assessment of such imaging alterations becomes important is that these measures are biomarkers that can predict certain outcomes. People who have damage to the microstructure of the white matter, or show a high level of atrophy, or white matter lesions, will have a higher risk to develop dementia or stroke.

'Over the past fifty, years we have increased life expectancy due to the fact that today we have a much better understanding of these risk factors and thus a better prevention, by decreasing the number of predisposing or external factors.'

to select can be overwhelming. The ProMRI Configurator relieves concerns by channelling MR-conditional systems and devices into a single online platform with an easy-to-use interface. In a step-by-step process doctors are directed to possible cardiac implantation combinations for their patients' MRI needs.

The ProMRI Configurator marks the second offering of the ProMRI Check online platform that the manufacturer offers physicians. 'The first tool, the ProMRI SystemCheck, was launched in 2014 and helps physicians to determine whether an implanted Biotronik system is MR-conditional.'

This is a 'retrospective tool', the firm points out. 'The ProMRI Configurator enables physicians to be proactive in their approach – to determine beforehand the best system or device to implant based on the physical needs of the patient.'

As Manuel Ortega, the company's Senior Vice President, confirmed: 'We are determined to maximise patient accessibility to MRI scans as far as possible.'

Details: www.promricheck.com

‘Very few people have a carbon hyper-polariser’

From the extremely new, but not generally available, to the somewhat new… very available and highly useful… Walter Kucharczyk outlines potentials and practicalities in advanced brain tumour imaging

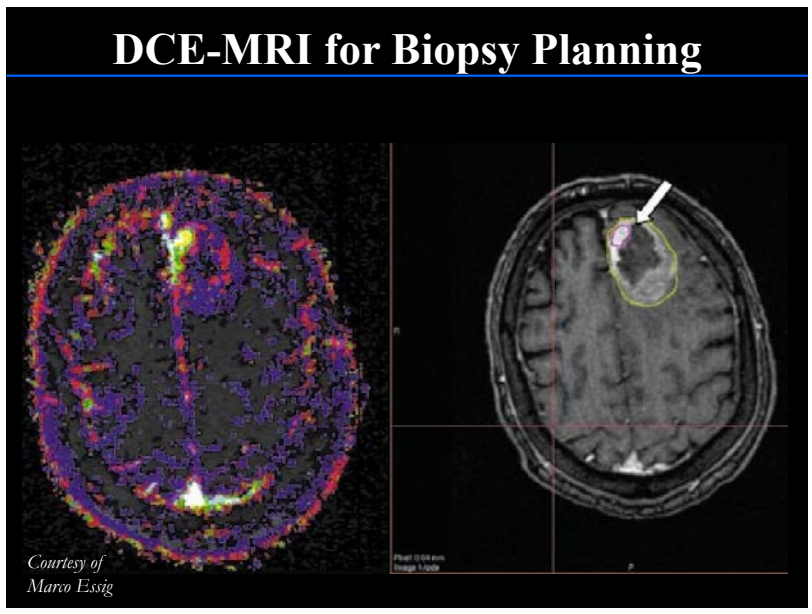
Report: John Brosky

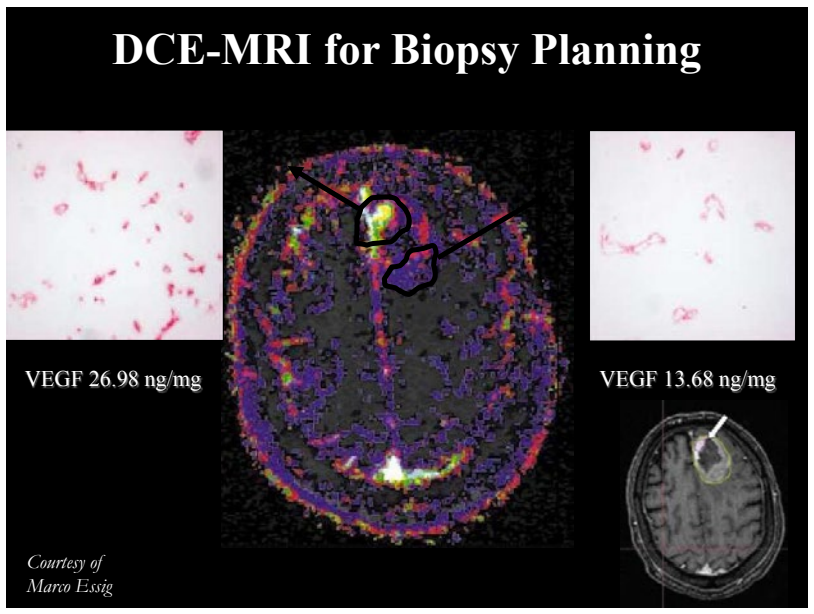
When the organisers of Garmisch MR 2017 (22 January) wanted to hear about the newest developments in neuro radiology, they turned to Walter Kucharczyk MD FRCPC, one of the event’s most experienced presenters, having delivered lectures at this MRI Symposium since 1991.

His experience also includes having served as the President of the International Society of Magnetic Resonance in Medicine (ISMRM), the largest research and education group in the world devoted to developing and teaching magnetic resonance to doctors and scientists, and as previous Professor and Chair of the Department of Medical Imaging at the University of Toronto for sixteen-years. He is a renowned veteran lecturer with a decades-long record of international lectures.

The faculty’s proposed title for the talk was terse, yet ambitious: ‘Brain tumours: what is new?’

Among those attending his presentation, Kucharczyk had predicted that, while many would be interested in and aware of the very newest developments in neuroradiology, most practitioners would not have had access to such equipment and methods, so they would look for advanced, “somewhat-new” techniques that might not be the newest, but are available, are of proven value, and have stood the test of time. ‘For this reason, I divided the lecture into two, between readily available, useful methods, that may not be extremely new, and what is truly new, but not readily available, is also complicated to analyse, and thus not particularly useful to most radiologists today,’ he explained. ‘I hope both parts of the lecture were of interest to the audience – letting them know what all of them can do today and giving them a taste of what might be useful in the near future.’





After setting a context in reviewing the not-so-new, but well-proven techniques, Kucharczyk advanced into more recent developments in techniques that are sufficiently available for everyone to use, and which are useful for a variety of applications, including diffusion weighted imaging, tractography, perfusion MRI, and MR spectroscopy.

The very newest techniques are mostly performed in a research environment to investigate and help solve yet unsolved problems. But, they are not widely practiced because not every medical imaging centre has the hardware, software, cyclotron, combined MRI-PET scanner, carbon hyper-polariser, or specialised personnel to perform these techniques. ‘I don’t think we are there yet with many of the very newest things,’ he pointed out.

The usefulness of the most readily available radiotracer, 18-FDG, to image brain tumours is limited, he said, because radiotracers based on glucose provide poor image contrast between the tumour and normal brain. Brain tumours and healthy brain tissue both avidly take up the glucose. ‘As a result you need to go to other novel formulations of radiotracers, which are very expensive and have very short half lives,’ Kucharczyk explained. ‘These necessitate having a cyclotron.’

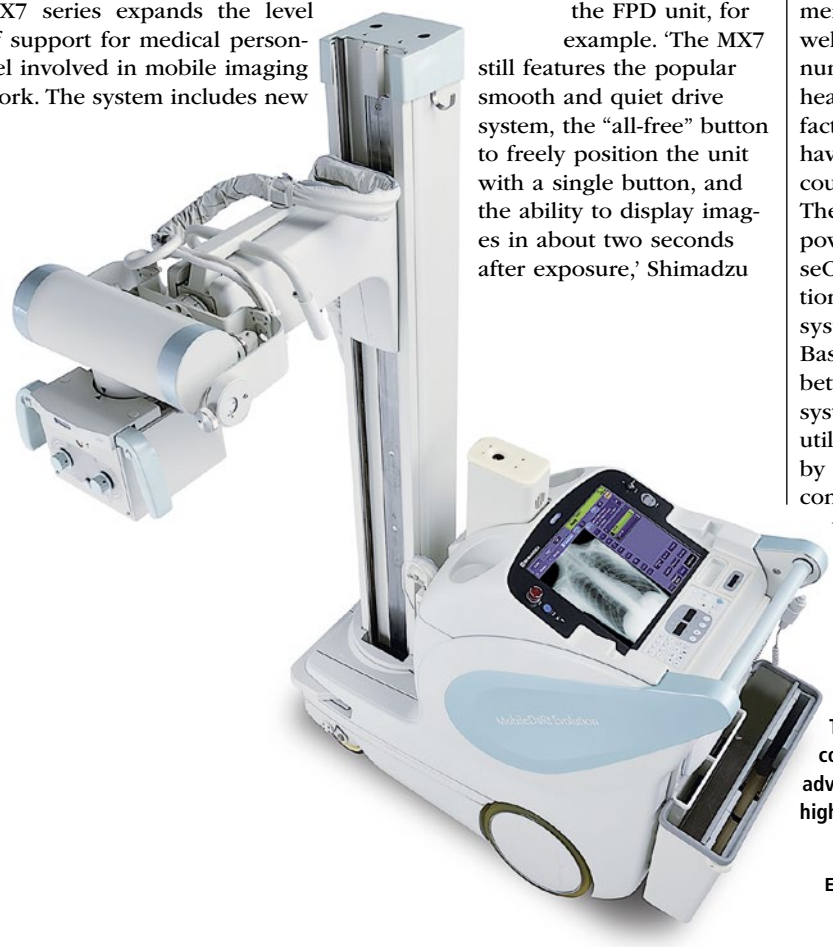
Similarly, hyper-polarised carbon species carry similar logistic and cost issues of requiring a very expensive carbon hyper-polariser, he added, ‘but they do enable the radiologist to study carbon-based metabolites, such as pyruvate, through its biochemical pathways and potentially assess the effectiveness of therapeutic drugs. But very few people in the

MobileDaRt Evolution MX7 series

Digital mobile X-ray systems equipped with a Flat Panel Detector (FPD) are used to examine patients during hospital rounds and for urgent cases in A&E and neonatal intensive care units (NICUs). Leading medical equipment manufacturer Shimadzu (www.shimadzu-medical.eu) reports that its new MobileDaRt Evolution MX7 digital mobile X-ray systems provide ultra-modern and extensive mobile digital radiographic (DR) system functionality. ‘The MX7 series expands the level of support for medical personnel involved in mobile imaging work. The system includes new software functions, an extremely operator-friendly design, and a built-in large 17-inch LCD monitor that increases resolution and also provides better visibility and touch-panel operability.’

Storage and more

Other new features include storage space for smaller items as well as grooves in the console top sidewalls, to maintain stability while placing a cover over the FPD unit, for example. ‘The MX7 still features the popular smooth and quiet drive system, the “all-free” button to freely position the unit with a single button, and the ability to display images in about two seconds after exposure,’ Shimadzu adds. ‘These help operators to work quickly in typical healthcare environments.’



The MX7 digital mobile X-ray systems combine clinical feedback with highly advanced technologies to meet the highest operator requirements

Trusted performance

The firm reports that, in a customer satisfaction survey by USA-based Research Firm KLAS, Shimadzu MobileDaRt Evolution was acknowledged as the 2016 “Category Leader” in Digital X-ray Mobile. ‘Thus, MobileDaRt Evolution can offer proven first-rate healthcare support.’

To date, Shimadzu has sold over 3,000 digital mobile X-ray systems worldwide. ‘With the steady growth of digitalisation in clinical environments, MobileDaRt is a globally well-known product appreciated by numerous customers in professional healthcare organizations,’ the manufacturer reports. ‘The 3,000+ units have been installed in more than 60 countries.’

The MX7 features, an integrated power management function Smart seCURE, which gives users a selection of choices to create the best system for their clinical needs. Based on superior communication between the main unit and DR system, this management function utilises the battery more effectively by minimising unnecessary power consumption. ‘In addition to a start-up time of about one minute for the DR system, the system also includes other new features designed to meet the needs of healthcare providers, such as a

lay – and not yet

world have a carbon hyper-polariser because it costs something north of a million dollars, and then it has to be placed beside the scanner because the tracers have very short half-life.'

Following the lecture a discussion of developments fell into the category of automated image analysis, big data and machine learning, he said. 'There is work being done on very interesting concepts based on automated image analysis and machine learning. When we humans look at an image, we see patterns that are based on the spatial location of dots, their Grayscale or colour, and shapes. But digital images can yield additional information already embedded in them, based spatial frequencies and similar features, that can only be extracted by various mathematical operations and transforms, and not appreciated by the human eye,' he explained.

'When we analyse this scatter image we can't say whether it's a picture of a human brain or a giraffe. But, with appropriate software, a computer can recognise patterns that we cannot, potentially finding unique patterns that may ultimately prove diagnostic of certain diseases. By analysing sufficiently large sets of such image data, perhaps soon automated analysis will enable us to distinguish between various types of brain tumours, grade them, and possibly even inform us of their genetic makeup,'

Looking ahead, Kucharczyk said he hopes that radiologists, like machines, can learn from the detailed correlative analysis of clinical information, images, and pathology studies to deliver findings that increasingly correlate with the ultimate pathology report. 'As radiologists, we are quite accurate in macroscopic diagnosis. We can see many things about a brain tumour that a pathologist does not: the extent of a tumour, its size, and whether there is more than one tumour. And we can provide a fair estimate of the grade and histopathology of the tumour.

'Today, the pathologist has the final say in brain tumour diagnosis and, by definition, has the definitive opinion on grade, mitotic rate, histopathology and genetic profile, with terms such as: 1p19q co-deletion to determine the chromosomal type, IDH 1 and 2 mutation [isocitrate dehydrogenase], and the MGMT promoter methylation status,' he said. 'These are all important in determining diagnosis, prognosis, and probability of treatment response.'

Then, he speculated: 'Wouldn't it be cool if we could actually determine the same findings from the images as the pathologist does from the microscopy?'

Continuing: 'Ultimately our objective should be to be able to do everything the pathologist does, but to do it in vivo, by extracting that information from images. Our objectives should be to determine all features of the diagnosis and prognosis without having to operate on the patient, without having to extract tissue. Are we there yet? No way. Will we ever get there? Probably not completely, but we are moving in that direction,' Kucharczyk concluded.

Walter Kucharczyk, MD, FRCPC is the Director for Research at the Joint Department of Medical Imaging of the University of Toronto and a hands-on Neuroradiologist there, as well as a Professor of Medical Imaging and Neurosurgery..

on

The team of the Neonatal Care Unit, Portsmouth Hospital NHS Trust with the mobile digital X-ray systems

larger image display monitor and convenient storage space,' Shimadzu adds.

Scatter Correction software

'The Scatter Correction software enables more efficient work, due to the elimination of grid misalignments,' the firm points out. 'Whereas a grid physically reduces scatter and increases image contrast, the software mimics this process virtually. It generates a scatter model, which is subsequently subtracted from the image. The result is an image with reduced scatter and increased contrast.'

Finally, Shimadzu adds that the state-of-the-art control software incorporates new functions and optimises the pre- and post-processing workflow. 'The anatomical programs (APRs) can be selected easily via a body mask to perform the recommended radiographic examinations.' Further information: Shimadzu Europa, www.shimadzu-medical.eu

Shimadzu is at ECR 2017

Expo X2. Stand 19

ECR 2017– Eminent radiologist stresses adverse work issues

Radiologists suffer burnout and gender inequality

In an exclusive interview with EH Correspondent Mélisande Rouger, Mauricio Castillo president of the American Roentgen Ray Society (ARRS), spoke about the impact of dissatisfaction and gender discrimination in radiology, the focus of his Wilhelm Konrad Roentgen Honorary Lecture at ECR 2017

Mauricio Castillo MD is the James H Scatliff distinguished professor of radiology as well as chief and program director of neuroradiology at the University of North Carolina in Chapel Hill, N. Carolina. He is also the current president of the American Roentgen Ray Society. Dr Castillo completed his radiology and neuroradiology training at the University of Miami School of Medicine, Jackson Memorial Medical Centre, and Emory University School of Medicine, Affiliated Hospitals in Atlanta. His research interests include paediatric neuro-imaging, application of new imaging techniques and medical literature editing. Within the latter, he has authored more than 640 articles and 25 books including the famous Neuroradiology Companion (now in fifth edition), a reference work covering the fundamentals of neuroradiology for residents, fellows and practitioners.

Burnout, dissatisfaction and gender inequality are recognised phenomena among physicians, and recent studies reveal they increasingly affect radiologists. 'We're hurting in these aspects,' confirmed Dr Mauricio Castillo, the JH Scatliff Distinguished Professor and head of neuroradiology at University of North Carolina, in Chapel Hill, USA.

Radiologists are among the best-paid physicians in the USA. In 2011 they earned more than any other specialty and ranked sixth in 2015. 'We earn more than in 2011, but our salaries have not increased at the rate of other specialties. But we still do very well,' Castillo agreed.

However, only around 50% of radiologists felt fairly compensated and satisfied with their career choices, according to a study conducted among almost 20,000 physicians by Medscape in 2016. (http://www.medscape.com/features/slideshow/compensation/2016/public/overview#page=1)

Evidence collected over the past few years has also increasingly shown that radiologists are depressed. And worse, they suffer burnout.

A 2015 study led by the Mayo Clinic showed that burnout affected over 39,000 physicians in the USA especially family doctors, urologists, physical medicine and rehabilitation specialists… as well as radiologists.

'Ten years ago, the proportion of radiologists seeking counselling was negligible. Today this figure has increased by 400% and more radiologists are quitting their jobs for positions inside the industry,' Castillo pointed out.

The neuroradiologist became alarmed after a study conducted at his university revealed how disheartened radiology residents felt. In a questionnaire sent to 504 residents about the issue of feeling extremely tired or burnout, those who said they were the most exhausted were the surgeons and radiologists.

'I was surprised. But burnout has been on everybody's mind, including the American College of Radiology, which has taken a significant interest in this issue to ensure it is being properly tackled in medical schools,' he said. 'At UNC, one of our top priorities is to take care of our own, by making sure that people have appropriate psychological help and achieve a life-work balance.'

To take care of its staff, UNC has launched a three-year program, in which it will inject US$300,000.

This is an essential step, Castillo argued, as radiologists usually don't receive help in their daily work and find themselves increasingly squeezed by finances.

'We do a lot more studies than ever before, which has made our salaries go up, but also lead to burnout. Radiology used to have fixed schedules similar to anaesthesia. Now you can never leave,' he said. 'Studies always have to be read, turnaround time has decreased and we are expected to have everything ready within minutes. We are teaching that to residents. Getting that turnaround time in less than one hour is compromising what is being learned, but it's how we work nowadays. We're held accountable for how many studies were read within the 60 minutes threshold. It's the same during the weekend, and this, of course, increases burnout.'

The profession's inherent lack of contact with people also adds up to burnout and creates a sense of frustration.

Castillo believes these factors have led to a significant decrease in interest from medical students in radiology, an alarming fact as experts predict the profession will need 20% more radiologists by 2025 when the last baby boomers retire. Radiology has become even more unpopular among women medical students.

'Radiology has one of the lowest percentages of women in medicine and that's amazing when you think that 50-60% of all medical students who are now graduating are women,' Castillo observed. In 2013-14, radiology was not even in the top ten of entering in the pipeline women applicants, students and residents, according to the Association of American Medical Colleges (AAMC). The unattractive, poor life/work balance experienced in radiology is possibly one of the main reasons why women disregard radiology as a career choice, he suggested; but gender inequality in salary and career advancement may not be far behind.

Studies in this field show that women in medicine make an average 25-35% less than men for an equal position, and the number of women becoming full professors in medicine is small compared to the number of men. 38% of a medical faculty are women, and only 21% are full professors and 16% are deans, according to the AAMC.

The USA has done the most research on this topic, but the problem is also very much present in Europe and probably the rest of the world, and it should receive more attention from everyone, Castillo believes. 'In Western Europe and Scandinavian countries the question of gender inequality seems a little less obvious than in the USA. However, when you speak to women in Europe they feel that there's inequality of gender in respect to free time, advancement within the career and between salaries, so this has become an issue there, too.'

* ECR 2017. 1-5 March. Vienna, Austria
* ARRS Annual Meeting. 30 April – 5 May. New Orleans, USA.

Closing gaps in the hygiene chain of medical devices

Trusted cable systems

Ever more imaging devices are characterised by very extensive movement sequences while simultaneously being compact. Both device manufacturers and suppliers must consider mounting dynamic requirements when developing their products and ensure their long-term system integrity.

Furthermore, antimicrobial products are of interest not only for minimally invasive or invasive applications because of the increasingly discussed risk of nosocomial infections, but can also close unwanted gaps in the hygiene chain of medical devices. Systems supplier Leoni reports that it supports customers '…as early as the development phase of their medical devices with cable routing, specification, design and manufacture of complex cable systems and ready-to-install subsystems. These solutions for imaging processes decrease installation time while supporting the device properties in providing maximum patient safety, excellent image quality and long-lasting dynamic operation.'

Incorporated components conform to either national or international standards, the firm adds, with proven reliability in numerous tests. Leoni adds that the firm itself executes verification and documentation in standard and increasingly complex customised testing procedures as an add-on service for its customers.

Comprehensive testing proves reliability

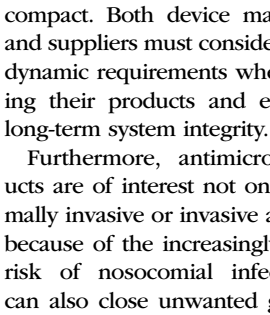
In addition to transferring a growing bandwidth, cables and cable systems for imaging devices nowadays must cope with an increasing range of movement. 'Devices are becoming more mobile; horizontally, vertically and orbitally,' Leoni points out. 'Cable breakage and consequently required service calls are as unwanted as ever.

'The best preparation for durable wiring is optimum routing, as well as the corresponding specification of individual components and the whole system. Involving a solution provider like Leoni in the development phase of an X-ray machine can minimise the interference on the wiring at an early stage.' As a systems provider, the firm reports that it scrutinises the long-term manoeuvrability of its solutions in extensive tests. 'Alongside using standard set-ups in compliance with national and international standards (such as UL), Leoni will, on customer request, simulate non-standard movement sequences with prototypes or device models designed in-house. A Leoni add-on service – basic or complex test set-ups can be established in 2-D or 3-D, and individual components can be rapidly produced by means of 3-D printing. Leoni is thereby able to document and verify the system integrity of its solutions when subjected to customised movement sequences in long-terms tests.' Leoni's antimicrobial cables and systems can help to enhance the hygiene of imaging procedures and patient safety. The integration of only a small quantity of a metal oxide to the sheath material significantly reduces contamination to >99.99% on the surface. Similar to the skin's protective shield of acids, germs, bacteria, viruses and fungi are killed at a pH level of <4. 'During normal handling (involving contact with sweat and proteins), the antimicrobial effect is retained well, throughout a range of times and concentrations,' Leoni continues. 'This is an important difference compared to conventional methods using silver or copper.'

At ECR 2017
Leoni's Business Unit Healthcare
Hall X5. Stand 26.

To give plastic surfaces an antimicrobial effect, Leoni adds a metal oxide to the polymer during the extrusion or moulding process, which then lowers the pH level on the surface as a result of escaping acid ions.

A basic principle for wiring is to route hardwearing cables close to the motion sequence. Thorough system solutions for dynamically durable wiring of imaging devices can involve drag chain structures, abrasion-proof bulkhead receptacles, cable reservoir modules or spring return systems



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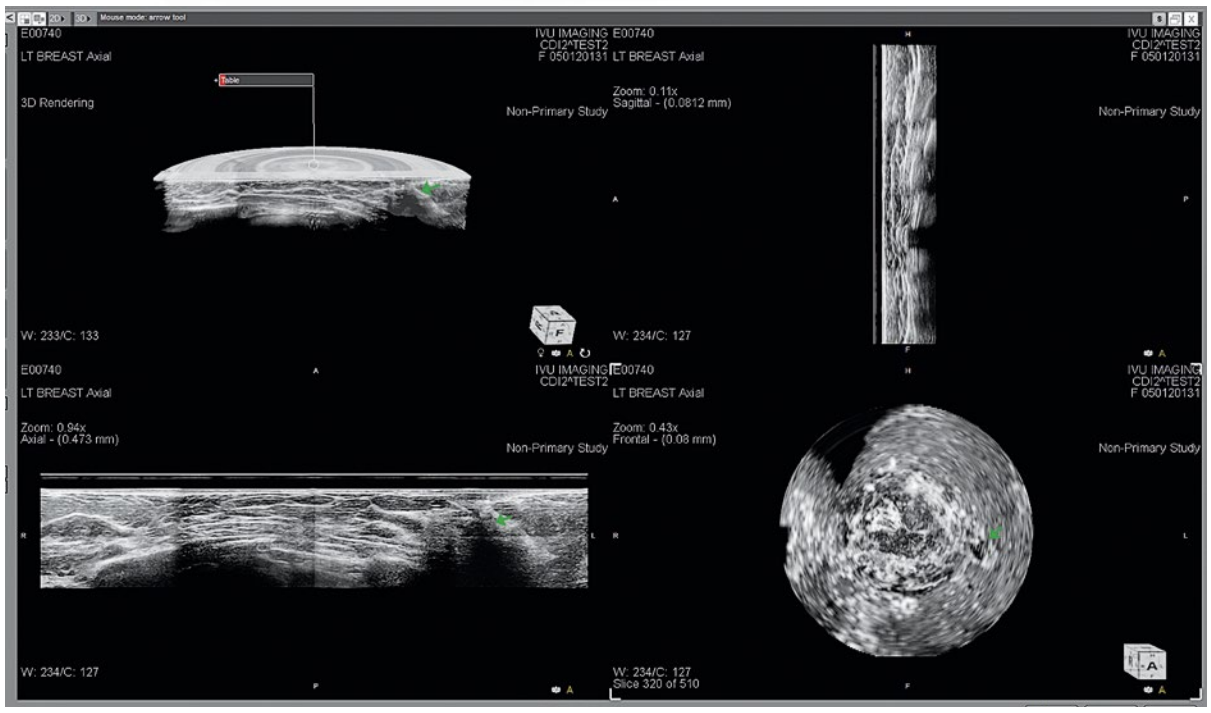
Whole breast ultrasound reveals minute cancers in minutes

Built for comfort; created for speed

The new Sofia 3-D breast ultrasound system solves all the economic and logistic challenges associated with whole-breast ultrasound by using a full-field radial scanning method, the firm reports. The resulting throughput, efficiency, and patient comfort make Sofia an ideal solution for women with dense breasts



Combining Hitachi's high-end ARIETTA ultrasound with iVu Imaging has resulted in the Sofia 3-D whole breast ultrasound system. 'By consistently finding cancers of five millimetres to one centimetre early enough, we are likely to find they are localised to the breast and pre-metastatic,' explained Mark Stribling, CEO of iVu Imaging Corporation. 'That's the goal, to find these occult cancers by surveying the (dense) breast quickly.'

It is understood that women with dense breast tissue face a four to six times greater risk of developing breast cancer. 'This is a high risk population, and all the literature tells us that conventional mammography is going to miss these tumours for four women in every thousand examined,' he added.

Speed up the process

Yet supplemental ultrasound exams performed manually to detect hidden cancers are time-consuming, and a good outcome for a woman depends heavily on the experience of the operator handling the probe. To solve these clinical challenges, Stribling introduced an innovative approach with Sofia, an examination table that automates the examination and speeds up the process developed in Texas through his start-up company, iVu Imaging Corporation.

Partnering with Hitachi Ltd, in Tokyo, Japan, Stribling could take Sofia to the next level. In September 2016 he introduced 3-D radial acquisition of whole breast images using a long linear transducer (92mm width), which was then linked to the Hitachi's 'Noblus' ultrasound system.

Following the latest development steps, Sofia now also can be operated in conjunction with Hitachi's premium performance Arietta platforms. 'The Arietta platform is the game-changing breakthrough for 3-D whole-breast ultrasound,' Stribling pointed out. 'Hitachi ultrasound now enables the Sofia system to scan eight times faster than our first configuration, while at the same time tripling the resolution.'

A full bilateral exam requires just 10 minutes from the moment a patient enters the exam room until she leaves. As a result, clinics equipped with Sofia can schedule more patients for supplemental imaging per day requiring no additional consumables and no time-consuming pre-scan preparation. Sofia does not require a room dedicated to whole-breast ultrasound. Instead, the adjustable height table and the Arietta platform create a new multi-use examination room for a wide variety of diagnostic ultrasound exams or interventions.

Confirm findings

Sofia also offers women the most comfortable of any breast exam experience, the firm points out. They lie on a padded table and, unlike suffering the breast compression involved in other devices, the breast is positioned in a recessed cone in the table and then, in a single automated radial sweep of only 30-seconds, a full image is acquired. 'We can present a single breast volume to the radiologist, clearly showing breast structures in their natively-acquired radial plane along with the reconstructed coronal, sagittal, and oblique views if desired,' Stribling said. 'The result is an average interpretation time of about one minute per breast.'

The 900 images Sofia captures are reconstructed into a 3-D volume that looks more like an MRI image than a conventional ultrasound image, yet with the anatomical detail that ultrasound can provide. 'This view gives clinicians the ability to review the exam like a breast tomosynthesis or MRI image that they are familiar with. In fact, all our customers who use MRI for supplemental dense breast exams also use Sofia for a second look to confirm findings, because of the number of false positives in MRI images,' he added.

The automated acquisition also assures consistent and reproducible results, thereby eliminating the user-dependency of manual breast exams using traditional ultrasound. Because the Sofia is powered by the Hitachi Arietta platform premium ultrasound system, it comes equipped with a host of powerful imaging capabilities. Arietta family's Symphonic Technology optimises data fidelity along the entire signal handling chain, from transducer to display monitor, the company pointed out. The system also dynamically focuses at the pixel level, improving resolution and image uniformity.

'Anything Arietta is capable of doing, the examining clinician can do with Sofia,' explained Stribling, who added that Hitachi engineers are already working with iVu Imaging to bring an innovative capability to Sofia with automated eFlow Doppler scanning and mapping in 3-D.

'Hitachi's eFlow can depict very specific intra-nodular vascularity so that we will not only see abnormal anatomical structures but with the push of a button can provide functional information showing any abnormal vascularity, such as angiogenesis,' Stribling said. 'This new functionality is not very far away.'

Mark Stribling is President and CEO of iVu Imaging Corporation. Stribling introduced an innovative approach with Sofia and set up his own start-up company in Texas. Partnering with Hitachi Ltd. In Tokyo, Japan, Stribling could take Sofia to the next level.

Way fo ultraso

Report: Mark Nicholls

It is collaboration could push vascular imaging to a new level. Researchers from the University of Manchester and IVS Ltd (Independent Vascular Services) – an independent UK company providing clinical services and running vascular ultrasound departments for the NHS – is pairing Mindray's Resona 7 with Piur Imaging's tomographic ultrasound device to develop 3-D tomographic ultrasound (tUS) to enhance vascular diagnosis.

The collaboration is underpinned by a €2.6m European Horizon 2020 grant, in a research initiative that Charles McCollum, Professor of Surgery and head of the Academic Surgery Unit in the Institute of Cardiovascular Sciences at the University of Manchester, believes will significantly enhance the imaging of carotid disease as the cause of stroke and advance monitoring and treatment of aortic aneurysms, as well as many other conditions.

Duplex ultrasound imaging, such as that achieved by Resona 7, is already regarded by the team as the first line of investigation for arterial and venous disease throughout the body, apart from the heart and chest arteries.

Safe, pain-free and delivering high quality imaging, it avoids the disadvantages of MR, which can over-estimate the severity of stenosis, or CT with the risk of ionising radiation and nephrotoxic X-ray contrast, Professor McCollum explained.

'For the investigation of carotid disease, varicose veins, deep vein thrombosis, peripheral arterial disease and arterial and venous malformations in the limbs, it can't be bettered,' he added. 'For aortic aneurysm, ultrasound is the way you make the diagnosis. But what we are showing now with 3-D tomographic ultrasound with the Piur Imaging solution, is that it is the best way to measure the aneurysm; for surveillance and to detect endoleaks, or problems after Endovascular Aneurysm Repair.

'In my view the future is 3-D tomographic ultrasound. It will not be necessary for all applications of colour Doppler, but for quality imaging that a surgeon can interpret, 3-D tomographic ultrasound will be the way forward.'

McCollum added that the 3-D tomographic approach will produce images that a surgeon can look at from every angle, as well as inside the artery, and images he/she can

WHAT IS V-FLOW?

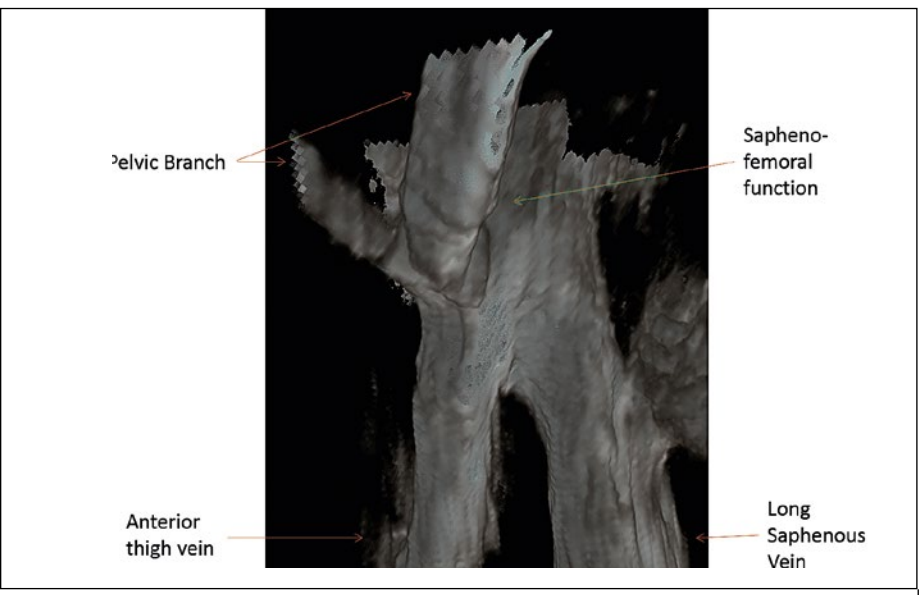
Mindray's new ultrasound system, Resona7, delivers a technology that dynamically visualises blood flow.

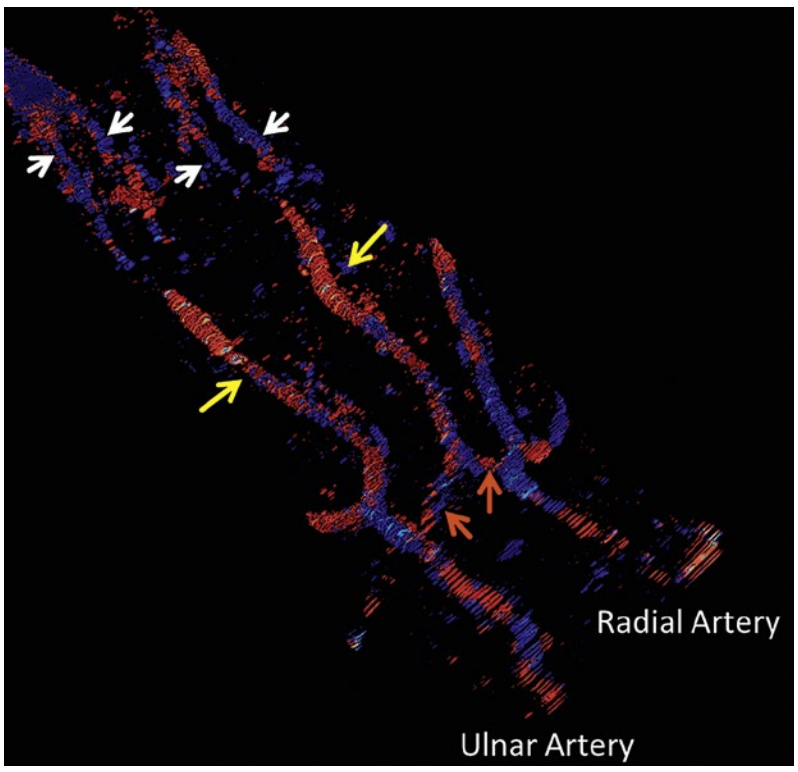
Called V-Flow, it displays the fluidity with dynamic arrows indicating the flow process, rather than a series of static images, with both the magnitude and direction of the flow measurable at any location in the vessel, avoiding the inconvenience of angiography.

The platform uses an extremely high frequency yet remains flexible due to the availability of arbitrary beamforming methods. Consequently, multiple image lines are obtained after a single transmission. Continuous Doppler transmission can

Delivering a new dimension to vascular imaging

rward: 3-D tomographic und





Charles McCollum is Professor of Surgery at the University of Manchester and an honorary consultant surgeon at University Hospital of South Manchester, with a tertiary referral practice in carotid artery disease, cerebral perfusion, complex aneurysms and venous disease. Leading a research team of lecturers, fellows, scientists and technicians, his collaborations are with various disciplines including epidemiology, neuro-imaging, dementia services, stroke medicine, cardiology, mathematics, engineering and industry. He has published over 450 papers including 350 on original research.

have confidence in when making surgical decisions.

The greatest impact, he believes, will be in stroke intervention due to evidence suggesting that emboli (elements of thrombus or atherosclerotic material discharged from the plaque and blocking arteries in the brain) are more important in the causation of stroke than stenosis. 'We've found that the volume of plaque is a very important association with stroke symptoms,' he said. 'If the risk of stroke is over 5% then, to detect people with carotid plaques, population screening becomes worthwhile. We can use the Resona 7 tomographic ultrasound solution to measure the volume of the plaque.'

This is now a major focus for McCollum and team; he also believes that the same combination could increase accuracy in aneurysm screening.

Resona 7 incorporates a novel ultrasound-based technology called V-Flow which can visualise blood flow and, rather than a series of static images, the fluidity will be displayed with dynamic arrows indicating the flow process. McCollum said it is particularly suited to this latest research, especially with high quality images and Mindray's flexibility in responding to clinicians' needs in developing the equipment and associated techniques.

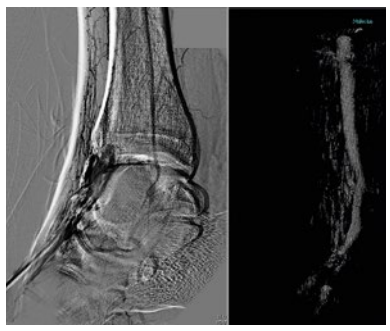
In addition, with IVS performing more than 80,000 vascular ultrasound investigations a year, there is demand for robust and reliable equipment to achieve such high volume.

'It needs to have excellent image quality and a very good user interface; that's why we chose Mindray Resona 7,' explained Steven Rogers, an academic clinician with IVS. Piur Imaging provides the tomographic ultrasound device that couples to the Resona 7 to produce the tomographic ultrasound images.'

There are four key research areas the team aims to advance tomographic ultrasound use in the vascular surgical market in addition to aortic aneurysms: carotid plaque volume for plaque vulnerability in the prevention of stroke; arteriovenous fistula for haemodialysis access; vein mapping for cardiac and vascular bypass; tomographic ultrasound angiography to produce angiogram-like images for planning peripheral arterial disease surgery.

'For certain aspects at present, previous ultrasound was not good enough to make a surgical decision, which means surgeons have to rely on traditional forms of angiography, whether CT, MR or catheter angiography,' Rogers said. 'Finding an imaging modality that allows us to make surgical decisions, that does not involve radiation and nephrotoxic contrast media, is of the utmost importance to the European market and would save the European economic area a significant amount of money each year.

'That's what we are trying to achieve with the Resona 7 tomographic ultrasound solution. Effectively, it will use both devices to replace angiography as the next step in vascular surgical planning.' Being able to view the vascular system in the 3-D, he pointed out, opens up new ways of measuring, monitoring and assessing a range of diseases.



Steven Rogers is an academic clinician, providing clinical services for IVS and conducting 3-D ultrasound research using Piur Imaging equipment and Mindray's Resona 7. As a senior clinical vascular scientist and research associate, his research interests include 3-D ultrasound within vascular surgery focus on carotid disease, aortic aneurysms, peripheral arterial disease and venous disease. At the Vascular Societies' Annual Scientific Meeting 2016, Rogers was awarded the Ann Donald Scientist of the Year Award and a prize for Best Proffered Paper for his presentation on Tomographic 3-D Ultrasound on peripheral arterial disease.

be achieved, avoiding a transient state, enabling continuous filtering for removing clutter.
To derive the direction of flow velocity, multi-directional transmissions and receptions are employed. A true velocity with accurate direction calculated via angle-compounding technology, shows an example where compounding and regression analysis of two angles is applied giving more angles. This is supported by innovative display technology with colour arrows.
Clinical results have already shown that this new method gives much more detail with different types of flow in the carotid artery, compared to conventional ultrasound colour flow mapping (CFM).

Training in radiography and medical technology is mainly academic

ECR significantly expands radiographers program

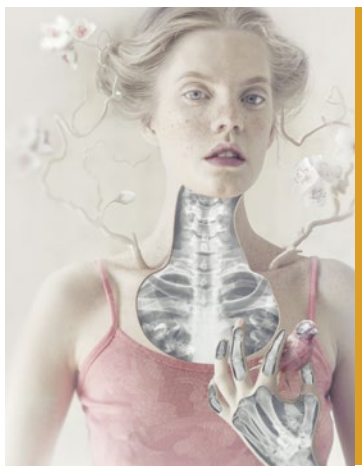
Report: Sylvia Schulz

The job title radiographer has a firm place in many European and non-European countries. The academic training reflects the complex range of responsibilities the role entails. Michaela Rosenblattl M.Ed, who heads the radiology degree course program at the University of Applied Sciences in Wiener Neustadt, Vienna, reports on the Austrian situation. As president of the Austrian Society of Radiological Technologists (rtaustria), a founder member of the European Federation of Radiographer Societies (EFRS), also presents a European perspective.

Since 1960, Austrian training for this profession used to require students to have passed their Matura (equivalent to A-levels), Rosenblattl explains. In those days, training centres were mostly affiliated to hospitals. The Bologna Process, a pan-European harmonisation of degree courses and degrees and trans-national academic reform, aiming to achieve international mobility for students, accelerated further developments. In 2004 the title 'radiographer' was officially introduced (in Austria) and, in 2005, training was integrated into the universities for applied sciences. The degree course is now available at seven of these universities across Austria.

Radiology department assistants can perform less challenging radiological tasks, requiring fewer qualifications. They work closely with radiographers and are only allowed to carry out certain procedures, such as bone density measurements and mammograms. Radiographers are on a level with doctors. 'Doctors can avail themselves of our competencies when required,' Rosenblattl says. The Law on Higher Medical-Technical Services (MTD) governs the profession; doctors are regulated by Medical Law.

Accordingly, radiographers in Austria have extensive competencies. Since 2004 they have been entitled to administer contrast media and, since 2012 they have also been able to administer radiopharmaceuticals. 'Dosage calculation has always been part of our duties. The application is obviously always carried out in agreement with doctors, with the degree of risk governing the intensity of this cooperation. It is important that doctors are available in case of any incidents,' explains Rosenblattl.



Training for radiographers is academically based in almost all European countries, Rosenblattl points out. Only Germany and Spain lag behind, with the latter now making amends. 'I don't understand why things should be so difficult in Germany of all countries,' she observes. In many non-European countries, including Australia, training is also organised on an academic level. 'This is even the case in Nigeria, with an entire institute being managed by a radiographer.'

The academic training is demanding because the course includes physics, technology and IT. But even those without A-levels can enrol, as long as they pass the additional examinations required. 'The permeability of our education system is quite high and we put this principle into practice,' Rosenblattl explains. Training also continues to be important once graduates have completed the course and work in the profession, because radiology is a very innovative field, both from a medical and a technological perspective. 'Our organisation also offers its own programs to promote further training.' More importantly, an exchange across national borders is

What's best for a radiographer: the clinic or industry?

You can't compare an apple with an orange

Usually radiographers work in a clinical environment, are specialised in CT, MR or ultrasound and take care of patients and their treatment. Not so Patrick Doherty, Siemens Healthcare Regional Business Manager, Dublin undergraduate who worked in a University Hospital for five years before switching to work within the healthcare industry. Conclusion? 'It's a daily challenge,' he confirms. In the ECR's Rising Star Session he describes 'Working in the industry'. Earlier, he outlined his experiences for European Hospital.

Report: Marcel Rasch

Asked why there no standardised education for radiographers in Europe, Siemens Healthcare Regional Business Manager Patrick Doherty pointed out that, for a start, countries use a different term for radiographers – e.g. radiological technicians. 'In European countries the educational approach for radiographers and radiological technicians differ very considerably,' he added. 'There appears to be no established standard yet and indeed it seems to be difficult to agree on an educational standard.

'I did my undergraduate degree in Dublin – on a four-year undergraduate degree program – the only one in Ireland for diagnostic radiography. 'In the United Kingdom there is a three-year undergraduate program, but this can vary based on content. And in other countries, such as the USA, where they call radiological technicians MTAs, one undergoes an educational diploma in a particular area of a radiological department, for example general X-ray scanning, and this is what they do after examination, all day, every day – general X-ray scanning. Whereas the undergraduate degree that I took was a broad-based degree, covering all the imaging modalities and topics, so that we were essentially able to go into the departments fully qualified.

What opportunities are there when working in the industry?

"When I started to work in the industry, I went into direct sales, for a local Irish medical distributor, selling an array of products. That was real learning by doing and a quick immersion into the world of sales and being nimble and entrepreneurial. It broadened my perspective because it was a hard challenge for this small distributor to compete in an environment where all the big companies, like GE, Siemens, Philips and the national big players as well, are placed. For me it was a big learning curve, having gone from the clinical environment and essentially being a customer to now seeing the industrial view.

'Back to your question: typically radiographers who work for companies such as Siemens are specialised in a certain area. When the company sells an MRI Scanner, for example, the radiologist or radiographer explains how to use it and how to interact with the system. That would be the first step of I would say 75 percent of radiographers going into industry. The advantage is that you start with a lot of the tasks you would have done in your clinical work routine. From there you can develop into different areas.'

What are the benefits of working in the industry?

'It's a different approach. Working in a hospital is a busy, hectic job with all the subjects you have to address from patient to paper work. Working in the industry is a different challenge. There are pros and cons in each role.

'In the industry I miss, on one hand, the clinical interaction with patients but, on the other hand, it opened my eyes to the complexity of what the companies and the industry

Michaela Rosenblattl M.Ed heads the radiology degree course program at the University of Applied Sciences in Wiener Neustadt, Vienna, and is president of the Austrian Society of Radiological Technologists (rtaustria).

welcome. As mentioned, Rtaustria is a founder member of the European Federation of Radiographer Societies (EFRS). The EFRS represents more than 100,000 radiographers in member organisations across Europe and supports the ECR, which hosts the Educational Wing Annual Meeting with an integrated program for students of radiography. 'The ECR is important for exchange amongst our members,' Rosenblattl points out. 'We are pleased that the program for radiographers has been significantly expanded this year.'

Patrick Doherty is Regional Business Manager Western Europe and Africa at the Advanced Therapies department at Siemens Healthineers in Forchheim, Germany. He gained his radiography undergraduate and master's degrees at University of Dublin School of Medicine, Ireland

is trying to do for our patients to make clinical decisions faster, easier and more comprehensive. Having been on the clinical side I can appreciate quicker what already has been achieved by the industry. You cannot compare the clinical to the industrial environment. This is like comparing an apple with an orange.

'My personal message about the advantages and disadvantages of working in the industry is a very realistic one. There exists a perception in the clinical environment that people in industry have a good life, because they may receive benefits like a company car, bonuses, and the company supports you very well. Yes, that's right. However, the industry is, in fact, a tough environment; it's challenging. For example you might not have to work a night on call but the working days are typically longer than those in the clinical world

'The step to change from a clinical environment to industry should not be undertaken just because you want a company car. It sounds great to travel the world, go to conferences and events, and those are elements of the job that you can have. But, I would encourage the thinking that these are the primary benefits of working in the industry.

'There is a high application rate of clinical based people who want to go into industry, with the majority staying in their original position for only about three years, before they either return to the clinical environment or move within the company. That's what I have seen personally."

Patient management and care alongside technical ability

The role of a radiography assistant

'Breathe in. Hold your breath. Then we press the button' – the times when this brief summation could be made about a radiography department assistant's (RDA) work are long gone. As an imaging support worker, the radiology assistant helps qualified radiographers with procedures such as biopsies, and also performs clerical tasks, such as handling appointments.

With rapid technological and innovative advances in radiology, plus transformation of the field, this assisting role has developed increasing importance and is now an essential part of the smooth operation of radiology, nuclear medicine, radiotherapy and medical physics. Responsibilities in radiology are manifold, needing a multi-talented approach.

An RDA's tasks fall into three main areas: logistics, management and examination. They manage patients from admission to discharge, acting as a constant contact for reassurance

and information during radiology department visits, as well as transporting patients between wards and departments.

Radiology assistants also help to maintain image processing systems and accessory equipment and report on faulty equipment.

They assist the radiographer in logistics, such as the management of materials needed for the radiological process. Some have a huge degree of responsibility being, for example, authorised to order materials costing as much as a luxury car.

An RDA also needs concentration and precision to help perform the rising numbers of complex examinations and interventional procedures. Incorrect or incorrectly processed images lead to wrong diagnoses, or more work if the formatting must be redone – losing time and costing more. In other words, the quality of a radiography assistant's work can underpin fast, precise diagnosis.

Last but not least, good teamwork is a vital prerequisite for any successful radiography assistant, by relating well with radiology department colleagues, physicians, nurses, auxiliaries, porters and all others involved in patients' welfare.

Claus Becker qualified as a radiography assistant at the Training College for Radiography Assistants in Grosshadern, Munich in 1997 and launched his career in the Radiology Department a Regensburg University Hospital. In 2011-12 he completed further training in Esslingen, qualifying him to teach prospective radiography assistants. In 2006 Becker was appointed senior radiography assistant at Regensburg. He has also chaired the Board at the Association for the Medical Technical Professions (VMTB), since May 2015.

Reviewer workshop

Interested in publishing your work or reviewing for a journal? Attending ECR in Vienna this March? Join the Radiography Editorial Team for an interactive and informative author or reviewer workshop. Saturday 4th of March, 16:30 - 17:30

Topics covered will include;

- Chairman's introduction: Establishing the evidence base in radiology and radiography
  Graciano Paulo; Portugal/PT
- Why publish your work?
  Francis Zarb; Msida/MT
- Journal selection: aims and scope, audience and metrics
  Julie Nightingale; Salford/UK
- Ethics of publishing
  Jonathan McNulty; Dublin/IE
- Things to consider: the reviewer's perspective
  Andrew England; Salford/UK
- Editor's ten top tips for publishing success
  Julie Nightingale; Salford/UK
- Panel discussion: What are the barriers to publishing your research or becoming a reviewer and how can they be overcome?

Save the date

8th EFRS Educational Wing Annual Meeting & the seminar "Educational Developments in Radiography" on Wednesday 1st March

EFRS radiography student meeting "The future is in our hands: stay involved, make a difference" on Thursday 2nd March

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RADIOGRAPHERS' SPECIAL

Radiographer calls for increased cooperation with radiologists

By Mélisande Rouger

The increased demand for imaging studies and workforce shortages have put strain on radiology services while technological advances enabled other medical disciplines to perform their own imaging examinations. To hold their ground, radiologists and radiographers must work together and develop common strategies, an expert will argue during a dedicated professional challenges session organized by the European Federation of Radiographers Societies (EFRS) and the European Society of Radiology (ESR) at ECR 2017.

"Workforce shortages, workload increase, workplace changes, new technologies and budget challenges put quality of medical imaging and radiology at risk," Dr. Graciano Paulo, professor of Medical Imaging & Radiotherapy at Coimbra Health School in Portugal, said.

Assessing opportunities and challenges facing radiography and radiology has become mandatory because medical imaging is being taken over by other specialists, Paulo, co-founder of the EFRS, explained.

"While the number medical imaging procedures has risen sharply over the past fifteen years, there is evidence of a shortage in the number of radiologists and radiographers. This can only mean that the imaging procedures are being fragmented and slowly being taken by others. Cardiologists, orthopedists and many other specialists now perform their own interventional procedures and imaging investigations. Technology is becoming more available, smaller and easier to use, so the boundaries of the profession are disappearing," he said.

Many experts agree that radiologists need to have more contact with patients and within the clinical team to secure their position.

One solution would be to delegate part of their workload to radiographers, Paulo suggested.

"Training an advanced-practice radiographer to work in close cooperation with a radiologist would enhance patient care and increase the visibility of the radiologist. The radiologist would have more time to do clinical work and interact with patients and his peers instead of sitting behind his/her screen filling reports," he said.

In some countries like the UK, where the number exams is increasing every year, radiographers already fill in the imaging report for plain x-ray examinations and in close cooperation with the radiologist.

The radiographer has a special position in the imaging chain, and this role could benefit both the patient and the radiologist, according to Paulo.

"The radiographers are gatekeepers to radiological equipment and act as real pivots between referrers, patients and radiologists. Allowing and improving skill mix and joint guidance between the two professions can give the radiologist more time to do clinical work and meet the patient," he said.

Radiology, an increasingly deserted specialty, would become more attractive in return; similarly, more young people would decide to become radiographers if training included disease knowledge, Paulo believes.

"If we manage to bring the two professions together towards a new paradigm in the way we provide service to the patient, this will increase professional satisfaction of both radiologists and radiographers and make both professions more attractive," he said. Radiographers education and training programs level across Europe should be harmonized, and include a minimum European Qualification framework (EQF) level 6 of Knowledge, Skills and Competences (KSC) and a 240 ECTS program. Some countries are currently lagging behind.

"In Spain, the radiographer profession has one of the lowest qualifications in the world. It's not a university degree and training lasts only two years. Almost everywhere else, radiographers must train four years (240 ECTS). Many Spanish radiographers are actually training in Portugal to have their skills recognized internationally. So we are currently working on convincing the Spanish government of the necessity of training radiographers more appropriately," he said.

Besides, imaging services need to use a common coding system across Europe to make sure they are comparing the same type of data, regardless of the country or institution. Departments should also adopt workflow performance metrics, clinical indication oriented protocols, audit and accreditation systems, Paulo recommended.

Graciano Paulo is a full time professor of medical imaging & radiotherapy and vice president of IPC-Escola Superior de Tecnologia da Saúde in Coimbra, Portugal. He is a co-founder and past president of the European Federation of Radiographers Societies (EFRS). Dr. Paulo has a bachelor's degree in radiography, a master's degree in health economics, and a PhD in health sciences. His main area of research is radiation protection.

"With these pillars, we would be able to increase the visibility and recognition of radiology in healthcare systems. But we can only do this together in Europe," he said.

In the end, the future of medical imaging will depend on both professions' capability of working as a team, based on roles and responsibilities, bearing in mind that the patient should be always in the center of the process, with a holistic approach, he added.

"We should be proactive in finding a solution because when we want to be reactive, at that point, it will be too late."

Pivotal role in patient care for radiographers

By Mark Nicholls

Delivering consistent levels of education and training throughout Europe remains an important challenge as radiographers play an increasingly pivotal role in patient care and patient safety.

As the European Congress of Radiology in Vienna prepares to hold a record number of sessions for radiographers, including many focused on the evolving roles of radiographers, Dr Jonathan McNulty, vice president of the European Federation of Radiographer Societies (EFRS), believes that delivering Europe-wide levels of education, qualification and training for radiographers is critical in raising standards of care, diagnostics, therapeutics and patient safety. He acknowledged that, whilst radiographers in Europe are generally well educated, and often trained to masters or doctoral level, access to bachelor degree level training in some countries is still limited.

'In Europe, the quality of imaging services is generally good, however, there are some discrepancies so an important body of work at European level is to try to work with radiographers, national societies and education institutions to enhance the education and training of radiographers,' McNulty added.

ECR 2017 has a strong education and scientific program for radiographers, including a number of sessions delivered with partner organisations and, this year, ECR is recognised as the official congress the EFRS for medical imaging.

There are sessions looking at professional challenges, patient safety and refresher courses across all specialist areas of radiography.

McNulty, from the School of Medicine at University College Dublin, also stressed the importance of using the skills of radiographers to their full potential. 'There remain issues in countries around Europe where the knowledge and skills of radiographers are somewhat underutilised at a time when there are huge opportunities for radiographers to play a more significant role in medical imaging and radiology.'

However, while radiographers have been viewed as technicians in some nations, in others their role has advanced significantly with their increasing knowledge, experience and responsibility with some working as advanced practitioners or the equivalent of consultant radiographers.

'It's not just about giving more opportunities to radiographers,' he continued, 'but there's a very good evidence base showing that when radiographers are used more effectively - when challenged and allowed to take more advanced roles - there can be improved patients outcomes as well, so there is a big benefit to the patient from better utilising the workforce across Europe.'

The European Society of Radiology and EFRS have a Memorandum of Understanding as a blueprint for greater collaboration at a time that radiographers are playing these ever greater roles in radiology services.

'Radiographers are a key piece in the jigsaw, which makes for a modern state-of-the-art diagnostic or therapeutic service being provided by radiology departments,' he said.

'It is essential that radiographers are the experts in terms of the technology that is at the heart of a modern radiology department and radiographers have the key role to play in optimising the use of that technology.

'An equally essential role - that people can often overlook - is that radiographers work closely with their patients. They interact with them on a daily basis and have an important role to play in patient care and patient safety in a modern imaging department.

'If it is an imaging modality using ionising radiation, they make sure the radiation dose to the patient is minimised. From being seen as a technician, they need to be seen as the expert in that area who can really get the most out of the technology and play that important role in patient care, patient management and in a safe way as well.'

What is also important, he added, is that radiographers – whether diagnostic or therapeutic radiographers – must work to raise the identity and profile of their profession among the public and other members of the health service.'

Dr Jonathan McNulty is an Assistant Professor and Head of Subject, Radiography, in the School of Medicine, University College Dublin, Ireland where he oversees the BSc Radiography programme along with over 20 postgraduate programmes and as a University Fellow in Teaching and Academic Development, he has led University-wide educational research projects. Since 2014 he has sat on the Board of the European Federation of Radiographer Societies (EFRS) and is currently Vice-President of the EFRS. Having delivered more than 100 conference presentations and contributed to over 50 journal articles, he has held significant national and international research grants. His research interests include medical and healthcare education, optimisation and benefit-risk communication, neuroimaging and image perception.

McNulty said a team approach and closer collaboration with other health professionals remained important in terms of achieving patient safety and the best clinical outcomes. McNulty is presenting a session, looking at the challenges in education and training and implementing the theory of patient safety into clinical practice.

He said a challenge lay in achieving agreement on the scope of patient safety within radiology.

'A message I'd like to get across at ECR is to make people reflect more on what we are doing in our educational programmes, in clinical practice, and to identify patient safety-related deficits which may exist and what steps we might be able to take to try and address some of those areas.'