

Medical Imaging International

Vol.20 No.3
5-6/2010
ISSN 1068-1779



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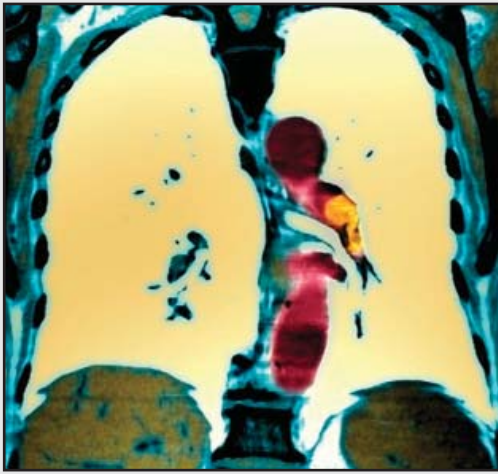
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CT Scans See Increased Use in Severe H1N1 Cases

Published reports on the usefulness of computed tomography (CT) scans for complicated H1N1 cases have spurred use of these procedures in U.S. hospitals.

According to healthcare market research publisher Kalorama Information (New York, NY, USA; www.kaloramaInformation.com), this creates a pathway of diagnostics for physicians and overall is a positive sign not only for the technology but also for companies making chemical agents for procedures. In the recent report, Kalorama estimates the sale of CT contrast agents in the United

States at US\$880 million in 2009.

CT utilizes energy waves to image the human body and renders an image in three-dimensional (3D) from a series of two-dimensional X-rays. Although it is not completely novel for a CT scan to be ordered for flu cases where pain is reported, a new study suggests the technology is preferable to X-rays. The study, conducted in coordination with the University of Michigan (Ann Arbor, USA) Health Service and published in the December 2009 issue of the *American Journal of Roentgenology (AJR)*, has given new support to the modality's usage in the most severe cases of the H1N1 flu virus.

The study, which consisted of a review of thousands of patient records, provided several important findings: that H1N1 flu can cause pulmonary embolism, that pulmonary embolism (PE) may be responsible for H1N1 deaths, and that physician evaluation of patients diagnosed with respiratory complications via contrast-enhanced CT scan is recommended. The study did not establish the technology as a test for detecting the virus itself. The primary test for H1N1 is an immunoassay that can detect antigens for specific strains of flu. But the study supports using the CT scan as an adjunctive tool after other tests are performed, to determine if the patient's flu is a major case.

"This is one of many areas where the agent-enhanced CT scan is playing a supporting role in diagnosis," said Bruce Carlson, publisher of Kalorama Information. "Physicians are increasingly comfortable with computed tomography when a diagnosis is not clear from other modalities."

Trauma, pediatric health, vascular imaging, and cardiac imaging are among the areas where CT scans are employed, and other areas are being investigated. Kalorama estimates that over 54.5 million imaging procedures were performed in the United States in 2009, most requiring some kind of contrast agent.

Kalorama Information supplies independent market research in the life sciences, as well as custom research services.

Image: Colored coronal computed tomography (CT) scan of a pulmonary embolism (Photo courtesy of Du Cane Medical Imaging).



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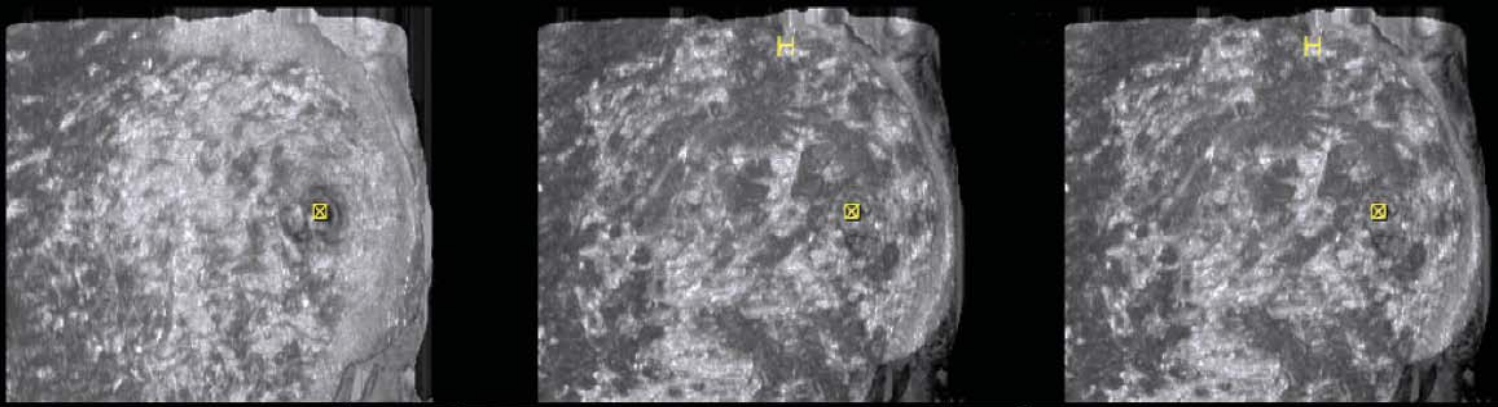
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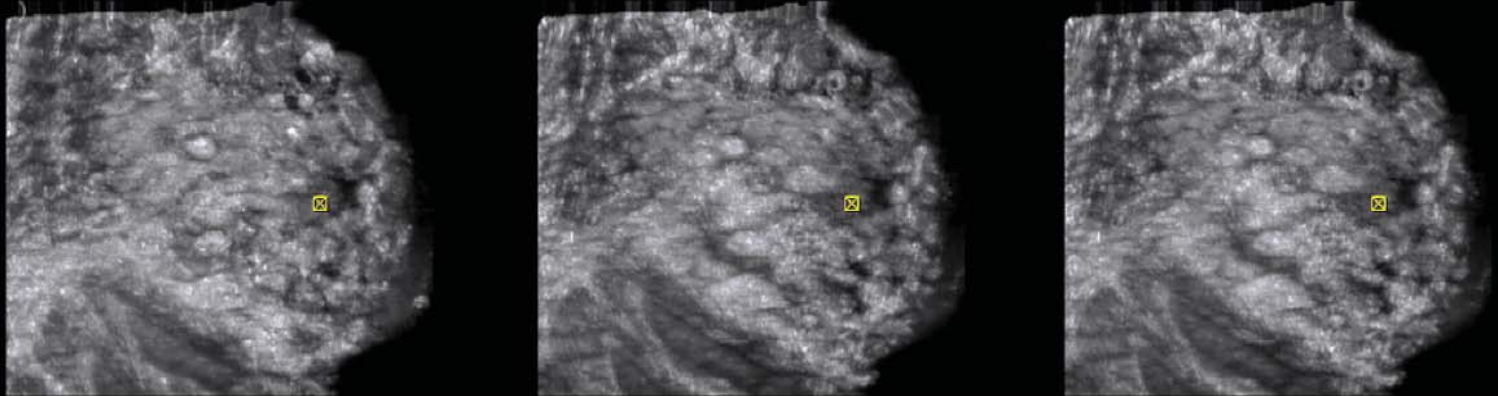
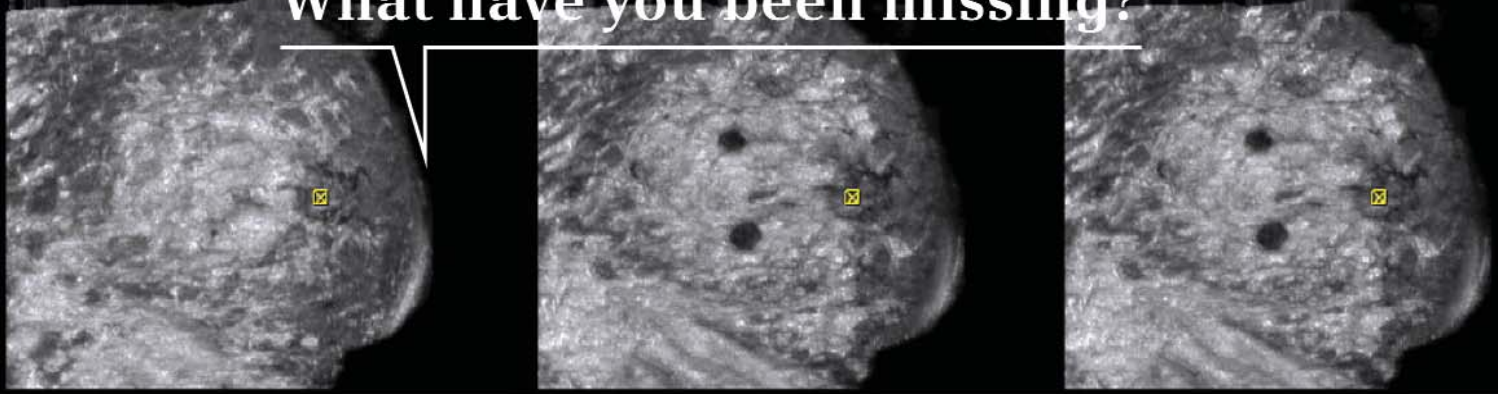
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PET Scanner Optimized for Myocardial Perfusion Imaging

A new positron emission tomography (PET) system is the only PET scanner optimized for myocardial perfusion imaging. The scanner has several specialized features that make it suitable for nuclear cardiologists, who value high quality PET imagery and cardiovascular specific interpretation tools, assisting in accurately assessing the patient's condition.

Positron Corp. (Fishers, IN, USA: www.positron.com), a molecular imaging solutions company focused on nuclear cardiology, announced the sale of its Attrius PET scanner to Manhattan-based (NY, USA) Gramercy Cardiac Diagnostic Services, owned by cardiologist, Dr. Peter Rentrop.

Joseph Oliverio, chief technology officer of Positron stated, "We are proud to sell Positron's newly released Attrius PET scanner to Dr.



Rentrop. We appreciate his confidence in Positron Corp. in purchasing multiple systems to date. Positron has the ideal solution for thousands of cardiology groups looking to improve their diagnostic accuracy at an affordable price."

Image: The Attrius PET scanner (Photo courtesy of Positron).

Project Aims to Expand MRI Access to Less Developed Regions

A project is ongoing to expand access to imaging technology to regions without access to advanced imaging systems.

Working to expand access of state-of-the-art medical imaging to underdeveloped regions around the world, GE Global Research (Niskayuna, NY, USA; <http://ge.geglobalresearch.com>), the technology development arm for the General Electric Co. (Fairfield, CT, USA), has been awarded a four-year, US\$3.27 million award from the U.S. National Institutes of Health (NIH; Bethesda, MD, USA) to develop new magnet technology that will make magnetic resonance imaging (MRI), systems less expensive and easier to site.

In MRI, the magnet is the key part of the system that enables detailed images of tissue inside the body to help physicians and clinicians make critical diagnoses. To obtain images with such high resolution and quality, the magnet must be kept at super cool temperatures of -269 °C. That is only a few degrees above absolute zero and as cold as outer space. Cryogenic liquids, or liquids at ultra-low temperatures, are used today to keep the magnet this cool.

Because cryogenic liquids are used, special venting and other room specifications must be met that can make MRI systems more expensive and difficult to site. As part of this project, GE researchers are developing a cryogen-free magnet that would considerably reduce these costs and siting requirements.

"The use of cryogenic liquids limits where MRI systems can be placed today, and we want to change that so more people around the world can have access to this vital diagnostic imaging technology," said Minfeng Xu, lead investigator on the MRI magnet project from GE Global Research. "By developing a cryogen-free magnet, we can reduce

the overall size, cost, and siting requirements of new MRI systems and make them easier to site in areas where the infrastructure is not as well developed."

The magnet GE researchers are developing will be smaller and require less wire to support an MRI scanner. The reduction in wire would also help reduce the overall cost of an MRI system. "The whole idea is to create a more highly mobile, less costly MRI system platform that delivers the same high resolution and quality of imaging for patients," added Kathleen Amm, lab manager, electromagnetics and superconductivity.

A key strength of MRI scanners is the ability to differentiate various soft tissues inside the body. Clinicians typically use them for brain, cardiovascular, and musculoskeletal imaging as well as for imaging of the body's major organs.

The development of a lower-cost mobile MRI platform would help support GE's healthymagination (www.healthymagination.com) vision by expanding MRI use into underserved communities worldwide. Healthymagination represents GE's focus on driving new technologies and products that reduce costs, improve quality and increase access to healthcare.

The chief objective of the program is to develop technologies that enable low-cost whole-body MRI systems that are easier to site and maintain the highest degree of image quality. With the successful development of the proposed magnet technologies, MRI systems can be realized with cost and sitability requirements comparable to today's low-cost permanent magnet systems (magnetic field of 0.2 T - 0.35 T), but with a high magnetic field (1.5 T - 3.0 T) and excellent image quality comparable to existing mainstream and premium superconducting systems.

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Medical Imaging International is published six times a year and is circulated worldwide (outside the USA and Canada) without charge, and by written request, to radiologists, medical specialists involved in imaging, and other qualified professionals allied to the field.

To all others: Paid Subscription is available for an annual subscription charge of US\$ 100. Single copy price is US\$ 20. Mail your paid subscription order accompanied with payment to Globotech Media, P.O.Box 800806, Miami, FL 33280, USA.

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New Formulas for Child-Specific Doses for Pediatric PET Patients

A new study has gathered data that may provide clinicians with new formulas – specific to pediatrics – to calculate the amount of radiotracer that should be injected based on the patient’s weight.

Studies have shown positron emission tomography’s (PET) value as a minimally invasive, painless, and safe diagnostic tool for many pediatric conditions. In a study published in the February 2010 issue of the *Journal of Nuclear Medicine (JNM)*, researchers at the Children’s Hospital of Philadelphia (CHOP; PA, USA; www.chop.edu) and the University of Pennsylvania (Penn; www.upenn.edu) investigated clear dose guidelines in PET exams on children.

“These findings mean that PET – a very common nuclear medicine procedure – can be used in children with methods that are even more patient-specific than those currently employed,” said Roberto Accorsi, Ph.D., former research assistant professor of radiology at CHOP-Penn and lead author of the study.

This study is one more contribution to the medical imaging community’s overall efforts to reduce radiation dose to children. Nuclear medicine specialists are continuously refining methodologies in order to preserve image quality and minimize radiation exposure during pediatric PET exams. Since medical research published in recently highlights the health risks of exposure to ionizing radiation, many have looked to the medical community for ways to reduce exposure during medical imaging exams. Although the nuclear medicine exam’s benefits to the patient far outweigh any potential risks associated with radiation, the nuclear medicine community seeks to uphold practices that are consistent and mindful of patients’ concerns.

In nuclear medicine, there are well-established guidelines for administering radiopharmaceutical doses for adults; however, there is little guidance for administering pediatric doses. Therefore, the CHOP-Penn study set out to examine how nuclear medicine physicians can take into consideration a child’s lighter weight and body size and adjust the dose and scan time accordingly, while maintaining high-quality imaging for the best diagnosis possible.

Image quality for PET depends greatly on the patient’s weight and body build. Meaning, the larger and heavier the patient, the more injection dose, or possibly a longer scan time is needed to obtain a quality image. For patients who are lighter

and have less body mass – such as in pediatric patients – less injection dose or a reduced scan time may still allow for high-quality images.

“The results of this study show that, due to children’s relatively small size and light weight, it is possible to reduce radiological dose [or scan time] while preserving image quality as compared to PET imaging in adults,” said Dr. Accorsi. “Minimizing exposure to radiation is important to all patients, but especially for young children.”

CHOP-Penn researchers acquired and analyzed data from 73 patients. The patients’ weight ranged from 11 kg to 90 kg. Researchers

reported in their study that when following an injection protocol proportional to weight, the data quality of PET images was found to improve with decreasing weight. The study provides practical injection protocols to trade this advantage for decreased scan time or dose at constant image quality.

Studies such as the one published in *JNM* are helping physicists and physicians gather new data about improving dose regimens to get the highest-quality diagnostic image while using the lowest amount of radiation practical, adhering to the As Low As Reasonably Achievable (ALARA) principle.



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Cancer Patients Gain Access to Proton Therapy Treatments at German Clinic

A Munich proton therapy center has doubled its capacity with the successful commissioning of a second treatment room that will enable it to deliver intensity-modulated proton therapy using pencil-beam scanning technology.

"The commissioning of our second treatment gantry will enable us to double our capacity and we are very pleased to be able to offer advanced proton therapy to twice as many patients," said Dr. Joerg Hauffe, chief executive officer of ProHealth, the Rinecker Proton Therapy Center's (RPTC; Munich, Germany; www.rptc.de) operating company. "We can now make more efficient use of this life-saving technology by switching the proton beam between rooms so we can treat in one room while we're setting up a patient for treatment in the other room. Before the year is out, we expect to commission three more treatment rooms."

When completed, the Rinecker Proton Therapy Center will be a state-of-the-art proton facility with four gantry rooms and one fixed-beam room, the latter of which will specialize in treating delicate tumors such as small head, neck, and eye cancers and tumors close to the spinal cord. The two additional gantry rooms are due to be ready for clinical treatment during 2010.

Unlike conventional X-ray-based radiotherapy that utilizes photons and electrons, particle therapy involves delivering heavier proton particles to destroy tumors. Proton therapy enables oncologists to improve dose control and limit exposure to healthy tissue while treating cancer and other indications. As a result, proton technology is moving from research facilities into active cancer treatment clinics such as RPTC.

Dr. Hauffe noted that RPTC benefits from being able to offer Varian's Medical System's (Palo Alto, CA, USA; www.varian.com) pencil-beam spot scanning delivery method, which offers distinct performance advantages for more precise dose distribution than is possible with other proton delivery systems. "We believe pencil-beam scanning is the best approach for patients because you can more easily and effectively shape the dose distribution as necessary and lessen exposure to critical organs such as the spinal cord, which is difficult to achieve using the standard scattering proton technique employed by most other proton centers. Studies show that we are lowering exposure to healthy tissue and making hypofractionation more of a reality in radiotherapy treatments," commented Dr. Hauffe.

Hypofractionation involves delivering the prescribed dose in fewer treatment sessions, or fractions, thus reducing the number of times patients have to come for treatment.

More than 80 treatment courses have been concluded at RPTC and several more patients are currently undergoing treatment. The patients have come from Germany and 18 other countries, including Canada, Argentina, the United Kingdom, and Switzerland. Among these patients have been several children, as proton therapy's ability to limit exposure to healthy tissue is particularly valuable in pediatric treatments.

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Photothermal Imaging Provides New Way to Track Nanoparticles

Investigators are trying to determine how nano-materials align, and new research is a step in the right direction. They have found a way to use gold nanorods as orientation sensors by combining their plasmonic properties with polarization imaging techniques, which may make it possible to see and perhaps track single nanoparticles over long periods. It would give researchers new information about materials, including living systems that incorporate them.

“With a spherical particle, you don’t have any information about how it’s oriented,” said Dr. Stephan Link, an assistant professor of chemistry and electrical and computer engineering at Rice University (Houston, TX, USA; www.rice.edu). “We wanted to see if we could determine the orientation of the nanorods, and eventually we’d like to be able to measure the orientation of the environment they’re in. We think this technique could be really useful for that.”

Dr. Link, primary author Dr. Wei-Shun Chang, a Rice research scientist, and their collaborators reported their study’s findings in February 2010 in the online edition of the journal *Proceedings of the [U.S.] National Academy of Sciences (PNAS)*. Seeing a single nanoparticle is nothing new. A scanning tunneling microscope (STM) can capture images of particles down to a few nanometers; particles tagged with fluorescent molecules can be seen for as long as the fluorophores are active. Dr. Link used this latter technique to show nanocars rolling at room temperature last year.

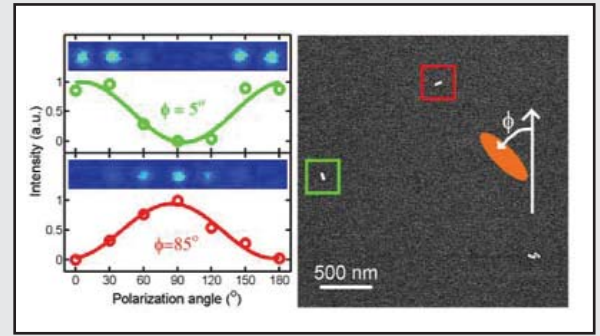
However, there are problems with each of

those techniques. STMs see nanotubes or quantum dots effectively as long as they are more or less isolated on a conductive surface. But in the wild, the particles would get lost amongst the muddle of everything else the microscope sees. Moreover, while fluorophores can help visualize particles out of the crowd, they can deteriorate in as little as 30 seconds, which limits their usefulness.

Gold nanorods can be “lit up” at will. Lasers at specific wavelengths excite surface plasmons that absorb the energy and emit a heat signature that can be detected by a probe laser. Because plasmons are highly polarized along a nanorod’s length, reading the signal while turning the polarization of the laser informs researchers precisely how the rod is oriented.

An electron microscope’s nanorods are about 75 nanometers long and 25 nanometers wide on a glass slide at 90° angles to each other. An image of the photothermal shows them as pixilated smudges. The smudges are strongest when the laser polarization aligns lengthwise with the nanorods, but they disappear when the laser polarization and rods are 90° out of phase. “With plasmonics, you always have two properties: absorption and scattering,” Dr. Link noted. “Depending on the size, one or the other dominates. What’s unique is that it’s now possible to do both on the same structure or do it individually – so we can only measure absorption or only measure scattering.”

Nanorods much smaller than 50 nanometers are not detectable by some scattering methods,



according to Dr. Link, but photothermal detection should work with metallic particles as small as five nanometers; this makes them useful for biological applications. “These gold nanorods are biocompatible. They are not toxic to cells,” said Dr. Chang, noting their similarity to gold nanoshells currently in human cancer therapy trials based on research by Rice scientists Naomi Halas and Jennifer West.

“Our work is more geared to the fundamentals,” Dr. Link said of the basic nature of his group’s research. “Maybe we can optimize the conditions, and then a physician or somebody who’s engineering a probe can take it from there. Our place is a little further down the chain of development. I’m happy with that.”

Image: The graph at left shows how nanorods photographed in an electron microscope at right appear and disappear, based on their orientation, when their photothermal signatures are detected with polarized

Genetic Link Found Between Mammographic Density and Breast Cancer

An Australian study has revealed that specific breast cancer genetic variants increase mammographic density, validating the link between mammographic breast density and breast cancer.

Prof. John Hopper of the University of Melbourne’s (Australia;

www.unimelb.edu.au) School of Population Health reported women differ greatly in their underlying risk of breast cancer. “These findings provide an insight into possible new pathways into the development of breast cancer. We hope our research on mammographic density will eventual-

ly help identify women at higher risk of getting breast cancer. That is still a way off, but for now women should follow national guidelines for screening,” he stated.

The research was conducted in the University’s School of Population Health and department of pathology along with key national and international collaborators. The article was published in the February 15, 2010, issue of the journal *Cancer Research*. “Previous twin studies have suggested there is a genetic link between mammographic density and breast cancer. For the first time, we have been able to identify some of the breast cancer genetic variants involved,” noted Prof. Hopper.

The amount of light areas on a mammogram reveals the mammographic density of a woman’s breast. Women who have high mammographic density for their age are at an increased risk of breast cancer. Utilizing mammograms and blood samples from a study of 830 twin pairs and 600 of their sisters aged between 30 and 80 years recruited via the Australian Twin Registry, researchers investigated 12 genetic

variants that are known to be associated with breast cancer.

Dr. Jennifer Stone, who led the measurement of mammographic density, said, “We aimed to determine if these genetic variants associated with breast cancer risk also influenced mammographic density. We found at least two variants were linked. To date, three other studies had examined this question but have not provided a convincing answer.”

“Finding that several genetic variants associated with breast cancer genes are also associated with mammographic density could help explain some of the biological reasons why women of the same age differ so much in mammographic density,” Prof. Hopper says. “In doing so, it could also help unravel how these genetic variants are associated with breast cancer risk. This is the beginning of a new research focus on how cancers begin and the role mammographic density plays.”

The researchers will now undertake a pooled international study to identify more genetic variants that are linked to mammographic density and breast cancer.



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Contrast-Enhanced MRI Helps Differentiate Between Common Types of Arthritis

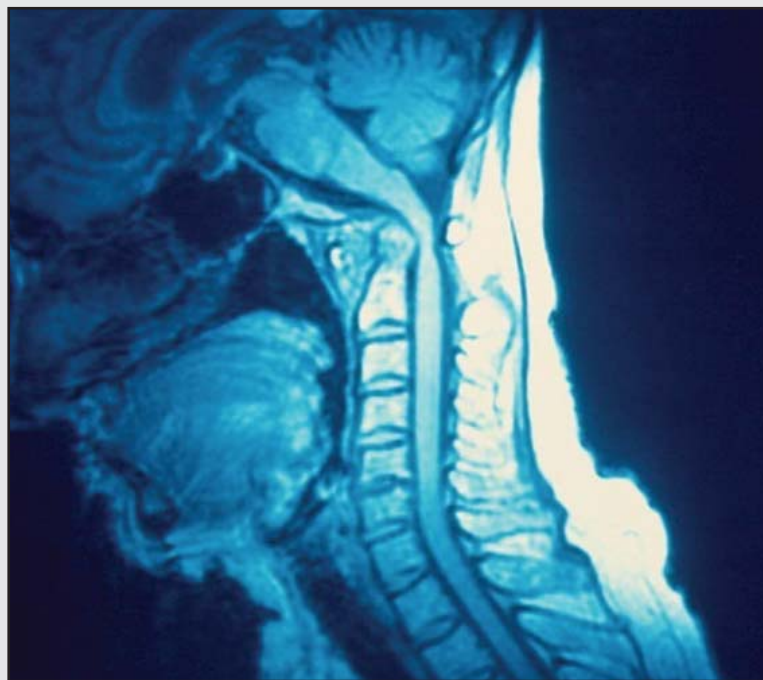
Contrast-enhanced magnetic resonance imaging (MRI) may help physicians distinguish between rheumatoid arthritis and psoriatic arthritis in the hand and wrist, enabling more targeted therapies unique to each condition. Contrast-enhanced MRI uses contrast media to improve the visibility of internal bodily structures.

Rheumatoid arthritis is a chronic disease that leads to inflammation of the joints and surrounding tissues. Psoriatic arthritis is associated with psoriasis of the skin and is typically confined to the knees, ankles, and joints in the feet. "Clinically, it may be difficult to distinguish psoriatic arthritis from rheumatoid arthritis because the symptoms of both diseases are similar and the diagnostic tests currently available to aid in the differentiation of psoriatic and rheumatoid arthritis are not always sufficient," said Nina F. Schwenzer, M.D., lead author of the study.

The study, performed at the University Hospital of Tubingen

(Tubingen, Germany; www.medizin.uni-tuebingen.de), included 45 patients (31 patients with rheumatoid arthritis and 14 with psoriatic arthritis) who were imaged using contrast-enhanced MRI. "The perfusion [or uptake] of contrast media in psoriatic arthritis and rheumatoid arthritis is presumed to be different," noted Dr. Schwenzer. Typically, one will not be able to see a difference until after 15 minutes after the contrast material is administered. "Our study revealed a significant difference in perfusion between those patients with rheumatoid arthritis and psoriatic arthritis after 15 minutes. However, since it was a small group of patients and there was an overlap in perfusion values between both types of arthritis, a diagnosis could not be led by contrast-enhanced MRI alone. Our results are nonetheless promising though," she said.

The study was published in the March 2010 issue of the *American Journal of Roentgenology (AJR)*. "In the past, the treatment strategy for



patients with psoriatic arthritis was based on that for patients with rheumatoid arthritis. Recent research indicates that the therapeutic management, including medication and therapy monitoring, has to be adapted for each type of arthritis," said Dr. Schwenzer. "As our study suggests, the use of contrast-enhanced MRI could play an

important role in differentiating psoriatic arthritis from rheumatoid arthritis."

Image: Magnetic resonance image of the neck of a 70-year-old woman suffering from rheumatoid arthritis, showing the subluxation (partial dislocation) of the atlanto-axial joint (Photo courtesy of Simon Fraser / Neuro-radiology Department / Newcastle General Hospital).

Smartphones Show Promise in Emergency Radiology

Handheld devices such as personal digital assistants (PDAs) and the iPod Touch are being used extensively among doctors. However, a recent study shows that these devices may be particularly useful for emergency radiologists, who in the near future, may be able to use them for teleconsultation and emergency procedures, according to new research.

The value of these devices in medicine is evident. Forty-six percent of attending physicians and trainees and 45% of radiologists use PDAs. "Although the benefits of handheld devices in the daily routine of clinicians is not under debate, the accurate display of medical images is disputed and has not been extensively researched," said Dr. Rachel J. Toomey, lead author of the study and researcher at the University College Dublin School of Medicine and Medical Science (Dublin, Ireland; www.ucd.ie/medicine).

Researchers compared the diagnostic efficacy of a PDA and iPod Touch against that of secondary-class monitors for each of two image types – wrist radiographs and images from computed tomography (CT) imaging of the brain. About 168 readings by examining radiologists of the Ame-

rican Board of Radiology (Tucson, AZ, USA) were collected. "In the PDA brain CT study, the scores of PDA readings were significantly higher than those of monitor readings when all observers' readings are taken into account. No statistically significant differences between handheld device and monitor findings were found for the PDA wrist images or in the iPod Touch devices studies, although some comparisons did approach significance," said Dr. Toomey.

The research was published in the February 2010 issue of the *American Journal of Roentgenology*. "This study showed that important clinical information about a patient's condition can be made available to clinicians through display of radiologic images on handheld devices. This finding extends the potential of the devices beyond current applications such as teaching residents and organizing clinical commitments. The results suggest that the handheld devices investigated in this study may be comparable with secondary monitors for reporting findings on intracranial bleeds on CT images and fractured wrists on radiographs and may be of value in radiology, particularly for teleconsultation and emergency procedures," concluded Dr. Toomey.

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Doppler Ultrasound Use in Pregnancy Safer in High-Risk Groups

Recent findings suggest that using Doppler ultrasound in high-risk pregnancies to monitor a fetus' health may reduce caesarean sections and the number of babies who die. Doppler ultrasound is a well-established technique used to diagnose problems during pregnancy. Doppler ultrasound can monitor how fast blood is moving in the umbilical blood flow. Clinicians can then look to see whether the blood flow is normal, indicating that the fetus is healthy, or abnormal, indicating that the fetus is under stress. The health professionals can then decide which high-risk pregnancies need assistance in delivering the baby, and which women can be left to deliver without assistance.

The goal of using Doppler is to reduce risk to the baby. However, some experts argue that it may prompt some unnecessary early interventions. The review included 18 studies, which together included 10,000 women in high-risk groups. High-risk women included those who had previously lost babies during pregnancy, those carrying growth-

restricted infants, and women with hypertension or diabetes. Women who were examined with Doppler ultrasound were compared with those who had no Doppler or with those who had cardiotocography (CTG), which monitors the infant's heartbeat. According to the results, Doppler reduced infant deaths, possibly through better timing of caesarean sections, as well as reducing the number of caesarean sections themselves, and inductions of labor. However, the researchers say the studies included were of questionable quality.

"A case could certainly be made for a higher quality, multicenter trial of Doppler ultrasound than we have so far seen," said lead researcher Zarko Alfirovic, who is based at the division of perinatal and reproductive medicine at the University of Liverpool (UK; www.liv.ac.uk). "It is quite possible that for some so-called high risk groups fetal Doppler offers little or no benefit. Women with diabetes are one such group where fetal Doppler may, in fact, give false reassurance.



It is important to point out, of course, that it is the clinical decision that follows a Doppler ultrasound examination that changes the outcome for the baby, and currently there is little agreement on what intervention should follow an abnormal Doppler finding." The study's findings were published in the January 2010 issue of the *Cochrane Systematic Review*.

Image: Doppler ultrasound of pregnant woman (Photo courtesy of Carlos Goldin / SPL)

Slovenia Hospital to Utilize Multimodality Radiotherapy/Radiosurgery Technology

A new radiotherapy and radiosurgery platform will give Slovenian cancer patients in the country's only radiotherapy department access to advanced radiotherapy and radiosurgery treatments.

Physicians at the Oncology Institute of Ljubljana (Slovenia) intend to begin RapidArc treatments on the Novalis Tx radiosurgery platform for patients with head and neck and prostate cancers. The RapidArc technology was developed by Varian Medical Systems, Inc. (Palo Alto, CA, USA; www.varian.com) and the Novalis Tx radiosurgery platform was developed by BrainLAB (Munich, Germany; www.brainlab.com). "The

excellent dose distribution, high precision, and extremely fast treatment delivery of the Novalis Tx radiosurgery platform with RapidArc offers a major step forward for both clinicians and patients," said Dr. Bozidar Casar, lead medical physicist. "To be able to deliver this using a multimodality platform which integrates all modern radiotherapy and radiosurgery technologies will be very beneficial for our patients."

With the new Novalis Tx radiosurgery platform, the clinic can complete complicated radiosurgery by delivering more powerful doses to brain tumors or small metastatic lesions throughout the body in just

one to five sessions. "We're able to use the radiation beam rather than a scalpel to remove disease without making a single incision," said Dr. Casar. "It's faster and much easier on patients."

The Oncology Institute of Ljubljana treats over 4,000 new cancer patients – or 5,100 individual treatment courses – each year using six-megavoltage treatment units, some of them unable to deliver advanced radiotherapy technologies such as image-guided radiotherapy and intensity modulated radiotherapy. The hospital also treats several hundred new cancer cases each year with brachytherapy. The lack of radiotherapy capacity in Slovenia, a country of just under two million inhabitants, has led to long waiting lists.

"Even though we work in two shifts using the six-megavoltage treatment machines, our capacity is clearly insufficient to meet the current standard of 50% of cancer patients that should receive radiotherapy during the course of their disease," said Prof. Primož Strojčan, head of the radiotherapy department. "All patients with cancer that need radiotherapy have to come to our hospital. With Novalis Tx and RapidArc technology we are gaining a powerful weapon in our fight against cancer which should have, among many other benefits, a positive influence on bringing down waiting lists."

The Novalis Tx radiosurgery platform features very high dose delivery rates, which contributes to shorter

treatment times. It also offers dynamic fine beam shaping and noninvasive, precise patient positioning for rapid and more comfortable treatments. Specialized X-ray imaging systems are used to pinpoint the target and position the patient with millimeter accuracy, compensating for any motion that occurs during a treatment.

Dr. Casar reported that the clinic would be ready to deliver the full range of treatments when the Novalis Tx radiosurgery platform with RapidArc capability is commissioned in mid-2010.

Varian Medical Systems is a world-leading manufacturer of medical devices and software for treating cancer and other medical conditions with radiotherapy, radiosurgery, proton therapy, and brachytherapy. The company supplies informatics software for managing comprehensive cancer clinics, radiotherapy centers, and medical oncology practices.

BrainLAB develops, manufactures, and markets software-driven medical technology that enables procedures that are more precise, less invasive, and less expensive than traditional treatments. Among the core products are image-guided systems that provide highly accurate real-time information used for navigation during surgical procedures. This utility has been further expanded to serve as a computer terminal for physicians to more effectively access and interpret diagnostic scans, and other digital medical information for better informed decisions.



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Project to Advance Early Detection of Brain Aneurysms

Preventing deadly ruptures of the blood vessels in the brain is the aim of a new project to help radiologists detect aneurysms with far greater speed and accuracy.

The new method utilizes analytics technology developed by the Mayo Clinic (Rochester, MN, USA; www.mayoclinic.org) and IBM (Armonk, NY, USA; www.ibm.com) collaboration, the Medical Imaging Informatics Innovation Center, and has proven a 95% accuracy rate in detecting aneurysms, compared with 70% for manual interpretation. Project findings were reported online November 24, 2009, in the *Journal of Digital Imaging*.

Already saving patients' lives, the project has examined more than 15 million images from thousands of patients since the project began in early July 2009. It uses technology that combines sophisticated imaging with analytics to highlight likely aneurysms for faster detection. This helps radiologists identify them before they result in brain hemorrhage or neurologic damage. In the future, the Mayo Clinic expects to use the same application for other radiology detection tests such as the diagnosis of cancer or vessel anomalies in other parts of the body.

"This fully automatic scheme is significant in helping radiologists detect aneurysms in magnetic resonance angiography [MRA] exams," said Mayo radiologist Bradley Erickson, M.D., senior author of the study and codirector of the Medical Imaging Informatics Innovation Center at Mayo Clinic.

One out of 50 people in the United States has an unruptured brain aneurysm – an abnormal outward bulging in the blood vessels in the brain – and approximately 40% of all people who have a ruptured brain aneurysm will die as a result.

Traditionally, a patient suspected of having a brain aneurysm due to a stroke, traumatic injury, or family history would undergo an invasive test using a catheter that injects dye into the body, a technique with risks of neurologic complications. To improve the process of detection using noninvasive magnetic resonance angiography imaging technology, Mayo Clinic and IBM worked to create so-called "automatic reads" that run detection algorithms immediately following a scan.

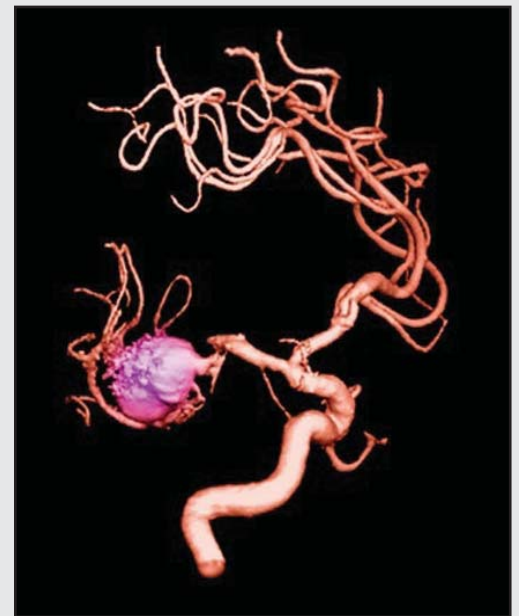
Once images are acquired, they are automatically routed to servers in the Mayo and IBM Medical Imaging Informatics Innovation Center located on the Mayo campus, a collaborative research facility that combines advanced computing and image processing to provide faster, more accurate image analysis. There algorithms align and analyze images to locate and mark potential aneurysms – even very small ones less than 5 mm – so specially trained radiologists can conduct a further and final analysis.

From the time an image is taken to the time it is ready to be read by a radiologist, there often is only a 10-minute window. In that 10 minutes, the new workflow is able to identify images coming off the scanners and route those related to the

head and brain through the special workflow, which then conducts automated aneurysm detection. On average, this can be done in three to five minutes, improving efficiency and saving valuable radiologist's time, leading to a faster diagnosis, which is especially important in the case of a serious aneurysm.

The aneurysm detection system uses an algorithm developed by Mayo researchers that is executed on IBM WebSphere Process Server to model and orchestrate the automated workflow. Images are stored on IBM DB2 for Linux and Windows data service and workflow logic is run on IBM System x servers and IBM storage.

Image: An angiogram of an aneurysm (pink) in the human brain (Photo courtesy of Medical Body Scans).



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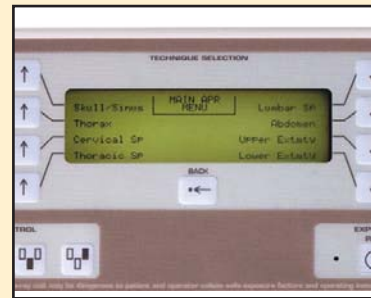
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New Tool to Determine CT Scan Need in Children with Minor Head Injury

A new tool may help standardize the use of computed tomography (CT) scans in children with minor head injury and help reduce the number of scans, according to new research.

More than 650,000 children with minor head injuries resulting in loss of consciousness, amnesia, disorientation, and/or vomiting are seen each year in emergency departments at North American hospitals. CT scans are important for diagnosing serious brain injuries but they expose children to the potentially harmful effects of ionizing radiation and significantly add to health care costs. Use of CT for minor head injury in Canadian pediatric emergency departments has increased to 53% in 2005 from 15% in 1995.

There are currently no widely accepted, evidence-based guidelines on the use of CT scans in children with minor head injuries. A team of researchers from pediatric institutions across Canada has developed the CATCH rule (Canadian Assessment of Tomography for Childhood Injury) to guide physicians in determining whether a child with minor head trauma should receive a CT scan. The study involved 3,866 children aged 0 to 16 years of age from 10 Canadian pediatric teaching institutions. The study's findings were published in the February 2010

issue of the *Canadian Medical Association Journal (CMAJ)*.

"We believe an accurate clinical decision rule, like the CATCH Rule, can stabilize or reduce the number of children receiving a CT scan, thereby minimizing both healthcare costs and exposure to the potentially harmful effects of ionizing radiation," wrote Dr. Osmond, from the department of pediatrics, Children's Hospital of Eastern Ontario (Ottawa, Canada; www.cheo.on.ca), and coauthors. "There is growing concern that early exposure to ionizing radiation may result in a significant rise in lifetime fatal cancer risk."

The study was conducted by researchers from the University of Ottawa, University of Alberta (Edmonton), Children's Hospital of Eastern Ontario Research Institute, University of Toronto, University of Western Ontario (London), CHU Sainte-Justine (Montreal), McGill University (Montreal), Columbia University Medical Center (New York, NY, USA), University of Calgary (Alberta; www.ucalgary.ca), Dalhousie University (Halifax, Nova Scotia), and University of Manitoba (Winnipeg, Manitoba).

There is considerable debate when it comes to the use of CT scans. Some support routine CT scanning of all minor head injury patients, while others are more



selective. "Without the support of widely accepted, evidence-based guidelines, physicians are likely to follow the conservative approach of ordering CT scans for most children seen in emergency departments with minor head injury," wrote the authors.

The investigators concluded that the CATCH Rule, comprised of seven simple findings from the child's history and physical exam,

has the potential to both standardize the need for CT and reduce the number of CT scans performed in children with minor head injury. They noted that additional studies are required to validate this rule in other pediatric age groups.

Image: Colored 3-D computed tomography (CT) scan of a child's head and chest in three-quarters view (Photo courtesy of Antoine Rosset / SPL).

New Ultrasound Breast Scanner Begins Operation in Europe

The first models of a new ultrasound system, the automated breast volume scanner (ABVS), have taken up operation in European radiologic and gynecologic clinics and offices. Patients in Switzerland, France, Portugal, Norway, and Germany can now be examined with the new system. Due to its more accurate, three-dimensional (3D) image acquisition, the technology is particularly suitable for the diagnosis of very dense breast tissue.

Dr. Frank Stöblen of the Diavero Diagnostic Center (Essen, Germany), is one of the first physicians to use the new ultrasound technology. "The ABVS system is a fascinating advancement from the previous method of manually guided ultrasound examinations. The automated system provides consistent image quality, regardless of the examiner."

Siemens Healthcare (Erlangen, Germany; www.medical.siemens.com) recently introduced the Acuson S2000 ABVS, the world's first multifunctional ultrasound breast scanner that automatically acquires volume images of the female breast. The user-independent, standardized images raise ultrasound examinations to a completely new level. Dr. Frank Stöblen, radiologist and co-owner of the Diavero Diagnostic Center in Essen, is convinced that the new ultrasound system with ABVS will become an essential component of breast cancer screening. "This technology will play a key role in early

detection. It can also be used for the examination of high-risk patients, for example in case of genetic predisposition or for follow-up during and after cancer treatments."

The innovative system allows for a much higher early detection rate of breast cancer among women with dense breast tissue. According to the *New England Journal of Medicine (NEJM)*, dense breast tissue increases the risk of breast cancer for a woman by a factor of five. Conventional mammography will continue to be the method of choice for breast cancer screening. However, a study published by the Radiological Society of North America (RSNA; Oak Brook, IL, USA) in 2002 has documented that the detection rate of nonpalpable, invasive breast cancer increases by 42% if the mammography is combined with an ultrasound examination. "I always perform an additional ultrasound examination for patients with dense breast tissue to be sure that the entire area has been thoroughly scanned," said Dr. Stöblen.

The automatically acquired, 3D volume images of the new breast scanner provide physicians with data about the entire breast, including a coronal view, which had previously not been available with conventional ultrasound systems. In addition to the automated functions, the Acuson S2000 ABVS allows for all types of manually performed, conventional ultrasound examinations, for instance, biopsies and color Doppler acquisition along with

applications such as elastography imaging with the eSieTouch. Dr. Stöblen also likes the image quality of the system, which is a great improvement over previously available ultrasound systems of this type. "The system application is extremely flexible. I can immediately follow up with a manual examination after an automatic image acquisition or use the system for a biopsy if necessary." All of these components help the physician reach a more accurate diagnosis than with conventional methods.

The automatic image acquisition of the Acuson S2000 ABVS offers significant acceleration of examination procedures. While manually performed ultrasound examinations used to take up to 30 minutes, the new technology shortens the examination time to less than 15 minutes. The documentation is enhanced by a semiautomatic reporting process and the integration of the so-called BI-RADS classification. This Breast Imaging



Reporting and Data System (BI-RADS) is a classification of the American College of Radiology (ACR; Reston, VA, USA) for reporting mammography screenings.

Coronal display of the breast volume images provides an even better overview of the anatomy and architecture of the breast tissue than earlier techniques. These 3D images are now able to display the coronal view of the breast (from the nipple to the breast wall) in slices. This view simplifies and accelerates the diagnosis.

Image: The Acuson S2000 ABVS automated breast volume scanner (Photo courtesy of Siemens Healthcare).

Partnership to Market Ultrasound Systems in the UK


Siemens Healthcare (Erlangen, Germany; www.medical.siemens.com) and Vertec Scientific (Silchester, UK; www.vertec.co.uk) announced a distribution partnership that will see Vertec exclusively market the X Class range of ultrasound systems in the markets of emergency medicine, general practices, rheumatology, orthopedics, acute medicine, chest medicine, and anesthetics. The agreement, which is effective immediately, will allow Vertec to market the systems and Siemens Healthcare's engineers maintain the technology.

"Vertec is an established and trusted leader in the medical industry and is therefore well placed to develop our position as a specialist in innovative ultrasound solutions," said Declan

Dunphy, ultrasound product manager at Siemens Healthcare.

"Vertec is used to working in niche markets, so we are delighted to work with Siemens Healthcare, extending its ultrasound product offerings in these growing areas," said Bill Hipgrave, managing director at Vertec Scientific. "The engineering quality of the products is beyond question and with a strong service group we can be sure that customers will be well supported."

Vertec Scientific's experience of the UK market covers almost every diagnostic imaging modality including computed tomography (CT), digital radiography, magnetic resonance (MR), ultrasound, and dual X-ray absorptometry (DXA).




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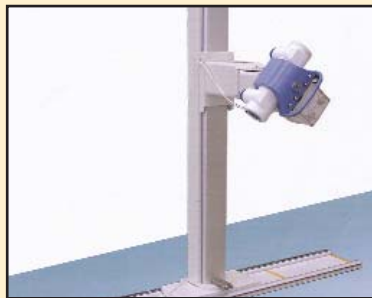
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Imaging Technique Helps Treat Tumors

When one diagnoses a cancer patient, it is important to collect as much information as possible. Now an accurate diagnosis could depend on throwing some of that data away, which is key to the technique employed by researchers as they enhance the efficiency of scanners that find and track lung and thoracic tumors.

In a study published January 2010 in the *Journal of Nuclear Medicine (JNM)*, a team from Rice University (Houston, TX, USA; www.rice.edu) and the University of Texas M.D. Anderson Cancer Center (Houston, USA; www.mdanderson.org) and led by fifth-year Rice graduate student Guoping Chang, described an amplitude gating technique that gives physicians a clearer picture of how tumors are responding to treatment.

Mr. Chang's technique works in conjunction with positron emission tomography/computed tomography (PET/CT) scanners, commonly used devices that combine two technologies into a single unit.

CT scanners capture a three-dimensional (3D) image of the inside of the body. PET scanners search for a radioactive signature. Before a PET scan, a patient is injected with slightly radioactive molecules tagged to track and adhere to specific cancer cells. As the molecules gather at those cells and decay, they give off a signal that the PET scanner can read. Together, the scanners give clinicians a good idea of a tumor's location and whether it is malignant or benign. Subsequent scans can show how it is responding to treatment.

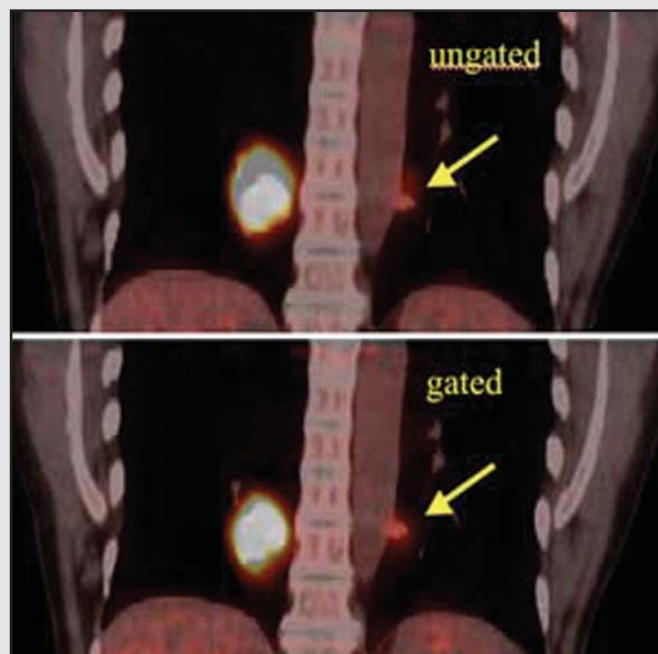
However, there is a problem. Whereas CT scans take relatively fast snapshots, PET scanners need as long as three minutes to capture an image from a single section of the body. Because patients have to breathe, the images do not always correlate well. "Patients might have lesions located in organs that move due to respiratory motion," said Mr. Chang's technical adviser, Dr. Osama Mawlawi, an associate

professor in the department of imaging physics at M.D. Anderson and an adjunct lecturer in electrical and computer engineering at Rice. "When patients breathe, these lesions will be blurred."

Since physicians cannot ask patients to stop breathing for three minutes, Mr. Chang found a way to turn a patient's respiratory motion – the amplitude – into a waveform that serves as a kind of time code. In the new technique, patients are fitted with a flexible band around the chest that records their breathing cycles during the CT scan – the 3D X-ray taken as the patient slides through the ring-shaped device.

During the subsequent, much longer PET scan, the program creates a "gate," which allows data for specific points in the breathing cycle to pass through and throws away the rest. The program automatically correlates that data to the CT images. A patient may take 40 breaths during those three minutes. Combining 40 images from a specific point in the breathing cycle – such as mid-breath – makes for a much sharper image because the tumor will be in pretty much the same spot.

Even better, according to Dr. Mawlawi, the radiologic signal captured by the gated PET scan is more coherent. "One of the important aspects of PET imaging is that it can tell us how malignant a lesion is," he said. "The scan gives us a specific number which is correlated with the measured signal intensity; the more accurate this number is, the better the physician's assessment is of a lesion's malignancy and response to treatment. When someone undergoing therapy is scanned again, the change in signal intensity – not just the size of the lesion – tells us whether the patient is



responding or not. This is equally important to the quality of the image."

In tests on 13 volunteer patients at M.D. Anderson, information collected using the technique on 21 tumors was significantly better with this gated technique than without. Patients were not required to modify their breathing in any way, Mr. Chang reported; this enabled them to be as comfortable as possible during the scan.

"It can save people's lives," Mr. Chang concluded, "that's what I want." The research was supported in part by a grant from GE Healthcare (Chalfont St. Giles, UK). Mr. Chang won a Young Investigator Award for his presentation on the topic during the 56th annual Society of Nuclear Medicine meeting in Toronto, Canada, in June 2009.

Image: CT/PET scans of a lung cancer patient in an M.D. Anderson trial show how the amplitude gating technique, bottom photo, developed by Rice graduate student Guoping Chang can clarify images. The technique could help physicians pinpoint tumors and assess how they respond to therapy (Photo courtesy of Mike Williams / Rice University).

PEM with Image-Guided Breast Irradiation Therapy to Improve Breast Cancer Treatment

An image-guided breast irradiation procedure is a technique for whole breast irradiation that is designed to target and deliver a boost dose accurately and effectively to the lumpectomy cavity margin. Combined with positron emission mammography's (PEM) three-dimensional (3D) metabolic perspective, physicians will be able to better visualize the region of interest prior to deploying the image-guided system, which lowers dose to healthy tissue as radiation is focused on the intended target sparing exposure to the heart, lungs, and the uninvolved breast.

First Coast Oncology (Jacksonville, FL, USA) has considerably enhanced its ability to treat breast cancer with the addition of a Naviscan PEM scanner. The facility will be among the first in the United States to use both a PEM scanner and the AccuBoost image-guided breast irradiation procedure to optimize their therapy treatment. Scot Ackerman, M.D., medical director of First Coast Oncology, said, "The acquisition of the Naviscan PEM scanner demonstrates First Coast Oncology's commitment to securing the latest technology to detect and treat breast cancer as well as being able to assess response to therapy. I expect that PEM will prove indispensable in the effective management of breast cancer for both our patients and referring physicians."

The Naviscan (San Diego, CA, USA; www.naviscan.com) PEM scanner utilizes positron emission tomography (PET) imaging technology to produce high-resolution tomographic images at 2-mm resolution, allowing physicians to visualize breast tumors approximately the size of a grain of rice. The scanner is the size of a mammography unit and consists of two high-resolution detector heads, which are placed in close proximity to the breast. Compared to the higher-force compression necessary for mammography, the Naviscan PEM scanner uses gentle breast immobilization.

Naviscan, Inc. develops and markets compact, high-resolution PET scanners intended to provide organ-specific molecular imaging, guide radiologic and surgical procedures, and advance new clinical therapies. The Naviscan PET scanner is currently installed and available in breast and imaging centers throughout the United States as well as utilized in clinical research studies, funded in part by the U.S. National Institutes of Health (Bethesda,



MD, USA). Naviscan is the first company to obtain U.S. Food and Drug Administration (FDA) clearance of a high-resolution PET scanner designed to image small body parts.

The Accuboost system was developed by Advanced Radiation Therapy, LLC (ART; Billerica, MA, USA; www.accuboost.com).

Image: The Naviscan PEM system (Photo courtesy of Naviscan).

New Radiation Treatment Guidelines for Safer Radiotherapy Procedures

The culmination of a two-year effort to review available studies and establish new guidelines for the safe treatment of cancer with radiation has recently been published.

Several radiation oncology faculty members from the University of North Carolina at Chapel Hill (UNC; USA; www.unc.edu) participated in the process establishing the new QUANTEC (Quantitative Analysis of Normal Tissue Effects in the Clinic) guidelines. These guidelines replace standards established almost 20 years ago, before the widespread use of three-dimensional (3D) imaging technology that allows more accurate targeting of radiation to cancerous lesions.

"The new standards have resulted from a systematic review of radiation therapy dose/volume/outcome data on 16 organs. The new data were made possible by the more general use of 3D imaging during radiation planning. These new standards provide a logical framework to assess the risks of complex 3D doses that we now routinely consider," said Lawrence B. Marks, M.D., chair of the UNC department of radiation oncology and coeditor of

the QUANTEC study.

Noting the overall trend in the United States toward improved practice through evidence-based medicine, Dr. Marks added, "Our goal is to make the practice of radiation oncology more standardized and efficient, less open to interpretation and ultimately as safe and effective as it can be, using state-of-the-art technology to treat cancer."

Teams of physicians, physicists, and statisticians/modelers reviewed the available literature for each organ to compile general dose/volume/outcome data, and make recommendations on the selection of dose/volume prescriptions. "We are pleased that UNC physician investigators played pivotal roles in this important analysis, which establishes new standards for this vital cancer treatment technology," said Richard M. Goldberg, M.D., physician-in-chief of the NC Cancer Hospital (Chapel Hill, USA). "It is a privilege to treat patients with these outstanding experts on our multidisciplinary teams."

David Morris, M.D., clinical associate professor of radiation oncology and member of UNC Lineberger Comprehensive Cancer Center, was

part of the American Society for Radiation Oncology's Health Services Research Committee, which originally recommended a review of the standards in light of new research and clinical experience. He helped to jump-start and obtain funding for the effort.

Dr. Marks, who is also a member

of UNC Lineberger, served as a coeditor and provided oversight to the entire project in addition to leading the group that established guidelines for radiation therapy to the lung.

The study was published in the March 1, 2010, issue of the *International Journal of Radiation Oncology, Biology, and Physics*.



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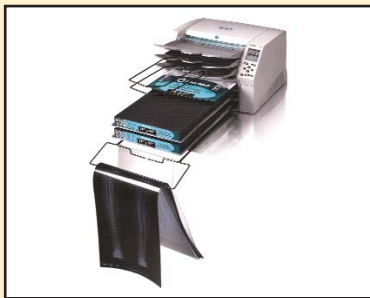
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C-ARM SYSTEM Comed Medical Systems

The KMC-950 offers an image intensifier tube, CCD digital camera, and rotating anode X-ray tube for R/F applications. The system is designed with a sensitive touch-screen control panel, for easy user operation and visualization on the LCD window.

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PORTABLE X-RAY UNIT Dongmun

The X-ray unit features a compact and lightweight design, along with a digital LED display that can be reversed. Other benefits include preset mode for anatomical memory, remote control switch, and halogen lamp collimator.

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ULTRASOUND Hitachi Medical Systems

The HI VISION Preirus offers precise adjustments for enhanced comfort for both user and patient. Key features include a slim footprint, and an operator console with a large digital LCD viewing monitor capable of a range of movements for various applications.

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Medical Equipment Donated to Haiti Disaster Relief

Immediately following the January 12, 2010, earthquake, Siemens Healthcare (Erlangen, Germany; www.siemens.com/healthcare) mobilized to provide disaster relief assistance to the citizens of Haiti. The Healthcare Sector of Siemens AG shipped healthcare systems and supplies through Project HOPE (Millwood, VA, USA; www.projecthope.org) to aid healthcare workers in their efforts to help the victims.

Siemens Healthcare donated 20 Acuson P10 ultrasound systems. These handheld systems are well suited for the urgent medical needs in Haiti as they were designed for triage and emergency situations and provide physicians and emergency personnel with earlier, faster, and more accurate clinical assessment in seconds. The system provides Focused Abdominal Sonography for

Trauma (FAST) protocols, which can identify free fluid from organ ruptures due to blunt trauma and identify foreign objects lodged inside the body. The unit runs on battery power, and will scan continuously for one hour on a single charge. An average scan in disaster type conditions only takes minutes. Because of its pocket-sized design and lightweight of only 0.73 kg, the Acuson P10 system is especially useful in the cramped and difficult working conditions in Haiti.

Siemens also donated 10 RAPID-Point 350 blood gas analyzers to Project HOPE. These systems can be used to provide critical care blood gas and blood electrolyte-test results within minutes in a field hospital setting. With these blood gas analyzers, Siemens provided sufficient test systems and supplies to perform 90,000

tests and worked with their partner, Smiths Medical (London, UK), who also donated sterile blood sample syringes necessary to perform the tests. Moreover, Siemens donated enough Multistix 10 SG urinalysis strips to perform 90,000 urine tests. These test strips assist rapid diagnosis in kidney function, urinary tract infections, carbohydrate metabolism, and liver function.

The Siemens technical team will be available by telephone to support Project HOPE as needed in the set up and operation of the systems.

The Siemens Healthcare Sector is one of the world's largest suppliers to the healthcare industry and a trendsetter in medical imaging, laboratory diagnostics, medical information technology, and hearing aids.

Founded in 1958, Project HOPE (Health Opportunities for People Everywhere) is dedicated to providing lasting solutions to health problems with the mission of helping people to help themselves. Identifiable to



many by the SS HOPE, the world's first peacetime hospital ship, Project HOPE now provides medical training and health education, as well as conducts humanitarian assistance programs in more than 35 countries.

Image: The Acuson P10 handheld ultrasound system (Photo courtesy of Siemens Healthcare).

Split-Course Palliative Radiotherapy Effective for Advanced Non-Small-Cell Lung Cancer

Researchers recently assessed the overall efficacy of split-course palliative chest radiotherapy (RT) for symptom relief in patients with advanced non-small-cell lung cancer (NSCLC) and found that the technology represents a beneficial alternative for patients who cannot tolerate continuous radiation treatment courses.

Moreover, the scientists investigated the impact the regimen's two-week break has on survival outcomes. The majority of lung cancer patients present with locally advanced or stage IV disease. The primary challenge in treating these patients is that most present with poor performance status and the benefit of treatment may be doubtful because of poor tolerance to any form of therapy. Palliative chest RT for lung malignancies has shown to be

effective in relieving serious chest symptoms from tumor bleeding or mass effect on major airways, vessels, and nerves. However, there is a lack of consensus for an optimal palliative RT regimen.

Researchers reviewed the medical records of 140 patients in a retrospective analysis. The team evaluated symptom relief and toxicity during and after completion of RT treatment from clinician notes and patient-reported symptom inventory forms. Then, the researchers examined the impact of the treatment regimen on survival rates. Symptomatic relief was observed in all types of chest symptoms with an extent ranging from 52% - 84%. Long-lasting symptom relief was experienced in 58% of patients. Therapy was well tolerated, and toxicity was mild and transient, with grade 1 or 2 treatment-related

esophagitis completely resolved during the two-week break. Furthermore, cancer survival was not adversely affected by a break in treatment.

"Balancing symptomatic relief with the side effects of radiotherapy remains a critical element of patient treatment," explained lead investigator, Su K. Metcalfe, M.D., MPH of the James P. Wilmot Cancer Center at the University of Rochester (NY, USA; www.rochester.edu). "Our selection design represents a viable option for patients who cannot tolerate continuous radiation treatment courses. Furthermore, the study's finding provides the basis for future large prospective studies that evaluate split-course palliative chest radiotherapy against other regimens." The study was published in the February 2010 issue of the *Journal of Thoracic Oncology*.

Neuroimaging Study May Pave Way for Effective Alzheimer's Treatments

Scientists have determined that a new imaging technology known as Pittsburgh Compound-B (PIB)-positron emission tomography (PET) is effective in detecting deposits of amyloid-beta protein plaques in the brains of living people, and that these deposits are predictive of who will develop Alzheimer's disease (AD).

The findings, the result of a survey of more than 100 studies involving the methodology, including those by the scientists, validates the sensitivity of the technique, not yet commercially available. In clinical practice, amyloid deposits are detected only on autopsy.

The study also provides strong evidence supporting the so-called "amyloid hypothesis" – the theory that accumulation of amyloid-beta protein plaques in the brain is key to the development of the disease. Whereas significant evidence has supported this hypothesis, it has been questioned for two main reasons. First, amyloid deposits do not correlate with the severity of the disease, and are, in fact, found at autopsy in people who did not have clinical symptoms; and second, drugs targeting the plaques have shown disappointing results, even when the drugs were successful at substantially lowering plaque burden. Thus, the question of amyloid's role in the illness has remained.

"Our survey of PIB-PET studies, which looked cross-sectionally and longitudinally at people with normal cognitive performance, mild cognitive impairment and full-fledged Alzheimer's disease, showed that amyloid deposits can be detected in a significant proportion of cognitively normal older adults, and that their presence is associated with Alzheimer's-like brain atrophy and changes in brain activity," said coauthor Gil Rabinovici, M.D., assistant professor of neurology in the University of California, San Francisco (UCSF) Memory and Aging Center (USA; <http://memory.ucsf.edu>).

The study also revealed that older individuals with amyloid deposits were much more likely to

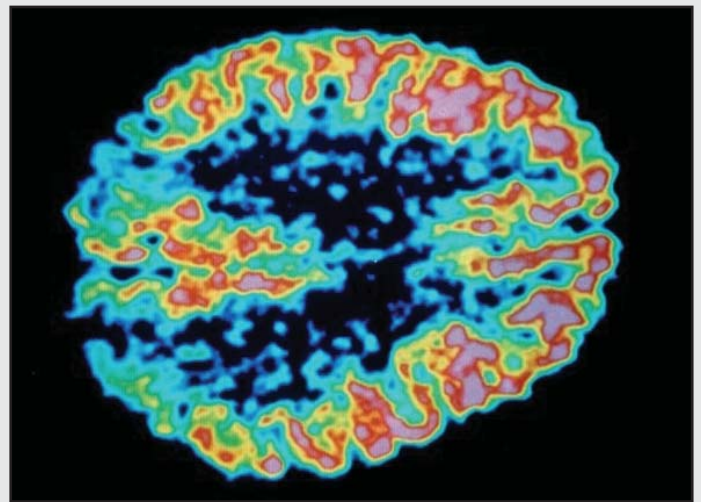
show cognitive decline over time than their amyloid-negative counterparts, according to Dr. Rabinovici.

The results of the survey, released online in December 2009 in the journal *Behavioral Neurology*, may clarify why patients with AD have not responded to promising experimental drugs that target amyloid, and suggest that these drugs may be effective if administered earlier.

"Amyloid deposits appear to reach a plateau early in the disease course, when patients experience very mild symptoms or no symptoms at all," stated Dr. Rabinovici, a recipient of new investigator awards from the Alzheimer's Association and the U.S. National Institute on Aging (Bethesda, MD, USA). "By the time patients have developed the symptoms of Alzheimer's disease, clinical decline and brain changes are occurring independently of further amyloid accumulation. This suggests that we have been starting treatment too late, and that amyloid-based therapies are most likely to work very early in the disease process."

Existing drugs, such as Aricept, Exelon, and Razadyne, treat symptoms but do not modify the biological progression of the disease, he says. Many treatments under development, however, target amyloid deposits in an attempt to arrest further decline. Thus far, these treatments have failed to produce a benefit in two phase-III clinical trials in mild-to-moderate AD.

PIB-PET involves injecting a tracer material into the brain via the bloodstream, and imaging the brain with positron emission tomography (PET). PIB binds to amyloid-beta protein plaques, a hallmark of Alzheimer's disease, and sends a signal that is then detected by the PET scanner and



translated into an image reflecting the quantity and distribution of amyloid in the brain. In the studies surveyed, scientists complemented the PIB-PET research by using additional neuroimaging techniques such as magnetic resonance imaging (MRI) or fluorodeoxyglucose (FDG)-PET, which allowed them to measure the size of different brain structures, network connections or brain metabolism.

While PIB-PET is used for research purposes only, due to its limited "half life," or amount of time it takes for the radioactive signal of the compound to decay, other amyloid imaging agents are being developed for commercial use. However, Dr. Rabinovici "strongly discourages" uses of the technology in cognitively normal individuals until effective and safe anti-amyloid therapies are available and the benefit of preventive treatment is demonstrated in clinical trials.

Eventually, Dr. Rabinovici predicts, the technology might be used for screening those genetically at risk for Alzheimer's, as well as those who are minimally symptomatic. Anti-amyloid treatments would then be prescribed to prevent the onset of the disease.

Image: Positron emission tomography (PET) scan of the brain of a patient with Alzheimer's disease (Photo courtesy of US Department of Energy / SPL).

Metabolic Imaging Used to Locate Sperm in Infertile Men

Men with no sperm in their ejaculate – a condition known as azoospermia – may no longer need invasive procedures to determine if they have sperm in their testes, according to a new study.

Instead, the study, published in the February 2010 issue of the journal *Human Reproduction*, found that magnetic resonance spectroscopy (MRS) – a simple metabolic scan that combines the use of 1H spectroscopy with magnetic resonance imaging (MRI) – could be utilized to determine the likelihood of finding sperm in men with nonobstructive azoospermia (NOA).

The study's lead author was Paul

Turek, M.D., former professor and endowed chair at the University of California San Francisco (UCSF; USA) and founder of The Turek Clinic (San Francisco, CA, USA; www.theturekclinic.com).

Conventional methods for evaluating if sperm exist, including testicular biopsy and micro dissection, are very invasive and have only a 60% - 65% success rate. Fine-needle aspiration (FNA) sperm mapping, pioneered by Dr. Turek, is far less invasive, but still involves the use of FNA to obtain tissue samples from the testes.

MRS is a noninvasive diagnostic technology that is cleared by the U.S. Food and Drug Administration (FDA).



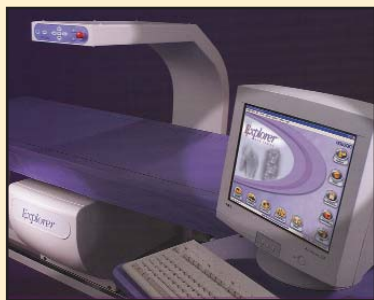
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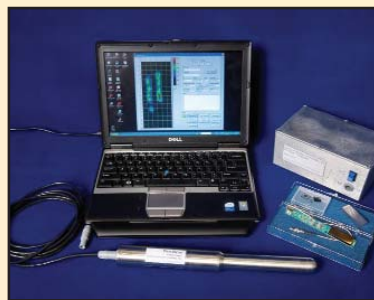
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GAMMA CAMERA Hybridyne Imaging

The ProxiScan is designed for the detection of cancer and other abnormalities in the body. The cost-effective camera offers high-resolution images of enhanced quality, and is considered ideal for the detection of prostate cancer.

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FILM DIGITIZER iCRco

The iCR-2000SL large format digitizer ensures easy integration into department workflow, maximum uptime, and low maintenance costs. The system offers a dual interface with FireWire and USB, which allows faster high-resolution scanning of X-ray films.

LINKXPRESS.COM MII-06-10 215



RF HEAD COILS IMRIS

The two-piece head coils include models for 1.5T and 3.0T magnets, and provide enhanced intraoperative imaging. The design allows the posterior section of the coil to be left in place during surgery, while the anterior section can be placed and removed at any time.

LINKXPRESS.COM MII-06-10 216

CR System Designed for Smaller Environments

A desktop, compact, and convenient multi-application computed radiography (CR) system is easy to install, use, and maintain. The solution is ideal for decentralized environment and the compact design makes it suitable for smaller facilities or areas where space might be an issue.

The compact design of the CR 30-X by Agfa HealthCare's (Mortsel, Belgium; www.agfa.com), makes it suitable for smaller facilities or areas where space might be an issue. Flexible and robust, it uses proven technologies to deliver excellent and consistent image quality that users would expect in full floor-size models. The system is a tabletop CR capable of processing up to 76 plates per hour and utilizes Agfa HealthCare's NX workstation, its leading image identification, and quality control tool, enabling a smooth and efficient workflow. The CR 30-X is provided with the company's Musica2 image-processing software, the market's gold standard.

The CR 30-X digitizer integrates with local pic-

ture archiving and communication system (PACS) networks, allowing imaging professionals to maximize the value of their existing or future PACS solutions.

Agfa HealthCare, a leading provider of diagnostic imaging and healthcare information technology (IT) solutions, announced that its CR 30-X single plate CR digitizer has been ranked as the #1 single plate CR system by Klas Orem, UT, USA; www.klasresearch.com, a research firm specializing in monitoring and reporting the performance of healthcare vendors.

For those facilities seeking to take their first steps into digital imaging workflows, the CR 30-X digitizer is an affordable entry to digital imaging. For larger facilities, the CR 30-X can cost-effectively add remote areas to the digital network. "We are proud to have achieved Klas' top ranking for single plate CR systems," stated Greg Cefalo, U.S. digital radiography business unit manager, Agfa HealthCare. "Our CR 30-X is one of several leading solutions in our computed radiography



portfolio and the recognition we have received from Klas has once again boosted our conviction that our CR solutions are, and remain, the best-in-class."

Agfa HealthCare, a member of the Agfa-Gevaert Group, is a leading provider of IT-enabled clinical workflow and diagnostic image management solutions, and systems for capturing and processing images in hospitals and healthcare facilities.

Image: The CR 30-X compact computed radiography system (Photo courtesy of Agfa HealthCare).

Monitoring Cell Structures with OCT Can Help Cancer Treatment

A technique to find cancer early has taken a significant step forward due to newly developed "phantoms," which should prove to be an exciting new screening technique that can be utilized by hospitals to identify early signs of cancer. The technique, called optical coherence tomography (OCT), is an increasingly popular method for looking beneath the surface of specific materials, notably human tissue. It is higher resolution and much quicker than techniques such as magnetic resonance imaging (MRI) or ultrasound, with no ionizing radiation, making it ideal for detecting changes in tissue structure which can indicate the early stages of cancer.

However, creating such images requires high precision, and any inaccuracy can lead to incorrect suppositions about cell disruption. This can mean missing opportunities for early, potentially life-sav-

ing treatment.

Technology developed by scientists from the UK National Physical Laboratory (NPL; Teddington, UK; www.npl.co.uk), called a "point-spread phantom," should eliminate the risk of such errors. The phantoms are translucent cylinders of resin containing specially arranged particles designed to reflect light in a very specific way. By viewing the phantom with an OCT machine and analyzing the image with NPL software, users can be certain the machine is producing accurate images, which they can rely on for important medical decisions.

These phantoms will also allow manufacturers of OCT technology to meet the necessary standards to guarantee to hospitals that their machines are sufficiently accurate. This will help speed the marketing of products using this important new tech-

nology, and assure hospitals of their ongoing effectiveness.

Michelson Diagnostics (Orpington, Kent, UK) is the first UK company to use NPL's phantoms to validate the accuracy of their machines. CEO John Holmes said, "We developed breakthrough technology for imaging living tissue and for detecting diseases, but we needed to validate our performance claims, to provide customers with greater confidence in them. NPL's phantoms and analysis have enabled us to validate our claims beyond doubt, thereby demonstrating the superiority of our scanners and giving us the edge over our competitors. We expect that this validation will give OCT technology the backing it needs to become standard in hospitals around the world, and thereby make an important progression in the battle against cancer."

Laptop Ultrasound System Brings Imaging Technology to the Patient

A new ultrasound system combines the portability of a laptop system with sophisticated radiology features to provide good image quality, enhance diagnostic confidence, and improve ease of use. Designed to meet the needs of today's hospitals by combining portability with high-end radiology features, Toshiba Medical Systems' (Tokyo, Japan; www.toshiba-medical.co.jp) new Viamo laptop ultrasound system has received U.S. Food and Drug Administration (FDA) clearance. The Viamo is an ultrasound system with advanced radiology capabilities, previously unavailable on hand-carried systems. Toshiba's Viamo provides excellent value in the hand-carried class by offering the same image quality as larger, more expensive ultrasound systems, but at a lower price point for hospitals.

Developed from a radiology foundation, Toshiba's Viamo provides the confidence to image patients at bedside, which typically requires larger, more expensive cart-based systems. When an immobile patient needs a high-end ultrasound exam, the portable Viamo ultrasound is brought to the patient to improve the patient's comfort with-

out compromising exam quality. It is also suitable for a variety of patient exams, including general radiology, pediatric, emergency, obstetrics/gynecology, and vascular. "The Viamo is specifically designed to provide advanced radiology capabilities in a portable system, creating more comfortable exams for patients," said Girish Hagan, vice president, marketing, Toshiba America.

The new Toshiba Viamo laptop ultrasound system offers: (1) Best-in-class imaging capabilities in a laptop size, making it suitable for high-end radiology, vascular, emergency, bariatric, and Ob/Gyn exams, even at bedside. For example, Viamo is beneficial during liver transplants when medical personnel must image the anastomoses to assess blood flow through the vessels. (2) Excellent image quality and color flow comparable to larger cart-based systems. (3) Ease of use with a simple touch-screen interface that is programmable in panel or tablet modes. (4) The ability to interchange Toshiba transducers while using the Viamo's transportation pole, thus improving productivity and flexibility while saving healthcare



costs by reducing the need to purchase multiple transducers. This unique feature improves productivity and makes economic sense for current customers by using their existing Toshiba transducers on the Viamo. Moreover, new customers are able to use Viamo transducers with other Toshiba ultrasound systems they may purchase in the future.

Image: The Viamo laptop ultrasound system (Photo courtesy of Toshiba Medical Systems).

New Cardiac CT Technology Significantly Reduces Patient Radiation Exposure

In a new study, U.S. investigators have determined that an imaging exam of the heart using the latest generation of computed tomography (CT) technology exposes patients to as much as 91% less radiation than standard helical CT scanning.

"Coronary CT angiography has generated great enthusiasm in recent years, due to its diagnostic accuracy in assessing patients with known or suspected coronary artery disease," said Andrew J. Einstein, M.D., Ph.D., assistant professor of clinical medicine in radiology and director of cardiac CT research at Columbia University Medical Center (New York, NY, USA; www.cumc.columbia.edu). "However, that enthusiasm has been tempered by concern about the potentially high radiation dose received by patients."

In CT imaging, numerous X-ray beams and a set of X-ray detectors rotate around the patient, measuring the amount of radiation being absorbed in the body. At the same time, the exam table moves through the scanner allowing the X-ray beam to follow a helical or spiral path. Many coronary CT angiography exams are conducted on 64-detector row CT scanners, which can image 4 cm at a time. The latest generation of CT technology, a 320-detector row volume CT scanner, can image 16 cm – or the entire length of the heart – in a single rotation and within a single heartbeat.

In his study, Dr. Einstein and a team of researchers from Columbia and the U.S. National Heart, Lung and Blood Institute (Bethesda, MD, USA; www.nhlbi.nih.gov) compared the radiation exposure incurred during a coronary CT angiography procedure using a 64-detector row helical scanning and volume scanning, using a 320-detector row volume CT scanner. Phantoms simulating the male and female body were imaged using six different scan modes. Using standard 64-detector row helical scanning as the benchmark, the effective radiation dose was reduced by 91% from 35.4 millisieverts (mSv) to 4.4 mSv using optimized 320-

detector row volume scanning.

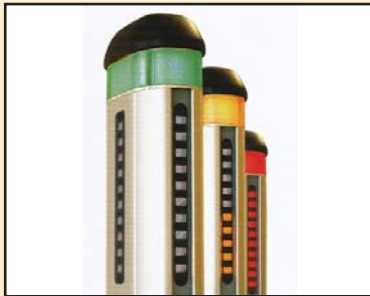
According to Dr. Einstein, state-of-the-art CT technology emphasizes optimal image resolution with the ability to lower radiation dose through a variety of features and scan modes that adjust and modulate the dose based on the specific needs of the individual patient. "As CT technology advanced from 16- to 64-slice capabilities, the radiation dose

went up significantly," he said. "Today, technology development is going in the opposite direction, reducing radiation exposure." Dr. Einstein emphasized that practitioners must pay careful attention to using the appropriate scan mode to obtain diagnostic information with the least amount of radiation exposure to the patient. The study was published in the March 2010 issue of the journal *Radiology*.

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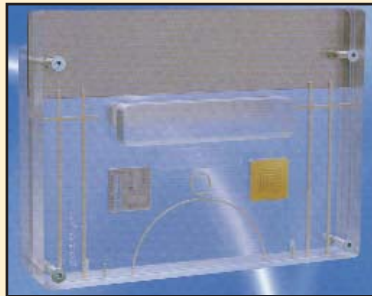
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SCREENING SYSTEM Metrasens

The Ferroguard system is designed to prevent patient injury and equipment failure that can occur when ferromagnetic objects are brought into an MRI unit. The flexible system allows users to select their preferred mode of operation based on their perceived risk levels.

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MAMMOGRAPHY PHANTOM Pehamed

The Europhantom Mammo verifies the parameters of a mammography system and film processor. Key points of focus are spatial resolution, image contrast, threshold contrast visibility, effective radiation field, and optical density in the reference point.

LINKXPRESS.COM MII-06-10 218



CT SCANNER IMTEC

The ILUMA Elite cone beam scanner offers a large field of view, adjustable dose positions, and medical-grade dose components. The scanner provides enhanced images with a lower dose than spiral CT, and is considered ideal for surgical navigation scans.

LINKXPRESS.COM MII-06-10 219



OVERHEAD SUPPORT SYSTEM Sedecal

The NOVA is a heavy-duty, X-ray tube system that offers high-precision positioning for an optimal radiographic result. The NOVA can operate on a horizontal or vertical bucky, and can also be installed with an elevating table.

LINKXPRESS.COM MII-06-10 220

Rapid MRI Analysis Method to Diagnose Alzheimer's Disease

Finnish scientists have developed a method for analyzing magnetic resonance (MR) images in only a few minutes when diagnosing Alzheimer's disease (AD). The accuracy of the analysis is comparable to manual measurements made by skilled professionals, which are currently considered the most effective application for diagnosing AD. The accurate and rapid analysis method is well suited for clinical use.

Early detection of Alzheimer's disease requires that the patient displays some other symptom or sign of AD in addition to memory problems. Such other symptoms include atrophy, i.e., the loss of brain cells, visible in MR images. One of the first areas of the brain where atrophy can be detected is the hippocampus. With this new method, developed by researchers from the VTT Technical Research Center (Espoo, Finland; www.vtt.fi), the volume of the hippocampus can be accurately calculated automatically.

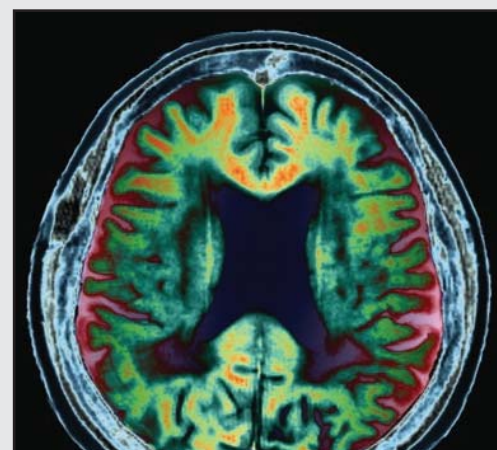
Currently, diagnosis of AD often makes use of visual assessment of MR images. Manual determi-

nation of brain structures in this way is a difficult task for the physician, and the repeatability of results typically poor. This has led to a high demand for objective methods. Earlier automatic systems for calculating the volume of the hippocampus are not in general clinical use because of deficiencies in speed and effectiveness.

Using VTT's new approach, the evaluation of MR images takes three minutes. With the fastest currently available automatic MR image assessment methods, the assessment takes 15 to 20 minutes. However, it is not uncommon for assessments to last for several hours.

The new method is part of a system, which is currently being developed under the European Union (EU) PredictAD project (Tampere, Finland; www.predictad.eu) to help diagnose AD. The system will be completed in 2011. The goal of the project is to develop objective methods that are sufficiently accurate, effective, and fast for clinical use but do not require large investments in equipment.

Other organizations involved in developing the



new method include GE Healthcare (Chalfont St. Giles), Imperial College London (UK), University of Eastern Finland (Kuopio, Finland) and Rigshospitalet (Copenhagen, Denmark). The method is currently being tested to confirm its operational effectiveness.

Image: Colored magnetic resonance imaging (MRI) scan of a section through the brain of a 68-year-old patient suffering from Alzheimer's disease (Photo courtesy of Zephyr / SPL).

Synthetic Probes Used to Image Cell Death

For quite some time, the "Holy Grail" in medical imaging has been the development of an effective technique to image cell death as a way to intervene early in diseases and rapidly determine the effectiveness of treatments. A new study has demonstrated important progress in using a synthetic probe to target dead and dying cells in mammary and prostate tumors in living animals.

The researchers working on the project were from the University of Notre Dame (Notre Dame, IL, USA; www.nd.edu) and the Washington University School of Medicine (St. Louis, MO, USA; <http://medschool.wustl.edu>). Bradley D. Smith, a professor of chemistry and biochemistry at Notre Dame, points out that the group of researchers had previously discovered that synthetic zinc (II)-dipicolylamine (Zn-DPA) coordination complexes can

selectively target the outer surfaces of anionic cell membranes. Furthermore, fluorescent versions of these Zn-DPA complexes act as imaging probes that can distinguish dead and dying mammalian cells from healthy cells in a cell culture and also selectively target bacteria in contaminated samples.

The researchers also recently demonstrated that a fluorescent near-infrared (NIR) probe referred to as PSS-794 can be used to image bacterial infections in mice, indicating that PSS-794 has a notable ability to selectively target anionic cells in living animals.

In the new study, the researchers revealed a significant expansion of the animal imaging capability of PSS-794 by showing that it can target the anionic dead and dying cells within tumors in rat and mouse models. The research is an important step

toward the development of optical imaging probes that could determine, noninvasively, the amount and type of cell death in tumors. Such imaging techniques could help clinicians accurately determine the grade of tumors and the stage of cancers, as well as to measure the effectiveness of treatments.

The researchers also believe that analogous probes can be developed that would allow for deep tissue imaging of cancers in humans. Prof. Smith pointed out that although the study focused on mammary and prostate tumors, imaging of cell death is also useful for treatment of numerous conditions, including cardiovascular disease, neurology, renal disease, and even transplant rejection.

The research was published online December 2009 in the *Journal of the American Chemical Society (JACS)*.

Mammography Screen Designed with Reduced Noise, Improved Detector Quantum Efficiency

A new screen has been developed for a computed radiography (CR) mammography imaging systems that features reduced noise and higher detector quantum efficiency (DOE) for improved image quality.

The EHR-M3 screen, developed by Carestream Health, Inc. (Rochester, NY, USA; www.carestreamhealth.com), is designed to replace previous screens used with Directview CR mammography systems that are equipped with the company's Mammography Feature. The Mammography Feature is now available in Canada, Europe, South America, Australia, Asia, and other regions of the world where approved for use (not yet approved in the United States).

Upgrading to cassettes with the new screen is an easy and affordable way to improve image quality for mammography exams. The new screen offers a 20% reduction in noise, which can improve diagnostic confidence and help reduce radiologists' reading time.

This new screen is now included in the company's mammography cassettes in both 18 cm x 24 cm (8 x 10 inch) and 24 cm x 30 cm (10 x 12 inch) sizes. The new screen is compatible with thousands of existing Directview CR 850/950/975 and Directview Classic and Elite CR systems currently used for mammography applications.

Carestream Health provides a digital range of women's healthcare solutions that includes: mammography-specific modules for its radiology information system/ picture archiving and com-



munication system (RIS/PACS) platform; a multi-modality breast imaging workstation that allows reading of all breast imaging modalities as well as general radiology exams; digital capture of mammography images and computer-aided detection (CAD) for its Directview CR systems in countries where approved for use; and high-resolution output to Dryview laser imaging systems.

Carestream Health is a worldwide provider of dental and medical imaging systems and healthcare information technology (IT) solutions; molecular imaging systems for the life-science research and drug discovery/development market segments; and X-ray film and digital X-ray products for the nondestructive testing market.

Image: The CR Mammography Cassette with EHR-M3 screen (Photo courtesy of Carestream Health).

MRI Contrast Agent Improves Detection of Lymph Nodes Metastases

Adding the contrast agent gadolinium during magnetic resonance imaging (MRI) for primary tumor assessment was shown to improve accuracy for detecting lymph node metastases, according to a new review.

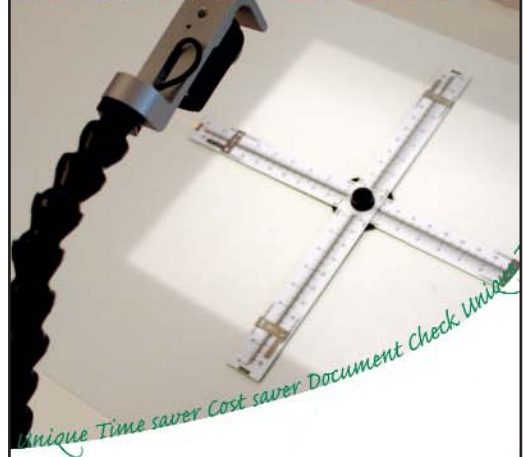
Gadolinium-enhanced MRI is primarily used to visualize primary tumors, highlight tumor vascularity, and increasingly to detect and evaluate lymph node metastases. In this systematic review, the investigators recommend that contrast highlighting be included as a malignancy criterion when this agent is used for primary tumor visualization.

Wenche M. Klerkx, M.D., Ph.D., from the department of gynecology and obstetrics at the University Medical Center Utrecht (The Netherlands; www.umcutrecht.nl), and colleagues searched the literature for studies that compared the diagnostic accuracy of gadolinium-enhanced MRI for staging lymph node metastases with that of histopathologic examination. The researchers conducted a meta-analysis that encompassed more than 30 studies from the last 10 years and reported summary sensitivity and specificity of MRI for detecting nodal metastases. They published their findings online February 1, 2010, in the *Journal of the National Cancer Institute*.

The researchers found that overall accuracy of gadolinium-enhanced MRI for the detection of nodal metastases was moderate. They also concluded that incorporating contrast enhancement in the malignancy criteria improves the accuracy of this diagnostic test. "We further advocate the use of uniform malignancy criteria, including contrast enhancement, for standardization of future evaluations," the authors wrote in their article. "Gadolinium enhancement by itself does not have the diagnostic accuracy to replace histopathologic examination of lymph nodes; however, it can help identify suspicious lymph nodes that should be surgically collected for histopathologic examination."

Study limitations included not all of the included studies reported diagnostic study quality, which precluded formal analyses based on the quality assessment items. A regression test for small-study effects was statistically significant, indicating that the retrieved studies had findings that may not be representative of the full range of evidence that has been produced (publication bias). In the overall analyses of the diagnostic accuracy of gadolinium-enhanced MRI for the detection of lymph node metastases, studies were pooled without regard to the primary tumor site.

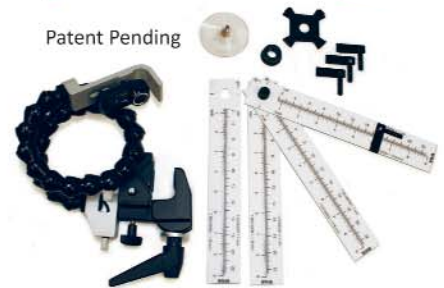
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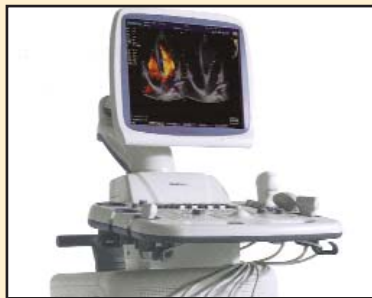
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ULTRASOUND SYSTEM SonoScape

The SSI-8000 system supports 4D imaging with optimal volume resolution, as well as tissue doppler imaging, steer M mode, and TEI index. The system is designed for cardiac, transcranial, TEE, celoscope, urological and volumetric applications.

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HYBRID MRI SYSTEM Time Medical

The Hybrid PICA whole-body scanner offers enhanced image quality, delivered at increased speed with lower user costs. Features include easy patient handling, maximum patient comfort, and flexible image sequence set up.

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IMAGE PROCESSING UNIT Vatech

The Xmaru1717 provides a wider active area for an image, along with versatile options for reliable imaging diagnostics. Key benefits include A-Si TFT technology, DICOM-compatible software, and quick and easy integration.

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Wireless DR Detector Improves Workflow and Image Quality

A growing number of healthcare providers across Europe are choosing to install an innovative wireless digital radiography (DR) system to solve workflow and productivity challenges. Since its introduction in 2009, the cost-effective price of this new technology and its ability to utilize existing X-ray systems has led to well over 200 units being successfully installed and operational across Europe.

The Carestream DRX-1 system is the industry's first wireless, cassette-size DR detector that can be employed in all applications where a 35 cm x 43 cm (14" x 17") X-ray cassette would be used. This means that it can be easily incorporated into all types of radiology environments, and it does not require modification of existing rooms. The DRX-1 system provides high quality preview images in about five seconds and its compact size and lightweight further enhance convenience and throughput.

Development of the system has also been recognized by leading global research company Frost & Sullivan (Palo Alto, CA, USA) with the presentation to Carestream Health (Rochester, NY, USA; www.carestreamhealth.com) of the 2010 Europe New Product Innovation Award in the Digital Radiography Market.

Dr. Günther Nics was the first radiologist in Austria to be convinced by the advantages of the DRX-1 system for his clinic in Hollabrunn, where the team of 12 staff and two physicians care for approximately 25,000 patients yearly, performing approximately 70,000 exams. Following the introduction of the DRX-1, imaging is now considerably faster and easier. "The fact that the cassette, the technologist and the patient are in contact with each other throughout the whole process, including checking the image, is a great step forward," said Dr. Nics.

A further advantage experienced by Dr. Nics has been an improvement in image quality, "The

resolution in the new system is definitely better," he added. Together with the new reader and processing software, we feel this represents a qualitative leap in image presentation."

Also in Austria, a DRX-1 has been installed in the Rudolf Foundation Clinic in Vienna, where it is used for examinations of the abdomen and urinary tract, urologic stone center, general internal and surgical imaging, as well as bedside lung and individual skeletal imaging. Dr. Dimiter Tscholakoff led the move towards the DRX-1 with the goal of prolonging the service life of existing systems while meeting the specific need to both improve workflow and maintain quality. "We opted for the DRX-1 in order to improve workflow and image quality and we have succeeded," Dr. Tscholakoff noted. "We have been able to increase productivity and shorten patient examination times for the benefit of all." In addition to enhancing quality, the DRX-1 system also has the advantage of shortening examination time from two minutes to 17 seconds, a particular benefit to patients from the intensive care unit.

The Centre Hospitalier de Decize is situated 30 km from Nevers in the Nievre region of France, and the hospital has been operating a DRX-1 system for several months. Ms. Herzog-Prunet, medical technical manager of the radiology department, outlined the system's advantages. "All our radiology is digitized today, image quality has been improved and the patient dose reduced, but what is most impressive is the global increase in work, particularly in the orthopedic unit. The DRX-1 has really boosted the number of examinations in this room, which is definitely down to not having to transport any cassettes but also to the previsualization function, which makes it possible to check the plate after just a few seconds. This saves precious time, particularly without a fluoroscope, and is a significant factor in improving patient comfort, something that is paramount for

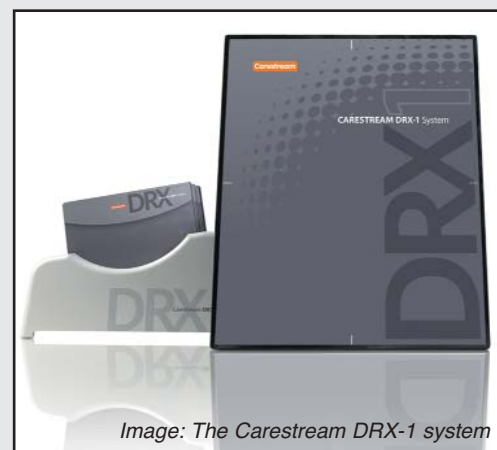


Image: The Carestream DRX-1 system

our patient recruitment which consists mainly of orthopedic examinations for elderly patients."

The ImaginX practice, owned by Dr. Hustinx, is located in Waterloo, near Brussels, and conducts approximately 250 examinations each week, one-third of which are mammograms. Installation of the DRX-1 has enabled Dr. Hustinx to optimize workflow, particularly with regard to the examinations carried out on the remote-controlled digitizer and mammography unit. The DRX-1 enabled transformation of the digitizer into a flat panel detector without any great investment enabling the CR reader to be moved to the mammography unit.

"The DRX-1 has fulfilled all its promises. Installing it into the remote-controlled digitizer took no time at all," commented Dr. Hustinx. "I had anticipated a month of working in parallel with the CR [computed radiography] reader but, in the end, we took the reader out of the unit and put it next to the mammography unit after just two days. The outcome is extremely positive because, thanks to the DRX-1, we have been able to improve the quality of the images and lower the radiation dose at the same time. Moreover, we have increased our productivity in the remote controlled unit by about 30%, thanks to no longer having to handle cassettes when the CR reader was in the unit."

Mathematical Model Devised for Curing More Cervical Cancer Patients

Cervical cancer is curable when detected early. But in one-third of cases, the tumor responds poorly to therapy or recurs later, when cure is much less likely. A more rapid identification of nonresponding tumors may be possible using a new mathematical model.

The model, devised by researchers at the Ohio State University Comprehensive Cancer Center-Arthur G. James Cancer Hospital and Richard J. Solove Research Institute (OSUCCC-James; Columbus, USA; www.jamesline.com), utilizes information from magnetic resonance imaging (MRI) scans taken before and during therapy to monitor changes in tumor size. That information is plugged into the model to predict whether a specific case is responding well to treatment. If not, the patient can be changed to a more aggressive or experimental therapy midway through treatment, something not possible now.

The study, published in the February 1, 2010, issue of the journal *Cancer Research*, uses MRI scans and outcome information from 80 cervical cancer patients receiving a standard course of radiation therapy designed to cure their cancer. "The model enables us to better interpret clinical data and predict treatment outcomes for individual patients," said lead investigator Dr. Jian Z. Wang, assistant professor of radiation medicine and a radiation physicist at the OSUCCC-James. "The outcome predictions presented in this paper were solely based on changes in

tumor volume as derived from MRI scans, which can be easily accessed even in community hospitals. The model is very robust and can provide a prediction accuracy of 90% for local tumor control and recurrence."

An advantage of the new model, according to first author Zhibin Huang, is its use of MRI data to estimate three factors that play key roles in tumor shrinkage and that vary from patient to patient – the proportion of tumor cells that survive radiation exposure, the speed at which the body removes dead cells from the tumor, and the growth rate of surviving tumor cells.

The model is applicable to all cervical cancer patients, and the investigators are developing a model that can be applied to other cancer sites, according to Dr. Wang. Coauthor Dr. Nina A. Mayr, professor of radiation medicine at Ohio State, noted that the size of cervical tumors is currently estimated by touch, or palpation, which is frequently imprecise. Furthermore, shrinkage of a tumor may not be apparent until months after therapy has ended.

Other clinical factors currently used to predict a tumor's response to therapy include the tumor's stage, whether it has invaded neighboring lymph nodes and its microscopic appearance. "Our kinetic model helps us understand the underlying biological mechanisms of the rather complicated living tissue that is a tumor," Dr.

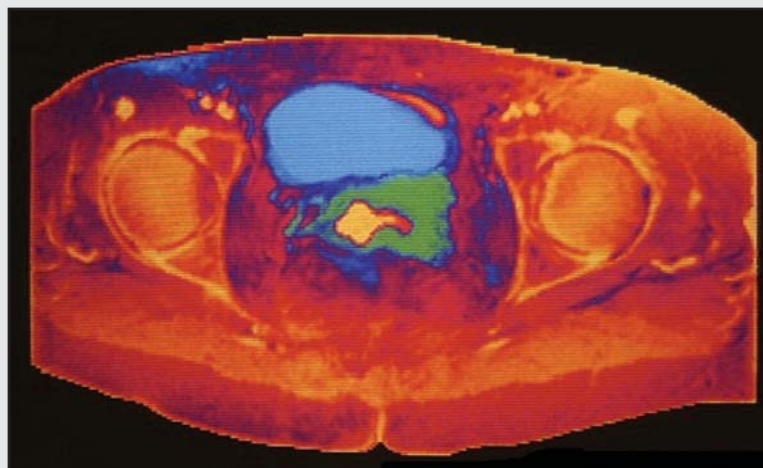


Image: False-color magnetic resonance image (MRI) of an axial section through a female pelvis, revealing cancer of the cervix (Photo courtesy of Mehau Kulyk / SPL).

Wang concluded. "It enables us to better interpret clinical data and predict treatment outcomes,

which is critical for identifying the most effective therapy for personalized medicine."

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Multileaf Collimator Upgrade Helps in More Efficient Radiotherapy

New multileaf collimator technology combines a fast leaf movement of up to 4 cm per second with the highest possible resolution and the lowest leakage and penumbra. These features make it possible to treat patients with high precision radiotherapy, sparing the surrounding healthy tissue regardless of the tumor shape, and can provide a more efficient therapy session by shortening the time of fractions due to fast leaf movements.

Siemens Healthcare (Erlangen, Germany; www.medical.siemens.com) reported that Christiana Care Health

Systems Helen F. Graham Cancer Center (Wilmington, DE, USA), has become the first facility in the United States to upgrade their Oncor linear accelerator with the new 160 MLC multileaf collimator. Charleston Radiation Therapy in West Virginia and Holden Comprehensive Cancer Center at the University of Iowa has also recently completed the upgrade.

The Siemens Healthcare Sector is one of the world's largest suppliers to the healthcare industry and a leader in medical imaging, laboratory diagnostics, medical information technology, and hearing aids.

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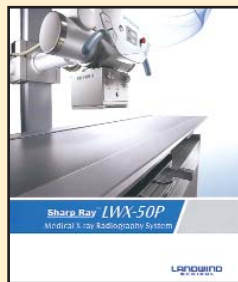
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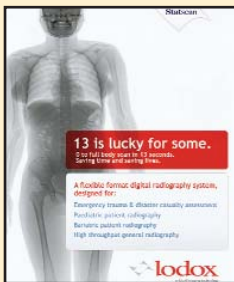
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RADIOGRAPHY SYSTEM Landwind Medical

The LWX-50P system offers green, lose-dose imaging, a compact design, and user-friendly workflow. The system is ideal for a wide range of clinical applications.

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DR SYSTEM Lodox Systems

The Statscan is designed for emergency trauma and casualty assessment imaging, as well as for pediatric and bariatric patient imaging.

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CT SOFTWARE SharpView

The SharpView CT software provides a CT-dose reduction of 30% - 70%, is easy-to-install, DICOM-compatible, and independent of the CT scanner.

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DR SYSTEM WDM

The Oriental 1000 features a single-panel, multifunction configuration, as well as enhanced image acquisition and processing for quick diagnosis.

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C-ARM SYSTEM Ziehm Imaging

The Vision Vario 3D combines 2D image quality with 3D imaging module. The system is considered ideal for orthopedic, trauma, and neurosurgery imaging.

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Preoperative Mammogram Reduces Need for Mastectomy in Women with Ductal Carcinoma in Situ

Over 60% of women who have a form of breast cancer in the milk ducts, called ductal carcinoma in situ (DCIS), can be spared a mastectomy, according to latest research.

Researchers for the Sloane Project (Birmingham, UK; www.sloaneproject.co.uk), a UK-wide prospective audit of screen detected noninvasive and atypical hyperplasias of the breast, examined how the size of the DCIS – measured by both imaging and pathology – related to the surgeon's decision of whether to conserve or remove the breast. They discovered that, out of 2,500 women who had DCIS detected by breast screening, approximately 70% of patients had conservation surgery to remove the disease and save the breast. Of those who had conservation surgery, 71% only needed one operation to remove the cancer, 19% needed a further operation, and 10% went on to have a mastectomy.

In situ (noninvasive) breast cancer is confined to the ducts or lobules of the breast and has not spread to the surrounding tissues of the breast or other parts of the body. It is therefore curable if removed completely, but if left untreated may become invasive breast cancer.

This research is part of a large review of screen-detected DCIS and its treatment over the past five years through the Sloane Project, investigating the best treatment methods for DCIS. Dr. Jeremy Thomas, study author and consultant pathologist from the Western General Hospital (Edinburgh, Scotland, UK; www.nhslothian.scot.nhs.uk), said, "This study shows that comparing the size of tumors as measured by imaging to the actual size of the tumor removed at surgery, gives a clear indication of where to focus improvements in practice. The results are very encouraging showing that 90% of patients offered breast conservation for DCIS have a successful surgical outcome, usually from one operation, and avoid mastectomy. Deciding the best surgery option for patients with in situ breast cancer is difficult and requires very careful preop-

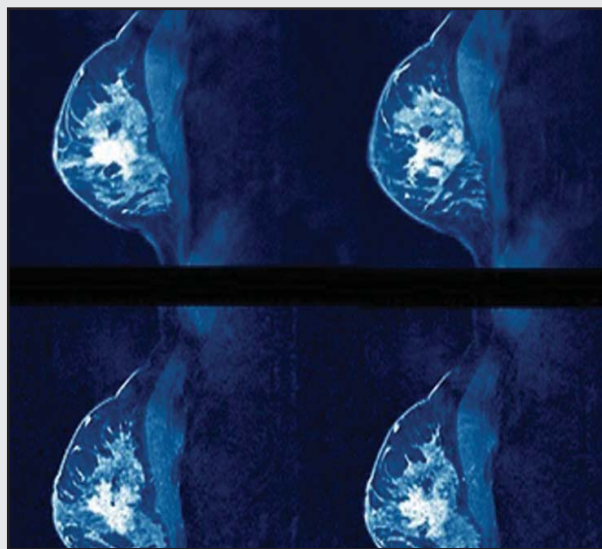
erative assessment to define the extent of disease. A mastectomy would almost always cure the disease but where possible we want to conserve the breast and only remove the tumor. In the future, we would hope to see that, with improvements in imaging and preoperative assessment, more women could avoid having mastectomies."

Prof. Stephen Duffy, Cancer Research UK's professor of screening at Queen Mary University of London, said, "In the screening era, large numbers of breast cancers are diagnosed at the DCIS stage. We have a responsibility to see that these cancers are not overtreated. Therefore, it is good to see that the vast majority does not get a mastectomy. There is clearly room for improvement in that we can further reduce the need for reoperation. This problem can and doubtless will be reduced by high-quality preoperative imaging."

Sara Hiom, director of health information at Cancer Research UK (London, UK), said, "In the past, treatment for DCIS was nearly always mastectomy so it's really encouraging to see that now around 60% of women with DCIS have only the affected area removed, along with a border of healthy tissue around it. It's important that women go for breast screening when invited. The program is very successful at detecting early stages of the disease which means treatment can be much more effective."

The Sloane Project's goal is to record the present situation in the UK regarding the management of in situ breast disease, and to provide a guide to the optimal radiologic assessment, pathologic handling, and reporting (including the features of greatest prognostic and clinical importance), surgical treatment, and adjuvant therapy.

The Sloane Project has been running for six years with more than 7,000 patients entered estimated about 50% of all relevant cases are now



entered into the audit. The Sloane Project is now funded by the National Health Service Breast Screening Program (NHSBSP). Between April 1, 2007 and March 31, 2008, 16,792 breast tumors were detected within the NHS Breast Screening Program (NHSBSP), of whom 3,311 (20%) had in situ/noninvasive breast cancer. There has been a marked increase in the incidence of in situ breast cancer since the NHSBSP started in 1988. The reason being that the trademark characteristic of microcalcification present in the majority of in situ breast tumors can be easily visualized radiologically on a mammogram.

The invasive potential of in situ breast cancer is uncertain and accordingly the optimal method of treatment for every case is ambiguous and unclear. A mastectomy would nearly always be curative, however this approach would be extreme in cases where breast-conserving surgery would suffice. Identifying the optimal method of treatment can therefore be difficult. The research was published January 20, 2010, in the *British Journal of Cancer*

Image: Colored sagittal magnetic resonance imaging (MRI) scans of a breast of a 39-year-old woman with ductal carcinoma (Photo courtesy of Zephyr / SPL).

Innovative Software Creates 3D Views of Cardiac Arteries

A new study describes a technology that allows doctors in the catheterization lab to see three-dimensional (3D) images of cardiac arteries, enabling them to more accurately and quickly assess the length, branching pattern, and angles of heart arteries and any blockages.

Researchers at the University of Colorado Hospital (UCH; Aurora, USA; www.uch.edu), Philips Healthcare (Best, The Netherlands; www.medical.philips.com), and other institutions and businesses compared standard two-dimensional (2D) images to automatically generated, computer-reconstructed 3D images of 23 patients' coronary artery systems. To generate realistic 3D images, the researchers used a recently developed technique called rotational angiography, which uses X-ray projection images acquired during a 180° C-arm rotation and continuous contrast injection, followed by electrocardiogram (ECG)-gated iterative reconstruction. The researchers compared overall image quality, lesion visibility, and a comparison of 3D quantitative coronary analysis with 2D quantitative coronary analysis.

The results showed that two-thirds of the resulting 3D volume

images were rated as having high image quality and provided the physician with additional clinical information, such as complete visualization of bifurcations and unobtainable views of the coronary tree. True-positive lesion detection rates were high (90% - 100%), whereas false-positive detection rates were low (0% - 8.1%). The researchers also found that 3D quantitative coronary analysis showed significant similarity with 2D quantitative coronary analysis in terms of lumen diameters, and provided vessel segment length free from the errors of foreshortening. The study was published in the February 2010 issue of *Circulation: Cardiovascular Interventions*.

"Coronary interventions may be improved by having a realistic, 3D image of the coronary artery tree," said study coauthor Prof. John Carroll, M.D., director of interventional cardiology at UCH.

Currently, clinicians take multiple 2D X-ray images from different views to visualize what the arteries look like inside the body, using a contrast dye that temporarily fills the coronary arteries to visualize the inner diameter of the artery. This allows the detection of plaque build up, and consequently the insertion

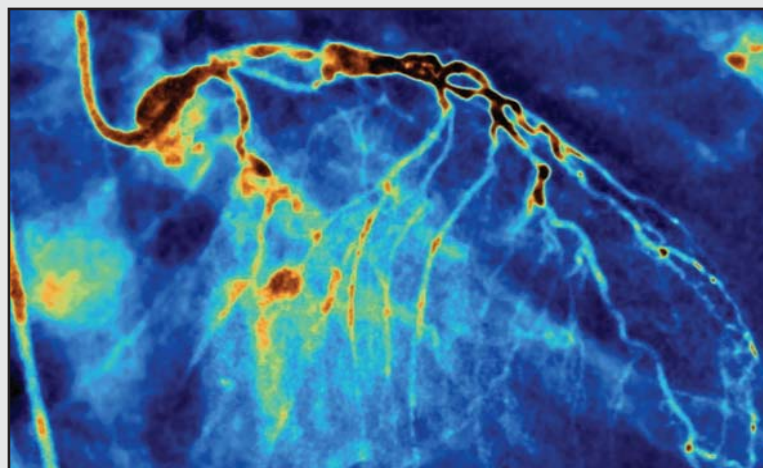


Image: Colored coronary angiogram of a 65-year-old patient with severe stenosis in the branches of the left coronary artery (Photo courtesy of Zephyr / SPL).

of a coronary stent to open a blocked artery and allow normal blood flow. The 2D images have

been the standard method of presenting coronary angiographic structure for over 50 years.

Unexpected Findings Seen on MRI-Enterography Evaluation of Crohn's Disease

Magnetic resonance imaging (MRI) is increasingly used in the evaluation of small bowel Crohn's disease (CD). Unlike traditional radiology, MRI enables visualization of disease extension beyond the intestinal wall, i.e., abscesses and fistulas. However, some extra-intestinal findings have been seen that were both unexpected and without relation to CD.

The ability to detect incidental findings presents a clinical dilemma. On one hand, modern imaging techniques may detect early extra-intestinal malignant disease or disease requiring clinical intervention, thereby reducing morbidity and mortality. On the other hand, incidental findings may lead to additional diagnostic work-up or surgery of benign lesions causing increased morbidity.

A research article published January 7, 2010, in the *World Journal of Gastroenterology* addresses incidental findings in MRI-enterography in patients with suspected or known CD.

Only few studies have dealt with incidental findings in abdominal MRI scans. In the present study, performed by investigators from the Medicinsk Gastroenterologisk Afdeling S (Aalborg, Denmark; www.aalborgsygehus.rm.dk) and Odense Universitets-hospital (Odense, Denmark; www.ouh.dk), MRI-enterography revealed incidental findings located outside the small intestine, which were not related to CD in 25% of patients resulting in further examinations in 5%. Additional investigations confirmed abnormal lesions in 1.8%, and one patient had a malignant disease.

Two patients benefited from the additional examinations (aortic aneurysm and prostate cancer) whereas incidental findings led to unnecessary examinations in nine patients. Detection of extraintestinal manifestations of CD was rare (1.8%). Therefore, incidental findings are common in patients having MRI scanning for evaluation of small bowel CD.

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Digital DR System Uses Direct Capture Technology

A fully automated direct digital radiography table and upright system generates images of excellent quality and includes special design elements and fast image cycle times that will help imaging departments increase efficiency and maximize productivity.

FujiFilm Medical Systems USA (Stamford, CT, USA; www.fujimed.com) reported that the U.S. Food and Drug Administration (FDA) 510(k) approval has been received for the Fuji digital radiography (FDR) AcSelerate system, making it available for sale in the United States.

A fully automated digital table and upright system, the FDR AcSelerate is the latest addition to Fujifilm's line of DR systems, and is the only general radiography system currently available using a direct image capture technology. This amorphous selenium technology, combined with Fujifilm's advanced image processing experience, produces images of outstanding clarity and sharpness with superior contrast resolution for increased diagnostic confidence. The FDR AcSelerate also provides the potential for dose reduction, and a dose area product meter (DAP) is available so that physicians can monitor patient dose per exam and total dose per study.

"The importance of image quality to providing the best possible patient care cannot be underestimated, so when Fujifilm developed the FDR

AcSelerate we chose to design our own detector with superior physical properties to provide radiologists with images of optimal quality," explained Penny Maier, Fujifilm's director of marketing, imaging systems. The FDR AcSelerate is already installed at Swedish Covenant Hospital (SCH; Chicago, IL, USA), where a clinical evaluation of the unit has taken place. "We are thrilled to be the first North American install of AcSelerate," said Bradley Carlton, director of radiology at Swedish Covenant.

The intuitive design of the FDR AcSelerate enables technologists to work more efficiently, departments to be more productive, and patients to have reduced wait times. A fully automated table and upright system, it can be properly positioned for most any general radiography exam with just the touch of a button. Moreover, with a lightweight ergonomic design, AcSelerate takes less effort to position than traditional systems. The system provides image preview in two seconds with cycle times of only four seconds, and the new FDX Console workstation is now configured to alert technologists when exams are ready to expose.

The FDR AcSelerate will be upgradeable for tomosynthesis and energy subtraction; both applications are expected to be available later this year. Both require FDA 510(k) clearance.

As one of the FujiFilm Corp. (Tokyo, Japan) fam-



ily of companies, FujiFilm Medical Systems USA, Inc. is a leading provider of diagnostic imaging products and network systems. Fujifilm's family of imaging systems products and technologies including digital X-ray, women's healthcare imaging, dry imagers, and conventional X-ray film and equipment are designed to suit many different applications for a variety of imaging environments.

Image: The FDR AcSelerate system (Photo courtesy of FujiFilm).

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Projection Systems Designed Specifically for High-Performance Medical Imaging

Solid-state light-source projectors have been developed that can be customized specifically to the requirements of the medical market.

Making its worldwide debut at the European Congress of Radiology (ECR) held in Vienna, Austria, on March 4-8, 2010, was projectiondesign's (Fredrikstad, Norway; www.projectiondesign.com) new FL32 wuxga medical. Fully compliant with Digital Imaging and Communications in Medicine (DICOM) clinical review standards, the new projector offers all the expected benefits of projectiondesign's RealLED technology – including ultra-low power consumption, low cost of ownership, and up to 100,000 hours of operational life, making the projector virtually maintenance-free.

Also on show in Vienna was projectiondesign's new F22 wuxga medical, which offers the same medical-market benefits, including DICOM-compliance, and preloaded medical calibration settings. These are all contained within the projector's small, stylish, industrially designed and unobtrusive cabinet enclosure.

Running "in the background" –

but just as important – is version 2.0 of projectiondesign's ProNet asset-management software system, which offers remote monitoring and control of multiple projectors including automated calibration of any number of displays.

Anders Løkke, international marketing and communications manager at projectiondesign, explained, "projectiondesign recognizes the need to develop projectors with characteristics specifically designed for medical applications. The latest incarnations of this program are the FL32 medical and the F22 medical, both of which offer high resolution images to ensure optimum performance and display accuracy, along with full DICOM compliance and complete compatibility with PACS [picture archiving and communication system] workflows. Exhibiting at an event like ECR gives us the chance to bring these products to the market and showcase our latest developments not just to our existing customers in the medical marketplace, but also to suppliers of PACS systems demonstrating how easy it is to incorporate our visualization technology into their designs."

3-Pronged Initiative to Reduce Unnecessary Radiation Exposure

A U.S. initiative has been designed to reduce unnecessary radiation exposure from three types of medical imaging procedures: computed tomography (CT), nuclear medicine studies, and fluoroscopy. These procedures are the greatest contributors to total radiation exposure within the U.S. population and use much higher radiation doses than other radiographic procedures, such as conventional X-rays, dental X-rays, and mammography.

CT, nuclear medicine, and fluoroscopic imaging have led to early diagnosis of disease, improved treatment planning, and image-guided therapies that help save lives. The organizers of the initiative, the U.S. Food and Drug Administration (Silver Spring, MD, USA; www.fda.gov), announced it continues to support a strong dialogue between patients and physicians over the medical necessity and risk associated with these types of imaging studies.

However, like all medical procedures, CT, nuclear medicine, and fluoroscopy pose risks. These types of imaging exams expose patients to ionizing radiation, a type of radiation that can increase an individual's lifetime cancer risk. Accidental exposure to very high amounts of radiation also can cause injuries, such as skin burns, hair loss, and cataracts. Healthcare decisions made by patients and their physicians should include discussions of the medical need and associated risks for each procedure.

"The amount of radiation Americans are exposed to from medical imaging has dramatically increased over the past 20 years," said Jeffrey Shuren, M.D., J.D., director of the FDA's Center for Devices and Radiological Health. "The goal of FDA's initiative is to support the benefits associated with medical imaging while minimizing the risks."

While there is some disagreement over the extent of the cancer risk associated with exposure to radiation from medical imaging, there is broad agreement that steps can and should be taken to reduce unnecessary radiation exposure. For example, the radiation dose associated with a CT abdomen scan is the same as the dose from approximately 400 chest X-rays. In comparison, a dental X-ray calls for approximately one-half the radiation dose of a chest X-ray. Both diagnostics serve important, sometimes critical, public health needs.

Through the FDA's regulatory oversight of medical imaging devices, such as CT scanners, and through collaboration with other federal agencies and healthcare professional groups, the FDA is advocating the adoption of two principles of radiation protection: appropriate justification of the radiation procedure and optimization of the radiation dose used during each procedure. "Working together," said Dr. Shuren, "the FDA and other organizations hope to help patients get the right imaging exam, at the right time, with the right radiation dose."

The three-pronged initiative the FDA is announcing will promote the safe use of medical imaging devices, support informed clinical decision-making, and increase patient awareness of their own exposure. The FDA intends to issue targeted requirements for manufacturers of CT and fluoroscopic devices to integrate important safeguards into the design of their machines to develop safer technologies and to provide appropriate training to support safe use by practitioners. The agency intends to hold

a public meeting on March 30-31, 2010, to solicit input on what requirements to establish.

Examples could include a requirement that these devices display, record, and report equipment settings and radiation dose, an alert for users when the dose exceeds a diagnostic reference level (the optimal dose for most patients), training for users, and a requirement that devices be able to capture and transmit radiation dose information to a patient's electronic medical record and to national dose registries. Moreover, the FDA and the Centers for Medicare and Medicaid Services are collaborating to incorporate key quality assurance practices into the mandatory accreditation and conditions of participation survey processes for imaging facilities and hospitals. These quality assurance practices will improve the quality of oversight and promote the safe use of advanced imaging technologies in those facilities.

The FDA recommends that healthcare profession-

al organizations continue to develop, in collaboration with the agency, diagnostic radiation reference levels for medical imaging procedures, and increase efforts to develop one or more national registries for radiation doses. A dose registry would pool data from many imaging facilities nationwide, capturing dose information from a variety of imaging studies. This registry will help define diagnostic reference levels where they do not yet exist, validate levels that do exist, and provide benchmarks for health care facilities to use in individual imaging studies.

In a bid to empower patients and increase awareness, the FDA is collaborating with other organizations to develop and disseminate a patient medical imaging history card. This tool, which will be available on the FDA's Website, will allow patients to track their own medical imaging history and share it with their physicians, particularly when it may not be included in their medical records.

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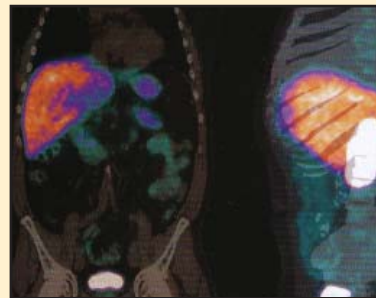




ORTHOPEDIC SOFTWARE Alma IT Systems

The ALMA Ortho module supports presurgical planning and postsurgical evaluation of hip and knee prostheses implants. The software offers 10,000 templates, annotations, image calibration, postsurgical tests, and study comparisons.

LINKXPRESS.COM MII-06-10 233



PET/CT ANALYSIS SUITE Biotronics 3D

The 3dnet solution allows for complete flexibility for PET/CT studies from tumor identification to assessment and oncology follow-ups. The suite can also be integrated in RIS/PACS environments, and can also be used for diagnosis and monitoring of Alzheimer's disease.

LINKXPRESS.COM MII-06-10 234



MEDICAL PROJECTOR Canon

The REALiS SX7 Mark II D is designed for viewing monochrome digital X-rays, CT scans, and MR images with accurate color and precise detail. The DICOM simulation mode serves to simulate the results of DICOM-compliant devices for display of grayscale images.

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MAMMOGRAPHY MONITOR Eizo Nanao

The RadiForce GS521 digital monitor features high resolution, density, and definition, as well as multi-grayscale detection and uniform brightness. Other added benefits include DICOM-compliance, and simple quality-control procedures.

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Computers Better at Measuring Some Radiology Images

Scientists have automated the measurement of a key region of the knee in images with a computer program that performs much faster and just as effectively as humans who interpret the same images. Having more precise data about wear-and-tear on this portion of the knee – a blend of fibrous tissue and cartilage called the meniscus – could lead to its use as a biomarker in predicting who is at risk for developing osteoarthritis, according to researchers. The meniscus consists of two C-shaped disks that rest between the thigh and shinbones. It provides cushioning, evens out weight distribution, and reduces friction. Under normal circumstances, radiologists use rulers to measure specific portions of an image. This new program replaces that method with automated measurements of several magnetic resonance imaging slices of the meniscus. These measurements can then be used to determine the total volume of the structure of the meniscus for comparison over time.

After developing the program, the scientists found that the automated measurements were either as effective or more reliable than human measurements of mild to moderate cases of knee degeneration. More research is needed to make the program equally strong in measuring severely damaged knees, researchers say.

On a case-by-case basis, manual interpretation takes between 7 and 20 minutes, and the computer program completes its segmentation in 2 to 4 minutes. The scientists reported that the program could be reworked to make it work even more rapidly without sacrificing accuracy. "Our ambitious goal is to change the way radiology is practiced," said Dr. Metin Gurcan, senior author of the work, and an assistant professor of biomedical informatics at Ohio State University (Columbus, OH, USA; www.osu.edu). "Right now, radiologists don't have the tools to make more than crude measurements of most images. So one thing we are doing is providing those tools."

The research appeared online in January 2010

in the journal *Osteoarthritis and Cartilage*. Researchers believe that if the meniscus, and ultimately, other parts of the knee – can be more accurately monitored for changes over time, the structures could serve as important predictors of an individual's risk for developing osteoarthritis, the leading cause of disability in older adults.

Dr. Gurcan and colleagues used imaging data from the Osteoarthritis Initiative (San Francisco, CA, USA; www.oai.ucsf.edu), a massive U.S. study of the disorder, to develop and test new programming designed to automate radiologic measurements. Ohio State's Medical Center was one of four clinical centers selected as part of the U.S. initiative to collect information and design disease standards intended to speed drug development. Osteoarthritis is the most common type of arthritis and is characterized by the breakdown and erosion of cartilage that causes pain, swelling, and loss of motion in the joint.

The initiative has collected images and other data on 4,796 study participants. This computer programming study used 24 randomly selected images from that collection – 10 from patients with no symptoms, and 14 from patients diagnosed with osteoarthritis. In developing the program, the researchers created algorithms based in part on the intensity of the pixels within each component of the images taken of study participants' knees. "We set up a process of elimination for consideration. It says bright pixels are not the meniscus. And we know some areas in the images are bone, ligaments, and cartilage, so the algorithms won't let those areas be considered the meniscus," said Mark Swanson, a medical student at Ohio State and lead author of the paper. "Once the programming is complete, our algorithms know the anatomy of the knee."

The program reads each of up to two-dozen slices to designate and segment the three-dimensional structure of the meniscus. As it moves through the images, the program also compares the previous slice to the current slice, reevaluates,

and checks its work.

At this point in the development, the program requires some human input. A person must scroll through images manually, find the first slice that includes an image of the meniscus, and place a point within that area of the image. A second point must be placed on the meniscus in the last slice in which that part of the knee anatomy appears. "From there, the computer takes over," Mr. Swanson said. "It looks at that first point and starts growing around it."

Once the segmentations are complete, clinicians are able to calculate the volume, thickness, intensity, and any tears in the meniscus – all data that can be compared with calculations made with data from later images. If changes in the meniscus correlate with osteoarthritis symptoms, this area of the knee could become a target for prevention and treatment of the disorder.

To check the validity of the programming, the researchers compared calculations from their study with typical measurements of the meniscus found in previous research. The figures matched. The scientists also compared the computer program's outcomes to interpretations of the same images conducted by five people specifically trained to manually segment the meniscus within the images. The computer is equally as skilled as two humans whose interpretations of the same image are compared, and exceeds the accuracy of a single person interpreting the same image twice.

The researchers are currently working to automate the entire process, including the establishment of start- and end-points for the program. They also are developing programs to automate measurement of other areas of the knee: bone, cartilage, ligaments, and the quadriceps muscles. All of the images will be obtained from the Osteoarthritis Initiative. "In my opinion, this disease will not have a single signature. I think we'll need to look at a lot of different things to understand how this disease develops," Dr. Gurcan said.

Workflow Kiosk Gives Patients More Control over Healthcare Experience

Combining the best of kiosk technologies already present in other industries and the specific requirements of healthcare consumers, a new patient information technology (IT) system creates a new way for imaging practices to stay connected to their customers.

In an effort to leverage health information-exchange technology for consumers, Merge Healthcare (Milwaukee, WI, USA; www.merge.com) announced the introduction of the Merge Patient Kiosk, and the successful deployment of this new patient engagement tool in several imaging centers in the United States.

"The kiosks have definitely made a positive impact in our clinics," says Matt Dewey, CIO of Zwanger-Pesiri Radiology (Suffolk and Massapequa Counties, Long Island, NY, USA). "Busy consumers who prefer user-friendly, automated technology are pleased that they now have the choice to complete their check-in with our kiosk. Unlike other kiosks, this system has the ability to connect to an avatar-based live agent, who can guide our patients through the check-in process when they need some assistance. Moving forward, I see the Merge Patient Kiosk as an important tool for keeping patients loyal to our centers."

The unique avatar-based Merge Patient Kiosk provides assistance from a professional who can see the person and talk directly to her to answer any questions, within a private environment. Integrated with Merge's Fusion RIS (radiology information system), the system can set the appropriate alerts, update a patients' status and scan documents, such as a driver's license and insurance card, all within the normal workflow of a healthcare enterprises operation. This new product was displayed at the Healthcare Information Management and Systems Society (HIMSS) show, March 1-3, 2010, in Atlanta, GA, USA.

"Our front office staff wondered how the kiosk would impact them and our patients at first," said Marilyn Lester, administrator of University of Texas Imaging (Houston, USA). "But, within a couple of days, we quickly realized its true value. It's just such a win for everyone involved – patients love the automation, referring physicians

tell us that we look very leading edge and our staff is able to focus on our patient's clinical experience rather than routine tasks."

"We are very pleased with the launch of this innovative new product line," says Justin Dearborn, Merge Healthcare CEO. "We've had excellent dialogue with our imaging professional customers and their patients; and the result is a well designed solution that benefits everyone involved in an imaging exam."

Merge products, ranging from standards-based development toolkits to advanced clinical applications, have been used by healthcare providers, vendors, and researchers worldwide for over 20 years.

Image: The Merge Patient Kiosk (Photo courtesy of Merge Healthcare).

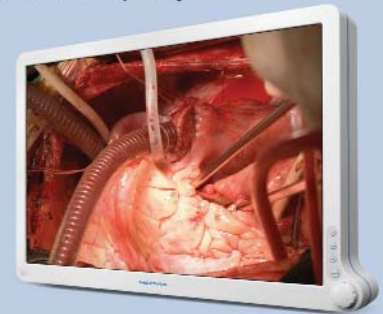


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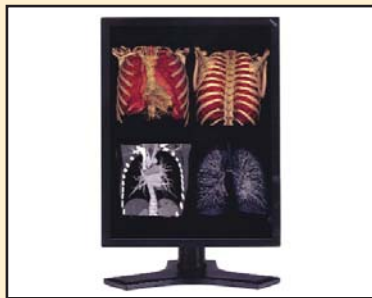
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DIAGNOSTIC SOFTWARE TomTec Imaging Systems

The M'ATH solution enhances the accuracy of arterial measurements in vascular examinations. The software is intended for use in the advanced analysis of atherosclerosis (IMT, distensibility, plaque analysis), to provide accurate results.

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LCD DISPLAY NEC

The MultiSync MD213MC is designed for the needs of medical imaging and PACS, including CR and DR. Features include digital uniformity correction, integrated three-color sensor, 12-bit gamma, and GammaComp MD software for consistent image quality.

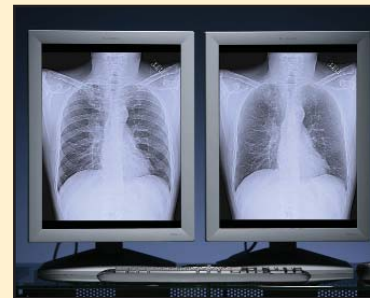
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PACS QC TOOL PACSGEAR

The GEARView QC allows for viewing, importing, editing, printing, burning, and sending DICOM studies to PACS/EHR. The tool lets PACS administrators fix common demographic errors in any DICOM field, as well as visually edit studies.

LINKXPRESS.COM MII-06-10 239



CHEST IMAGING TECHNOLOGY Riverain Medical

The SoftView suite suppresses ribs and clavicles on chest X-rays to produce a soft tissue image with increased clarity and improved detection of lung nodules. SoftView also delivers no addition radiation dose to the patient.

LINKXPRESS.COM MII-06-10 240

Multimodality Breast Imaging: Workstation Software Improves Radiologist Productivity

With new diagnostic software, radiologists may now review breast images from any modality in combination with review of mammography images. The ability to define the orientation and sequence of views in an exam, what radiologists call hanging protocols, can now be defined for different modalities, and our workflow keypad has been integrated with the multimodality viewer to allow for more efficient review of cases.

Hologic, Inc. (Bedford, MA, USA; www.hologic.com), a developer, manufacturer, and supplier of diagnostics, medical imaging systems, and surgical products focused on serving the healthcare needs of women, has developed SecurView DX multimodality diagnostic mammography workstation software.

The Hologic SecurView workstation is a platform for review of digital mammography images. With the release of version 7-0-0, the workflow benefits of the SecurView workstation have been extended to the multimodality viewer. Radiologists may now review breast images from any modality in concert with review of mammography images.

Moreover, the new software builds on the strengths of the Hologic SecurView workstation by offering a greatly expanded set of functions designed to improve mammographic reading workflow. One of the functions, a new visualization tool called Advanced Image Enhancement (AIE), is used to apply

proprietary wavelet-based image processing within the magnifier window. In a clinical study, AIE processing improved the ability to visualize abnormalities, particularly in dense breast tissue.

The multimodality viewing options can be expanded with Hologic's new magnetic resonance (MR)-CADWorks package for computer-aided detection (CAD) review of breast MRI images, including a full suite of tools to allow for analysis of kinetics, or wash-in and washout of contrast agent over time. All processing of MRI images is performed locally so that images can be displayed in different presentation formats dynamically. With the addition of the new multimodality and MR-CADWorks options to the SecurView mammography software, the SecurView workstation offers a comprehensive review of all breast-imaging modalities in one integrated platform.

"The ability to instantly process with the MR-CADWorks software has increased my efficiency," said Kara L. Carlson, M.D., a radiologist with Radia Medical Imaging and medical director of Evergreen Hospital's Breast Center (Kirkland, WA, USA). "The flexibility to dynamically change the presentation layout and the ability to utilize the kinetics analysis software, have been valuable tools to improve my breast MRI interpretation."

"We are excited to be introducing the new multimodality and MR-



CADWorks options as part of the rollout of Hologic's SecurView version 7-0-0," said Dave Mislán, product manager – breast imaging for Hologic. "These new features, along with the on-going advances in workflow efficiency, ability to view mammography images from all vendors, and advanced R2 CAD features, uniquely position SecurView as a comprehensive breast imaging workstation."

Hologic's core business units are focused on breast health, diagnostics, gynecologic, surgical, and skeletal health. Hologic provides a

range of technologies with products for mammography and breast biopsy, radiation treatment for early-stage breast cancer, cervical cancer screening, treatment for menorrhagia, permanent contraception, osteoporosis assessment, preterm birth risk assessment, mini C-arm for extremity imaging and molecular diagnostic products including *Human papillomavirus* (HPV), and reagents for a variety of DNA and RNA analysis applications.

Image: The SecurView breast imaging workstation (Photo courtesy of Hologic).

Image and Report Viewer Requires Only an Internet Connection

A “zero footprint” medical image and report viewer has been developed to provide access to medical imaging information for clinicians at any point of care. The solution requires no downloads of client application software or web application frameworks, thereby providing ready availability of imaging information to clinicians, independent of network bandwidth or operating system.

Agfa HealthCare (Mortsel, Belgium; www.agfa.com/healthcare), a provider of diagnostic imaging and healthcare information technology (IT) solutions, announced that Impax Data Center Viewer powered by Xero is now available in the United States and was on display at the Healthcare Information Management and Systems Society (HIMSS) annual conference in Atlanta, GA, USA, in March 2010.

Working in conjunction with the Impax Data Center, Agfa HealthCare's enterprise medical imaging repository, the Xero technology allows for local retrieval and viewing of images and reports from multiple departments and electronic health records (EHRs). Its standards-based interface and powerful image processing provide ubiquitous access to imaging information, including Digital Imaging and Communications in Medicine (DICOM) data types, DICOM-encapsu-

lated PDFs, DICOM-structured reports, and images encoded in a wide variety of DICOM-supported formats.

Agfa HealthCare's Xero technology, a Web 2.0 platform, uses AJAX (Asynchronous JavaScript and XML) to allow users to dynamically retrieve and view text and image information in the user's Web browser. The Data Center Viewer converts images and content for display in a browser without requiring any client software installation.

“The Xero technology allows clinicians to ‘visualize’ the EHR by incorporating reliable access to images, helping hospitals and healthcare facilities transform patient care,” said Lenny J. Reznik, Agfa HealthCare's director of enterprise imaging and information. “Impax Data Center and its unique Xero technology make image storage and visualization a seamless part of the EHR while bringing a patient's imaging record into the healthcare enterprise.”

Hospitals and healthcare facilities will appreciate the cost-effectiveness of Agfa HealthCare's



viewers, powered by Xero. They require no user site maintenance due to its lack of client software and desktop deployment. The Xero technology is also easily adaptable by staff and typically requires very little to no training.

Agfa HealthCare, a member of the Agfa-Gevaert Group, is a provider of IT-enabled clinical workflow and diagnostic image management solutions, and sophisticated systems for capturing and processing images in hospitals and healthcare facilities.

Image: The Impax Data Center (Photo courtesy of Agfa HealthCare).

Embedding Images in Radiology Reports Speeds Decision-Making

Embedding clinical images to accompany recent findings described in a radiology text report enhances radiologists' communication with referring physicians and can improve patient care.

“The imaging exam report provides an important means of communication between the radiologist and the other physicians rendering care and is often the only form of communication between the radiologist and the referring physician,” said Veena R. Iyer, MBBS (MGH; Boston, USA; www.mgh.harvard.edu). It has been suggested that providing the referring physician with selected images embedded in the text report over the web could improve and support the information contained in the report. “We undertook this study to measure the utility to the referring physician, of radiology reports with attached, relevant images of the abnormal findings,” said Ms. Iyer.

Thirty-five cases referred for abdominal computed tomography (CT) scans were included in the study, which was performed at MGH. Referring physicians were asked to view a text-only report fol-

lowed by the same report with pertinent embedded images. “In 32 of the 35 cases, the text-only report satisfactorily answered the clinical query. In these 32 cases, the report with the attached images helped in making a more confident management decision and reduced time in planning management. Attached images altered management in two cases,” stated Ms. Iyer. “The results of our study indicate that although clinician's queries are satisfactorily answered by the current itemized report, providing additional images conveys useful information. It may enable the referring clinician to formulate response plans more rapidly and with increased confidence.”

The study's findings were published in the March 2010 issue of the *Journal of the American College of Radiology*. “Providing referring clinicians with a selected subsample of relevant images attached to the report improves the radiologist's communication with them. Such a report has the ability to save the clinician's time, and possibly improve patient management,” concluded Ms. Iyer.

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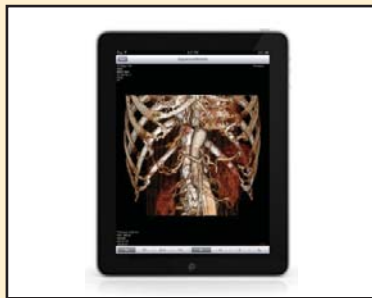
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IMAGING WORKPLACE Siemens Healthcare

The Artis zee Cockpit workplace is designed to ease the tasks performed in the control room of radiology and interventional suites. The workplace offers a 30-inch monitor, which can display the content of up to six individual monitors.

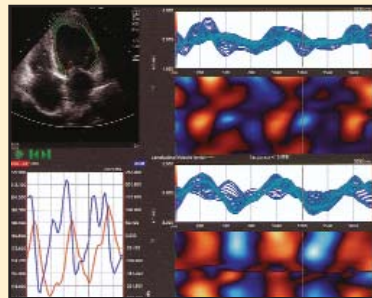
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SOFTWARE SUPPORT TeraRecon

Version 4.4.5 of Aquarius iNtuition now includes support for the iPod Touch, iPhone, and iPad. The software support allows users to obtain access to images through a mobile, multitouch, and image-centric user interface.

LINKXPRESS.COM MII-06-10 242



ANALYSIS SOFTWARE TomTec Imaging Systems

The 2D Cardiac Performance Analysis features a clearly arranged display, as well as easy-to-analyze myocardial function results. Other key benefits include versatile tracking algorithm, user-optimized workflow, and a wide range of diagnostic features.

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X-RAY METERS Unfors

The Unfors Solo line of meters is designed for QA and service of diagnostic X-ray machines. The Solo line provides the user with simultaneous measurements of a wide range of parameters. In addition, various options are also available for the Solo line.

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Web-Based Solution Eases Acceptance of Electronic Health Records

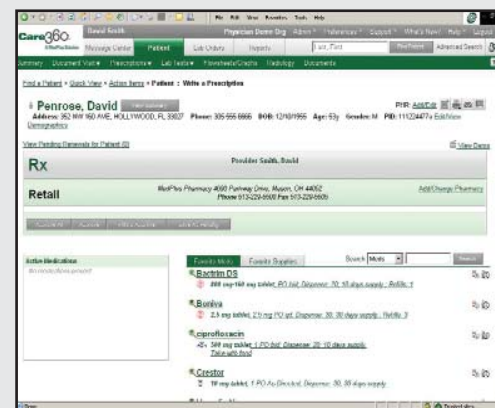
A Web-based solution enables physicians to adopt the benefits of electronic health records (EHRs), without large capital outlays or disruption to the office workflow.

The Care360 EHR is based on a modular architecture, allowing physicians to adopt incrementally new functionality at their own pace. The basic setup includes the Care360 Labs & Meds, with the option of Care360 ePrescribing. Physicians can access secure patient information anywhere, anytime, and from any internet browser, and can view lab results and medical history as well as ePrescribe drugs and medication from an Apple iPhone, iPod touch, or smartphone. Since the Care360 EHR is completely Web-based, implementation timeline and total cost of ownership is reduced. At the heart of the system is the on demand Software as a Service (SaaS) model,

which ensures key health information technology (HIT) applications are kept in compliance with certified standards, constantly available, and managed for performance.

The complexities and costs of managing applications are minimized through Active Server Pages (ASP)-based downloadable services, 24/7 technical support, network security, and integrated support for business continuity and flexible mobile networking. A special feature of the Care360 suite is its interoperability and the ability to interface with hundreds of electronic medical records (EMRs) and other HIT technologies already in use or being sold into physician offices. The Care360 EHR is a product of Quest Diagnostics (Madison, NJ, USA; www.questdiagnostics.com).

"Our Care360 EHR is an excellent solution for primary care physicians in small and mid-sized



practices. Care360 provides an easy migration path for all physicians today, but it is also a system that is built for the future," said Richard Mahoney, vice president of healthcare information solutions at Quest.

Image: A screenshot from Care360 ePrescribing EHR (Photo courtesy of Quest Diagnostics).

Irish Hospital Picks RIS, PACS and DR Technology

After a lengthy evaluation process, Ireland's largest private hospital has signed a multiyear contract with a U.S. information technology (IT) company for the provision of a comprehensive digital radiography (DR) system. Installation will commence mid-2010 and proceed in phases with completion scheduled for the end of 2010. The Mater Private Hospital (Dublin, Ireland; www.materprivate.ie) is Ireland's leading private hospital and the radiology department offers a range of modalities including X-ray, digital mammography, computed tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET)/CT, nuclear medicine, fluoroscopy and vascular imaging, undertaking approximately 70,000 studies annually.

For digital capture, the contract includes the installation of the innovative Carestream Health (Rochester, NY, USA; www.carestreamhealth.com) DRX retrofit system that allows healthcare providers to convert conventional X-ray rooms to DR and achieve valuable gains in workflow. A

Directview Elite CR system with Mammography Feature will also enable mammography exams to be performed using the same platform as general radiography and long length imaging, with the result of improved workflow and productivity.

The new imaging equipment will integrate with the latest version of the Carestream RIS and PACS (radiology information system and picture archiving and communication system) that allows healthcare providers to collaborate seamlessly across multiple sites, platforms, and clinical specialties, with just one desktop optimizing productivity for the entire radiology workflow. A storage area network and virtualized server environment will host and provide storage for all the Mater Private Hospital's IT applications, including the new Carestream RIS and PACS, and during the length of the contract Carestream Health will also provide full service support.

"The reason we chose Carestream Health was that the integration, usability, advanced 3D [three-dimensional] and image-processing facilities, espe-

cially for PET/CT, will support our wide range of disciplines," said Paddy Gilligan, principal physicist at the Mater Private Hospital. "The RIS was very intuitive and matched our workflows and overall the product best suited the detailed requirements laid out in our Request for Procurement. In addition, we visited Tullamore and Forth Valley hospitals where clinicians showed a high level of satisfaction with Carestream Health solutions. The DRX and CR will allow us to convert our general X-ray room and breast specimen radiography with maximum efficiency from a single product portfolio."

"The Mater Private Hospital was highly rigorous in their evaluation of Carestream Health's digital medical solutions portfolio, leaving no stone unturned to meet their overall objectives," added Charlie McCaffrey, managing director, Carestream Health U.K. and Ireland. "We are delighted to have been awarded the contract, which sees the first installation in Ireland of both the latest Carestream RIS and PACS platform, and the new DRX retrofit system."

Patent Awarded for Improving X-Ray Shielding

Varian Medical Systems, Inc. (Palo Alto, Ca, USA; www.varian.com), a supplier of X-ray tubes and flat panel digital image detectors, has been awarded a patent for improved shielding in X-ray tubes. It is the company's 100th X-ray tube patent from the United States Patent Office.

The new Patent # 7661445 entitled "Shielded Cathode Assembly" applies to internal shielding in X-ray tubes. Where lead is typically used in the tube housing to protect from radiation leakage, the new patent involves moving the shielding, now made of tungsten, inside the X-ray tube, closer to the point of X-ray development. "By moving the shielding as close to the X-ray source as possible, this innovative technology

improves the radiation shielding, reduces the tube weight and moves toward a 'greener' product by using less lead," said Dennis Runnoe, vice president of Varian's X-ray products research and development group.

"Our focus on innovative cost-effective solutions for developing and advancing X-ray technology fuels our company's growth and helps to improve the performance and cost-effectiveness of the X-ray imaging equipment manufactured by our customers," said Bob Kluge, president Varian X-ray products.

Varian also has numerous patents surrounding the development of the anode-grounded computed tomography (CT) tube.

E-Health Data Company Receives Accreditation in France

The Ministry of Health and Sports in France has officially named Carestream Health (Rochester, NY, USA; www.carestreamhealth.com) as an approved host for personal health data and the first medical imaging company to receive accreditation.

The Carestream Health Managed Service portfolio fully complies with the Health Data Security and Confidentiality Reference Table published by the newly created Agency for Shared Information Systems in healthcare--Health ASIP--responsible for organizing healthcare collaboration in France. Carestream Health has rigorously demonstrated conformance against the table, one of the most stringent in Europe, underlining the effective performance of its technologies, the professionalism of its operations and the security of its processes in the

arena of data hosting services.

Carestream Health's reputation for eHealth Managed Services is well established in France with a number of healthcare organizations using the company's eHealth cloud infrastructure to support a variety of workflows, from emergency teleradiology to hospital cross reading and long term archiving.

One recent recruit is Imadis, a teleradiology company based in Lyon, which was established with the aim of solving the lack of radiologist resources experienced by public hospitals at night and during weekends. The company uses the Carestream Health cloud to ensure efficient and secure data transfer from customer sites to their reading centre, with a dedicated workflow exactly tuned to their needs. Conformance to French legal requirements and best practice is a key issue.

Interventional Radiology Society in Information Software Alliance

The Society of Interventional Radiology (SIR; Fairfax, VA, USA; www.sirweb.org) and Custom Computer Specialists, Inc. (Hauppauge, NY, USA; www.customonline.com) have entered into an exclusive, long-term licensing agreement to promote innovation and the development of an information management system for interventional radiology. SIR and Custom have unveiled innovations such as Hosted HI-IQ, a Web-based version of HI-IQ accessible from any Internet-enabled computer and requires no special operating system, servers, or workstations. Moreover, SIR and Custom recently launched a new version of the product that enables physicians to comply with Part IV (prac-

tice quality improvement) requirements for maintenance of certification.

SIR and Custom have worked together since 1993, when the society engaged the company to develop HI-IQ on its behalf. "Custom has been a strong partner, understanding our members, the society's needs, the product, the IR [interventional radiology] market, and the competition," said Dr. Benenati.

As part of the agreement with SIR, Custom has acquired ConexSys Inc. (Vienna, VA, USA), SIR's subsidiary formed to manage the HI-IQ business. ConexSys, which will keep its name, is now a wholly owned subsidiary of Custom. The terms of the agreements were not disclosed.

Merge Healthcare Completes Acquisition of Amicas

An agreement between Merge Healthcare, Inc. (Milwaukee, WI, USA; www.merge.com) and Amicas, Inc. (Boston, MA, USA; www.amicas.com) creates a leading medical imaging software and healthcare information technology (IT) solutions provider with strong customer relationships, innovative solutions, significant cross-selling capabilities, and a solid international presence.

The agreement completed the definitive merger agreement between Merge and Amicas dated February 28, 2010, under which a subsidiary of Merge acquired all of the outstanding shares of Amicas common stock for US\$6.05 per share.

With a combined customer base of approximately 1,500 hospital and 2,200 outpatient sites in the United States alone, a complementary product range, and distribution agreements in over 35 countries, Merge is well positioned to capitalize on the expected growth in the global medical imaging and healthcare IT markets. "Merge and Amicas each has a rich history of delivering innovative solutions for the medical imaging and healthcare IT markets," noted Justin Dearborn, Merge CEO. "Despite

some overlap in the outpatient imaging market, our solution sets are highly complementary. As a combined business, we will have excellent coverage for imaging and healthcare IT solutions across the continuum of care--from outpatient imaging sites to radiology, cardiology, and enterprise solutions serving the hospital market."

For outpatient imaging businesses, the newly combined company will offer proven solutions for revenue cycle management, radiology information systems, referring physician connectivity solutions, radiology picture archiving and communication systems (PACS) and computer-aided detection (CAD) solutions. For hospitals, Merge will offer effective interoperability and healthcare IT solutions, as well comprehensive departmental solutions for cardiology, radiology, and perioperative departments.

Merge Healthcare develops and integrates information technology to create a better electronic healthcare experience. Merge products, ranging from standards-based development toolkits to sophisticated clinical applications, have been used by healthcare providers, vendors, and researchers worldwide for over 20 years.

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110th Annual Meeting of the American Roentgen Ray Society. May 2-7; San Diego, CA, USA; Web: www.arrs.org

ICR 2010 - 26th International Congress of Radiology. May 9-12; Shanghai, China; Web: www.icr2010.org

91st German Radiology Congress. May 12-15; Berlin, Germany; Web: www.drg.de

7th Annual Sports Medicine Imaging Conference. May 13-15; New York, NY, USA; Web: <https://tools.med.nyu.edu/RadCourses>

American College of Radiology (ACR) Annual Meeting & Chapter Leadership Conference. May 15-19; Washington DC, USA; Web: <http://acr.org>

48th Annual Meeting of the American Society of Neuroradiology (ASNR) & NER Foundation Symposium 2010. May 15-20; Boston, MA, USA; Web: www.asnr.org/2010

39th Annual Meeting of the Japanese Society for Interventional Radiology. May 20-22; Tokyo, Japan; Web: www.jivr.org

secretariat.ne.jp/ivr2010

Cardiovascular CT, Concord Conference. May 21-22; Sydney, NSW, Australia; Web: www.ctatconcord.com

HOSPITALAR 2010. May 25-28; Sao Paulo, Brazil; Web: www.hospitalar.com

18th Annual Meeting of the European Society of Thoracic Imaging. May 28-30; Bern, Switzerland; Web: www.estl-society.org

JUNE 2010

ESGAR 2010 - European Society of Gastrointestinal and Abdominal Radiology. June 2-5; Dresden, Germany; Web: www.esgar.org

SIIM 2010 - The Society of Imaging Informatics in Medicine - Annual Meeting. June 3-6; Minneapolis, MN, USA; Web: www.siim2009.org/siim2010

2010 Annual Meeting of the Society for Nuclear Medicine (SNM). June 5-9, Salt Lake City, UT, USA; Web: www.snm.org

UKRC 2010 - United Kingdom Radiological Congress. June 7-9; Birmingham, UK; Web: www.ukrc.org.uk

47th Annual Meeting of The European Society of Pediatric Radiology. June 7-11; Bordeaux, France; Web: www.espr2010.org

International Conference on Complications in Interventional Radiology (ICCIR 2010). June 10-12; Pörschach, Austria; Web: www.iccir2010.org

SIRM 44th National Congress - Società Italiana di Radiologia Medica. June 11-15; Verona, Italy; Web: www.sirm.org

European Society of Musculoskeletal Radiology (ESSR) 2010 Annual Scientific Meeting. June 17-19; Lille, France; Web: www.essr.org

11. Münchner Neuroradiologie Symposium. June 17-19. Munich, Germany;

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14th Annual Meeting of the Clinical Magnetic Resonance Society (CMRS). June 24-27; Orlando, FL, USA; Web: www.cmrs.com

JULY 2010

RADaim 2010. July 23-25; Broadbeach, QLD, Australia; Web: www.phoenixconf.com

20th Annual Conference on Musculoskeletal Ultrasound 2010 – 24th International Ultrasound Week. July 21-24; Cancun, Quintana Roo, Mexico; Web: www.fmri.org.mx

7th Annual Meeting of the Society for Neurointerventional Surgery (SNIS). July 26-30; Carlsbad, CA, USA; Web: www.snisonline.org

AUGUST 2010

EUROSON 2010 – 10th International Congress on Interventional Ultrasound. August 22-25; Copenhagen, Denmark; Web: www.euroson2010.org

European Society of Cardiology (ESC) Congress 2010. August 28 – September 1; Stockholm, Sweden; Web: www.escardio.org

SEPTEMBER 2010

ESTRO 29 - Annual Meeting of the European Society for Therapeutic Radiology and Oncology. September 12-16; Barcelona, Spain; Web: www.estro.org

ASUM 2010 - 40th Annual Scientific Meeting - Australasian Society for

Ultrasound in Medicine (ASUM). September 23-26; Gold Coast, QLD, Australia Web: www.asum.com.au

OCTOBER 2010

CIRSE 2010 - Cardiovascular and Interventional Radiological Society of Europe. October 2-6; Valencia, Spain; Web: www.cirse.org

6th World Congress on Ultrasound in Emergency and Critical Care. October 4-9; Rome, Italy; Web: www.winfocus.org/world

19th Symposium Neuroradiologicum. October 4-9; Bologna, Italy; Web: www.symposiumneuroradiologicum.org

EANM 2010 - Annual Congress of the European Association of Nuclear Medicine. October 9-13; Vienna, Austria; e-mail: info@eanm.org; Web: www.eanm.org

20th Annual Meeting, Society of Radiologists in Ultrasound (SRU). October 22-24; Las Vegas, NV, USA; Tel: (1) 703-858-9210; E-mail: info@sru.org; Web: www.sru.org.

JFR 2010 – Journées Françaises de Radiologie. October 22-26; Paris, France; Web: www.sfrnet.org

52nd annual meeting of the American Society for Radiation Oncology (ASTRO). October 31 – November 4; San Diego, CA, USA; Web: www.astro.org/Meetings

NOVEMBER 2010

2010 Chicago Multidisciplinary Symposium in Thoracic Oncology. December 9-11; Chicago, IL, USA; Web: www.thoracicsymposium.org

Medica 2010. November 17-20; Dusseldorf, Germany; Web: www.medica.de

RSNA 2010. November 28 – December 3; Chicago, IL, USA; Web: www.rsna.org




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