

RSNA *News*



Image courtesy of Mitchell E. Rubin, M.D.

ER CT Can Be Benefit or Bane

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- Ethics Spotlight Gets Hotter
- MR Imaging Deemed Safe for Patients with Implantable Devices
- CT Leads in Pursuit of Noninvasive Exam for Coronary Artery Disease
- Alternative to Invasive Amniocentesis is Goal of RSNA Scholars

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2006 Outstanding Educator and Outstanding Researcher Named

AT RSNA 2006, two individuals were honored for their commitment to education and research. The 2006 RSNA Outstanding Educator was Donald L. Resnick, M.D., and the 2006 RSNA Outstanding Researcher was Richard L. Ehman, M.D.

The RSNA Outstanding Educator award recognizes and honors an individual who has made original and significant contributions to the field of radiology or radiologic sciences throughout a career of teaching and education.

Dr. Resnick is a professor of radiology and chief of osteoradiology at the University of California, San Diego (UCSD).

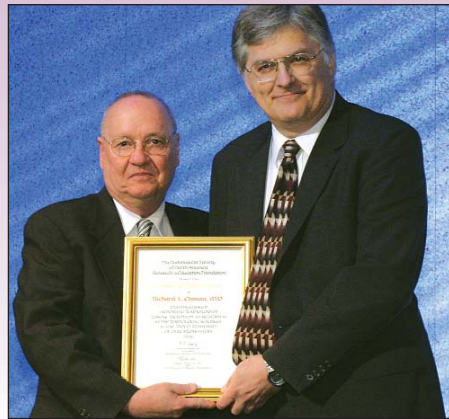
During more than 30 years in musculoskeletal radiology education, Dr. Resnick has served as a scientific advisor and mentor to almost 600 clinical and research fellows in podiatric radiology and osteoradiology. Of these fellows hailing from more than 20 countries, 70 percent have gone on to academic careers themselves.

A past-president of the International Skeletal Society, Dr. Resnick has also established himself in the radiology literature and lectured throughout the world. More than 1,000 people have visited his base of operations at UCSD, known as the "Bone Pit."

Among the recognitions Dr. Resnick has received are the American Roentgen Ray Society's gold medal, an honorary doctorate from the University of Zurich and honorary fellowship from



Donald L. Resnick, M.D.



2006 RSNA President Robert R. Hattery presented the Outstanding Researcher award to Richard L. Ehman, M.D., at RSNA 2006.

a half dozen European and Asian radiology societies.

Dr. Resnick has presented at least one refresher course at the RSNA annual meeting for 25 consecutive years and has twice presented the Annual Oration in Diagnostic Radiology.

The RSNA Outstanding Researcher award recognizes and honors an individual who has made original and significant contributions to the field of radiology or radiologic sciences throughout a career of research.

Dr. Ehman is a professor of radiology at Mayo Medical School in Rochester, Minn. His journey to becoming a leader in MR imaging began in the mid-1980s, when he was recruited as a clinical fellow to head the MR research program at the Mayo Clinic. Funding for one of Dr. Ehman's first research grants, "Development of a Comprehensive Method for High Resolution Magnetic Resonance Imaging of Moving

Structures," came from the RSNA R&E Foundation.

Today, Dr. Ehman oversees eight extramurally funded projects, seven of which are funded by the National Institutes of Health. His ongoing research—in MR, musculoskeletal, vascular and cardiac MR imaging, motion and flow physics in MR imaging and MR elastography—has led to 21 patents in the U.S., prolific publication and presentations at meetings worldwide.

Vice-chair of the Mayo Clinic's Rochester Executive Board and a member of the Mayo Clinic Board of Governors, Dr. Ehman also has served as president of the International Society for Magnetic Resonance in Medicine (ISMRM). He has received the ISMRM gold medal, the fellowships of several radiology societies and an honorary doctorate from the University of Saskatchewan, where he earned his B.Sc. and M.D. degrees.

RADIATION SAFETY

Tip of the Month

Radiography can satisfactorily answer many clinical questions with less patient dose than CT.



American Association of Physicists in Medicine

MEDICAL IMAGING COMPANY NEWS

Diagnostic Ultrasound is Now Verathon

Diagnostic Ultrasound Corp. has changed its name to Verathon Inc., to reflect the expansion of its business.

The Bothell, Wash., company originally focused solely on ultrasound devices. The company now makes a bladder volume instrument as well after acquiring Saturn Biomedical Systems of Burnaby, British Columbia, earlier this year.

New Professional Programs in Development

THE American Registry of Radiologic Technologists (ARRT®) and the Nuclear Medicine Technology Certification Board (NMTCB) are working to develop a Nuclear Medicine Practitioner (NMP) certification. The organizations predict that NMPs will likely be working as physician extenders in nuclear medicine departments across the country within a couple of years. The NMP, endorsed by the Society of Nuclear Medicine and its Technologist Section, has many parallels to the radiologist assistant concept developed by ARRT, American Society of Radiologic Technologists and American College of Radiology.

ARRT has also partnered with the Society for Imaging Informatics in Medicine (SIIM) to develop the SIIM Certified Imaging Informatics Professional (CIIP) program. With clinical and IT models merged into one comprehensive exam, the CIIP program will provide certification appropriate for both radiologic technologists and information technology professionals.

Recall and Notification Affect Radiologists

In July, Berlex, Inc. recalled all lots of intravenous contrast agent Ultravist (iopromide) Injection 370 mgI/mL. Possibly containing particulate matter along with crystals, these lots could cause vascular thrombosis, thromboembolism or injury to the heart, kidney or brain if administered to patients.

The recall affects only Ultravist Injection 370 mgI/mL and not other concentrations of Ultravist (150 mgI/mL, 240 mgI/mL and 300 mgI/mL). Hospitals, imaging centers and other healthcare facilities that have the recalled product should not use it and should immediately quarantine it and return it to the company. For more information, call 1-866-BERLEX-5 or visit www.fda.gov/medwatch/safety/2006/safety06.htm#Ultravist.

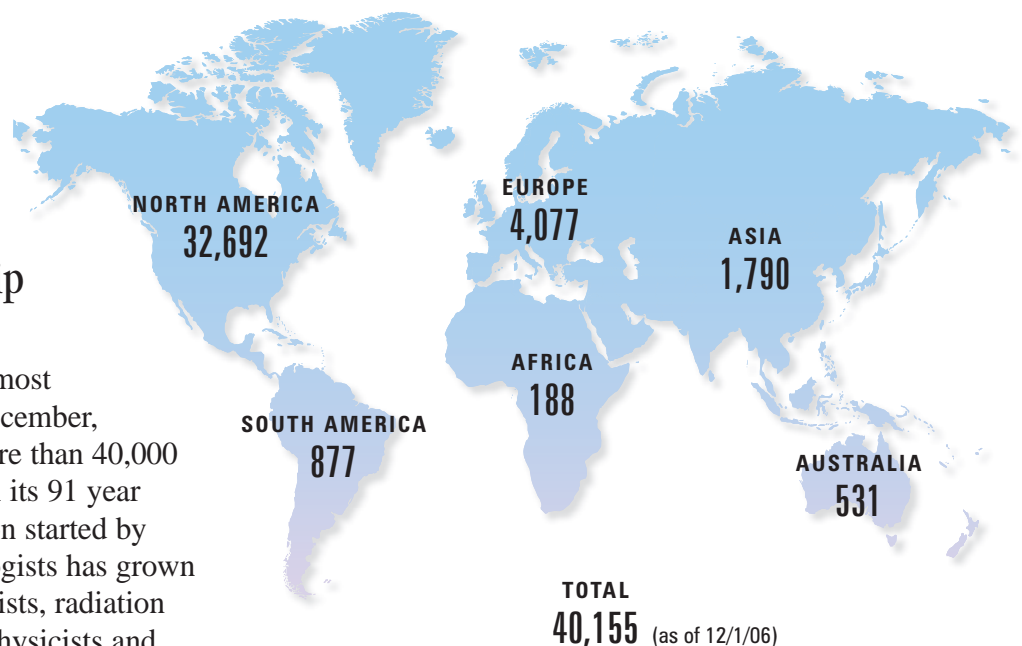
The FDA has also issued a

public health notification about the importance of adequately cleaning and sterilizing reusable ultrasound biopsy transducer assemblies between patients. The FDA stressed that reusable devices must be thoroughly cleaned before they are sterilized, with brushes often required for cleaning. Failure to brush the lumens of the needle guides may have been associated with patient infections in the past, and the FDA has a report of visible residue in the biopsy needle guide channels in one reprocessed transducer assembly.

The FDA recommends following the manufacturer's instructions for reprocessing. For more information, go to www.fda.gov/medwatch/safety/2006/safety06.htm#Ultrasonnd.

RSNA Membership Tops 40,000

With an increase of almost 5 percent since last December, RSNA now counts more than 40,000 members—the most in its 91 year history. An organization started by 62 Midwestern radiologists has grown to encompass radiologists, radiation oncologists, medical physicists and related scientists from around the world.



AAWR Presents Awards

THE American Association for Women Radiologists (AAWR) awarded 2003 RSNA President **Peggy J. Fritzsche, M.D.**, with its Alice Ettinger Distinguished Achievement Award for long-term contributions to radiology. Dr. Fritzsche is the immediate past-chair of the RSNA Research & Education Foundation Board of Trustees.



AAWR also presented these awards during a luncheon at the RSNA annual meeting last month:

- The Marie Sklodowska-Curie Award to **Carol Rumack, M.D.**, of the University of Colorado Health Sciences Center
- The AAWR President's Award to **Julie Timins, M.D.**, of Christ Hospital in

Jersey City, N.J.

- The Lucy Frank Squire Distinguished Resident Award in Diagnostic Radiology to **Meghan Blake, M.D.**, of Boston University Medical Center

AAWR also presented

Leonard Berlin, M.D.,

with honorary membership. Dr. Berlin is chair of radiology at Rush North

Shore Medical Center in Skokie, Ill., and a professor of radiology at Rush Medical College in Chicago.

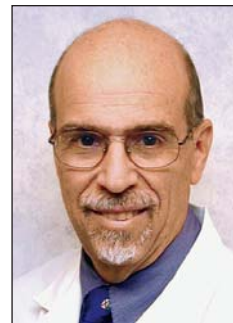
AAWR Vice-President **Etta Pisano, M.D.**, recently received an inaugural Health Breakthrough Award from *Ladies Home Journal* magazine.



Peggy J. Fritzsche, M.D.



Meghan Blake, M.D.



Leonard Berlin, M.D.



Etta Pisano, M.D.

Leapman is NIBIB Scientific Director

The National Institute of Biomedical Imaging and Bioengineering (NIBIB), a part of the National Institutes of Health (NIH), has appointed **Richard Leapman, Ph.D.**, as the scientific director of its Intramural Research Program.

Dr. Leapman was previously acting director of the Division of Bioengineering and Physical Science in the Office of Research Ser-



vices at NIH. He served in a dual capacity as the chief of the Supramolecular Structure and Function Resource. His research interests are in the development and application of quantitative electron microscopy and the application of novel nanoscale imaging methods to solve problems in structural and cellular biology. He is currently editor of the *Journal of Microscopy*.

CAR Gives Gold Medal to Hammond

The Canadian Association of Radiologists (CAR) gave its gold medal to Past-President **Ian Hammond, M.D.**, at its meeting in October. Currently on the staff in the Department of Radiology at The Ottawa Hospital, Dr. Hammond has served CAR in many capacities for the past 20 years.

Antoine is Radiation Oncology Chief at South Florida

John E. Antoine, M.D., has been appointed chief of the Radiation Oncology Service at the James A. Haley VA Medical Center and clinical professor of radiation oncology at the University of South Florida College of Medicine in Tampa. Dr. Antoine was associate director of the National Cancer Institute Radiation Research Program from 1985 to 1991.

Whitman Replaces Britain at NEMA

The National Electrical Manufacturers Association (NEMA) has named **Andrew Whitman** as vice-president of medical products. Whitman replaces **Robert Britain**, who retired after 21 years with the organization. Whitman joins NEMA from Carmen Group, Inc., a government relations firm in Washington, where he served as the senior associate for healthcare practice representing healthcare providers on Capitol Hill and the U.S. Department of Health and Human Services. Whitman also formerly served as deputy director for regulatory affairs and special counsel for the American Psychiatric Association.



ASHNR Awards Gold Medal to Mafee

Mahmood Mafee, M.D., of the Department of Radiology at the University of California, San Diego, received the gold medal of the American Society of Head and Neck Radiology (ASHNR) during its annual meeting earlier this year.

ASHNR president in 1992, Dr. Mafee was the 1993-1994 Armed Forces Institute of Pathology (AFIP) distinguished scientist in the Department of Radiologic Pathology.

IN MEMORIAM:

Hooshang Taybi, M.D., M.Sc.

World-renowned pediatric radiologist **Hooshang Taybi, M.D., M.Sc.**, died at his home in Walnut Creek, Calif., on August 7. He was 86.

A graduate of Teheran University School of Medicine, Dr. Taybi spent most of his career at the Children's Hospital Oakland, serving as director

from 1967 until 1986. He was also a clinical professor and part-time attending pediatric radiologist at University of California, San Francisco.

One of Dr. Taybi's major contributions to pediatric radiology came to be referred as "the book." *Radiology of Syndromes* was first published in 1975

and is now in its 4th edition as *Radiology of Syndromes, Metabolic Disorders, and Skeletal Dysplasias*. Among the syndromes Dr. Taybi is credited with describing is Rubinstein-Taybi.



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MY TURN

Changing the Curriculum

WHEN I was a resident, the training period lasted three years and an internship was not required. There were 18 months of core rotations and 18 months of electives. I spent a lot of time working with computers.

Now things are far different. There is much more to learn, yet we use a year of training for an internship that may be unrelated to

radiology. Future residents will need to focus on subject areas such as cardiac physiology and functional and

molecular imaging. Many will want to learn a little bit about everything, but for individuals who want to be

breast imaging specialists, how much do they need to know about neuroradiology? Wouldn't time be better spent studying MR physics, optical imaging, breast cancer genetics and computer-aided detection? If there is a clinical year, shouldn't it come later in the training program when it could be tailored to a resident's area of specialization?

We need to allow residents... to become super-specialists and future leaders.

To keep radiology at the forefront of medicine, our residents must have the opportunity to be far better trained than their counterparts in other specialties. We need to allow residents to follow a path

that permits them to become super-specialists and future leaders. We need more flexibility in the curriculum and better use of the time.

My Turn

ONE RADIOLOGIST'S VIEW

Such change will not be easy. It will require cooperation and compromise from organizations including the American Board of Radiology, Residency Review Committee, Society of Chairman in Academic Radiology Departments and Association of Program Directors in Radiology. But the world of medical imaging is changing ever more rapidly and our curricula need to change in order to keep pace and stay ahead of the competition. We could put this off because it is hard to do, but I



R. Gilbert Jost, M.D.

believe that the time to address this problem is now.

R. Gilbert Jost, M.D., is the 2007 RSNA President. He is also the Elizabeth Mallinckrodt Professor of Radiology and chair of the Department of Radiology at Washington University, and director of the Mallinckrodt Institute of Radiology in St. Louis.

ER CT Can Be Benefit or Bane

AS MORE emergency physicians realize the accuracy and cost-saving benefits of using CT to diagnose disease and guide treatment, they must also reconcile such concerns as overuse, radiation exposure and less thorough physical examinations.

“The concept of the CT physical exam is here to stay,” said Mitchell E. Tublin, M.D., associate professor and chief of the ultrasound section of the Abdominal Imaging Division of the Department of Radiology at the University of Pittsburgh.

“CT utilization in the emergency department has grown exponentially over the past five years,” he continued. “Although radiologists may feel besieged by what appear to be indiscriminate CT requests, the technology does improve patient care and patient throughput.”

Dr. Tublin joined two other physicians from the University of Pittsburgh for an RSNA 2006 focus session on the use and abuse of CT in the emergency room.

“Used intelligently, CT saves money by decreasing hospital admission, unnecessary surgery, unnecessary additional testing and the like,” said Michael P. Federle, M.D., chief of the Abdominal Imaging Division.

CT offers emergency physicians a quick way to triage patients, said Dr. Tublin. “If a CT scan is negative, the likelihood of a catastrophic event is extremely low,” he said. “On the other hand, if the scan is positive, the patient can be quickly triaged to appropriate clinical services.”

He and Dr. Federle focused their comments on the evaluation of patients with acute abdominal pain, a situation



(from left) Michael P. Federle, M.D., Mitchell E. Tublin, M.D., and Donald M. Yealy, M.D., participated in an RSNA 2006 special focus session on the use of CT in the emergency room.

where CT is especially useful.

“In most of these circumstances—for appendicitis, diverticulitis, renal stone disease, aortic aneurysm and abdominal trauma—CT is extremely

toward more CT scans for emergency room patients.

“Payers wonder whether we’re overusing CT. Hospital administrators wonder if we’re overutilizing CT. People

express concerns about radiation exposure,” said Dr. Federle. “Radiologists complain that the emergency physicians send patients for scanning with only the most cursory histories and physicals.”

Donald M. Yealy, M.D., professor and vice-chair of the Emergency Medicine Department, said he doesn’t believe physicians have abandoned physical examinations in favor of CT.

“That is one of the scares—that as people become more and more risk-averse and busier, they will trust their own bedside judgment less and move towards imaging procedures,”

Continued on next page

I wonder why, if there is an information deficit, either systematically or individually, a radiologist who is also a physician wouldn't just pick up the phone and say, 'Before I do this or before I read this, can you tell me what you're looking for?'

Donald M. Yealy, M.D.

accurate,” Dr. Federle said. “It’s in the high 90 percent range, so there is very little reason to rely on other imaging.”

Physicians Want Specificity

Some healthcare professionals, however, are concerned about the trend

Continued from previous page

Dr. Yealy acknowledged. “That’s an open and honest conversation that I think clinicians and radiologists have to have, but I don’t believe that’s the root issue right now.”

Physicians are likely utilizing CT more as they seek very high sensitivity and specificity, said Dr. Yealy. “They don’t want to miss disease, and they want to make sure that when disease is there, they get it right—right away,” he said. “I think that’s what’s driving the current growth, not so much an abandonment of clinical judgment.”

Dr. Yealy said it is also important to recognize that all physicians are concerned about malpractice actions, which may also affect CT ordering and interpretation. “We should be willing to come right out and say that while you may be fearful, it’s still not clear that ordering a lot of tests actually limits liability,” he said.

Good Communication is Key

Drs. Federle and Tublin both emphasized the need to gather as much information as possible before the CT scan is done.

“The patient’s clinical history is still crucial—it increases the specificity of the CT exam. We can also tailor the CT appropriately if a relevant history is given,” Dr. Tublin said.

Not every CT scan is performed exactly the same way, Dr. Federle added. “Sometimes we might give oral contrast media. We usually give IV contrast media. And with newer CT scanners, we can get a CT angiogram at no additional cost. We can manipulate the images into 3D pictures of the arteries, the bones, anything we want to do.”

However, Dr. Yealy pointed out, many radiologists do not choose to seek information.

“They believe that if the clinician didn’t provide more information about what they want, it’s not their obligation,” he said. “I wonder why, if there is an information deficit, either system-



CT performed on a 37-year-old female with right lower quadrant pain led to a diagnosis of Crohn disease.

Image courtesy of Mitchell E. Tublin, M.D.

atically or individually, a radiologist who is also a physician wouldn’t just pick up the phone and say, ‘Before I do this or before I read this, can you tell me what you’re looking for?’ That’s still a pretty rare event.”

Better communication ensures not only that the right information is obtained, said Dr. Tublin, but also eliminates unnecessary exams.

Dr. Yealy urged radiologists to communicate more with their clinician colleagues.

“If you want to change CT ordering, you have to work together with the clinicians to find reasonable solutions,” he emphasized. “And when you find those, you have to be willing to provide the timely—and high-quality—performance that meets the need of the average clinician.”

Patient Exposure Also a Factor

Drs. Tublin and Federle also want emergency physicians to consider the issue of radiation exposure from repeated CT scans.

“Many younger emergency physicians, particularly those with less clinical experience, will order CT examinations almost indiscriminately, without

any consideration of radiation dose,” Dr. Tublin warned.

Dr. Federle is especially concerned about young patients with kidney stones.

“I have no concern about the radiation exposure involved when we scan an older patient for cancer or when we’re scanning somebody for an acute life-threatening situation—clearly the risk-benefit ratio of CT is strongly in its favor,” Dr. Federle said. “I’m not so sure that’s the case when it comes to doing 10 or 15 CT scans on a single young patient for a benign process.”

“Think about radiation exposure, particularly in repeat renal stone formers,” he urged emergency physicians. “And at least briefly examine and talk to the patient and convey your most likely set of clinical concerns to the radiologist, so that we can tailor the examination and optimize the value of the CT scan.” □

Ethics Spotlight Gets Hotter

BEWARE the dangerous dinner out. Steer clear of golf outings. And whatever you do, don't go to a baseball game.

Radiologists, like many other healthcare providers, are hearing more and more warnings about what not to do when dealing with referring physicians or equipment vendors. Seemingly traditional and innocent types of contact, like the sporting event or dinner, are suddenly raising red flags about ethical behavior. And both radiologists and vendors have come to learn that what they may have once thought were simply ways of doing business or perks of the job may in fact be violations of the Stark Law or anti-kickback laws.

This hot topic was the focus of a special focus session at RSNA 2006.

At the heart of the matter are commercial relationships—among radiologists, referring physicians, and equipment vendors—whenever Medicare or Medicaid reimbursement is involved. Clark Silcox, general counsel for the National Electrical Manufacturers Association (NEMA), pointed to NEMA's Code of Ethics for Medical Imaging Equipment Manufacturers that details what vendors should and should not do when interacting with potential customers.

Modest is the Word

NEMA is concerned about several types of interactions with clients. For example, said Silcox, it's not a good idea for a vendor to pay for a radiologist to attend a conference. Instead,



A panel of experts addressed the issue of ethical relationships in an RSNA 2006 special focus session.

NEMA suggests that companies make educational grants directly to the conference organizers themselves, in order to reduce overall costs and make the conference more affordable. At the conference, NEMA recommends that suppliers provide meals and hospitality through the conference hosts and not directly to the healthcare providers in attendance.

Essentially, when dealing with clients, the buzzword is "modest," said Silcox. "You can't be lavish. No Broadway shows, no Olympics, no World Series games. All of that is history."

Silcox noted that yes, when it comes to perks, the healthcare industry is now under a tougher level of scrutiny. "A lot of people say 'well, jeez—every other industry does that kind of wining and

dining with their customers. What's wrong with our industry doing it?'" he said. "Why is the medical products community treated differently? Because federal healthcare dollars are involved."

NEMA is also concerned about vendors who deal with hospitals or research organizations and are asked to make charitable donations or contribute to research grants. Silcox said companies must "build a wall" between their sales and marketing departments and people within the company who decide which organizations will receive charity or research money.

"Five to 10 years ago, it was common practice for customers to say 'Hey, I'll consider buying your equipment, and by the way, we're trying to raise money for a new wing at our hospital,'" said Silcox. That sort of interaction is now "verboten," he said. "You have to be very careful that the sale of your product is totally separate," he said.

Continued on next page

■ The **Stark Law**, with some exceptions, generally prohibits physicians from referring patients for designated health services to an entity with which they have a financial relationship. Similarly, the **Anti-Kickback Law**, with exceptions, restricts a physician or vendor from soliciting, receiving or offering an item or service of value in exchange for referrals or generating federal program business (for example, ordering a Medicare-reimbursable drug).

Continued from previous page

Relationships with Referring Physicians Also at Issue

On the other side of the transaction, radiologists have to be equally careful about what they accept from and ask of vendors and what they themselves offer to referring physicians. Thomas Hoffman, J.D., associate general counsel for the American College of Radiology, noted “the climate has become cloudier for radiologists who want to engage with industry, even legitimately on clinical matters. Radiologists really have to look before they leap.”

When considering offering or accepting sporting event tickets, dinners out or any items of value, said Hoffman, radiologists should make sure they’re familiar with the ethical guidelines—ACR’s voluntary compliance guidelines and particularly model compliance guidelines issued by the Health and Human Services Office of Inspector General (OIG) that focus on physicians and hospitals. “You’re better safe than sorry,” he said. “Just say ‘no’ to lunch or dinner if you believe that, if not for your position and ability to generate business that’s billable to a federal program, you would not be getting the offer.”

Hoffman observed that while accepting pens, coffee mugs or a day out on the golf course from a vendor probably wouldn’t affect a purchasing decision, radiologists must make sure

such seemingly innocent exchanges don’t accumulate over time into “a pattern or practice where it becomes the appearance of a conflict.” At that point, noted Hoffman, “You cross the line into the minefield of compliance problems.”

Hoffman noted that ACR “does not wish to discourage radiologists from business with industry or referring physicians.” But, he added, the organization is “trying to illustrate to our members and their staffs that the rules have changed and the compliance spotlight has become a lot hotter. Before you agree to accept what in many instances is a legitimate arrangement—a dinner, a reception—just make sure you understand the ramifications.”

Scrutiny Mirrors that of Pharmaceutical Industry

All of this increased awareness, said experts, is a direct result of how the federal government cracked down on vendor-physician relationships in the pharmaceutical industry. Silcox observed that law enforcement seems to be migrating slowly from drug sales to devices. “It’s only natural to say ‘wake up and smell the coffee,’” said Silcox.

Robert A. Maier, president and chief executive officer of Regents Health Resources, a Tennessee-based company that consults on medical imaging services, said that while his company does not offer legal counsel, he does hear sto-

ries of ethically gray or flat-out black and white situations. These include imaging practices loaning out resort homes to top referring physicians and physicians telling certain hospitals they will not refer patients unless the hospitals can match or top what other imaging locations are paying them per year.

“I think there’s a general level of frustration on the part of hospitals and physicians who intend to comply with the letter or intent of the law,” said Maier, a former certified public accountant. “They run into situations where they don’t think the competition is playing by the rules.”

Still, Silcox is optimistic that the new flood of ethical guidelines and an environment of more open business interactions are having a positive effect. “By sharing information about our practices, hopefully we are leveling the playing field,” said Silcox.

In the meantime, the experts had the same advice: when uncertain whether an arrangement or gift is ethical, browse through the ACR, NEMA or OIG guidelines and then sit down with an attorney. “Find out if what you’re talking about is not only within the direct letter of the law, but also within the intent of the law,” said Maier. “Because if not, it’s likely that loophole will get plugged.” □

Ethical Issues Also Arise in Expert Testimony

INTERACTIONS with equipment vendors and referring physicians aren’t the only areas where radiologists need to have their ethical radar set a little higher.

“Certainly ethical issues are far more in the forefront today than they have been in the past,” said Leonard Berlin, M.D., chair of radiology at Rush North Shore Medical Center in Skokie, Ill., current chair of the Ethics Committee of the American College of Radiology and vice-chair of the RSNA Professionalism Committee. Dr. Berlin noted that the ACR committee is focusing heavily these days on the issue of ethical expert testi-

mony in civil malpractice litigation.

For Dr. Berlin, the question on the witness stand is “Where do you draw the line between honest differences of opinion and wrongful testimony?”—especially in the adversarial system used in U.S. civil courts. “In the office or hospital, a radiologist might say ‘maybe it’s this, maybe it’s that,’” observed Dr. Berlin. “But in a court of law you can’t use words like ‘maybe.’ You have to say ‘more likely than not.’ By definition you are put into stating a stronger position one way or the other.”

Courts have ruled in recent years that

medical societies should do more to monitor the behavior of their members when they are appearing on witness stands, said Dr. Berlin. He explained the courts’ reasoning: “Medical practitioners have expertise the average lay person does not. As a result, the average lay person should not be ‘dazzled’ by people who are not testifying honestly.”

Navigating such murky ethical waters can be tricky, but simply raising the issues is an important step, said Dr. Berlin. “Let’s bring these issues up, be provocative and let people think about them,” he said.

MR Imaging Can Be Safe for Patients with Implantable Devices

NEW FINDINGS on MR imaging in patients with implantable devices could change long-held beliefs about who can safely undergo what has become the modality of choice for many musculoskeletal, central nervous system and cardiovascular disorders.

In a study published in the Sept. 19, 2006, issue of *Circulation*, Johns Hopkins Hospital researchers concluded that, “given appropriate precautions, noncardiac and cardiac MR imaging can potentially be safely performed in patients with selected implantable pacemaker and defibrillator systems.”

Results of the study on 31 patients with pacemakers and 24 with implantable defibrillators were “amazingly consistent,” said senior author Henry R. Halperin, M.D., M.A., from the departments of radiology, cardiology/medicine and biomedical engineering. “We used a very rigid protocol and we had no problems whatsoever.”

Much debate has surrounded the issue of whether MR imaging could truly be made safe for the more than 2 million patients in the U.S. with pacemakers or defibrillators. Historically, concerns have centered on possible movement of the device, changes in its programming and inducement of current in the leads, resulting in heating and cardiac stimulation.

Citing an aging population, expanding indications for implantable devices and estimates that as many as 75 percent of patients will need MR imaging, Dr. Halperin and colleagues initiated the MRIs Made Safe project in the fall 2003. The project sought to evaluate the diagnostic utility and both immediate and long-term safety of noncardiac and cardiac MR imaging using a 1.5 Tesla scanner.



Henry R. Halperin, M.D., M.A.
Johns Hopkins Hospital



Edward J. Kendall, Ph.D.
University of Saskatchewan

Only Modern Devices Tested

Patients with no imaging alternative and with devices shown to be MR imaging safe by in vitro phantom and in vivo animal testing were enrolled in the study. Dr. Halperin said patients with abandoned leads were eliminated from the study, as those leads can heat up.

Saman Nazarian, M.D., study lead author and fellow in cardiac electrophysiology at Johns Hopkins, said only modern devices—pacemakers made after 1996 and defibrillators made after 2000—were tested.

“We embarked on this study to find the issues with modern devices,” he said. Older devices are not very well protected from electromagnetic interference, he said, while newer, smaller devices made of titanium offer better protection from the radiofrequency energy of the MR unit.

Pacemakers and defibrillators of patients enrolled in the study were interrogated for problems immediately before and after MR imaging. Long-term follow-up interrogation was performed as well.

Before imaging each patient, researchers also reprogrammed the

implantable device to ignore its external environment, reducing the potential for the device’s electronics to confuse the radiofrequency generated by MR imaging with an irregular heartbeat, which could result in a mis-

fire. Researchers also limited the estimated specific absorption rate (SAR) of the MR imaging sequences to an average 2.0 W/kg. In sequences with high SAR, researchers made adjustments by increasing repetition time or field of view and reducing

We can perform brain MR exams on people with modern pacemakers without worry, whereas several years ago those people would simply have been excluded.

Edward J. Kendall, Ph.D.

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flip angle or the acquisition bandwidth to limit SAR while maintaining diagnostic capability.

Study Has Clinical Implications

All subjects were over age 19 and were followed from 3 to 6 months after the scan to look for any post-test heart damage or changes in the device's programming. Researchers reported finding no symptoms consistent with device movement, torque or heating, and all devices were functioning appropriately after MR imaging. In addition, they found that exams performed with lower SAR still provided images with sufficient quality to make an accurate diagnosis in more than 90 percent of cases tested, Dr. Halperin said.

"Most of the images were directly used to make a diagnosis, so the clinical utility was quite high," he said. Specifically, the study helped identify renal artery stenosis or other vascular abnormalities in nine patients and aided in planning cardiac revascularization or ventricular reconstruction in another 13. In another nine patients, MR imaging was instrumental in diagnosing and treating malignancy.

Johns Hopkins researchers have now imaged more than 100 patients using their method.

"Following this protocol, we did not have any problems," Dr. Nazarian said. "But there are still issues to be concerned about, so we want this research to continue to be done with all

of the safety precautions."

Currently, several other U.S. institutions are doing similar research, but each team relies on different protocols.

"We've gotten a number of requests from other centers for more information about this, but it's still not mainstream," Dr. Halperin said. "It still has to be done with careful monitoring, although most academic centers are more than capable of doing this."

The research at Johns Hopkins has attracted patients from up and down the East Coast, with at least two or three requests daily for the imaging exams. Dr. Halperin said his team will continue providing the exams as a service, "because they are clinically necessary and the more patients we image, the better the data we'll have."

Findings May Spur Device Manufacturing Changes

While some physicians believe that day-to-day management of MR imaging will change little in light of the research, others say there is greater motivation for this type of study.

"It really involves expanding the scope of MR imaging applications," said Edward J. Kendall, Ph.D., of the University of Saskatchewan College of Medicine, who co-authored a 2004 *RadioGraphics* review article on MR imaging and pacemakers, concluding that MR imaging may be performed safely under defined conditions. "We have struggled for many years with this issue. We can perform brain MR exams

on people with modern pacemakers without worry, whereas several years ago those people would simply have been excluded."

Dr. Halperin said the Johns Hopkins research has not only shown that MR imaging can be done safely with certain devices, but the results may also prompt device manufacturers to make products that are MR imaging-safe.

"Companies should do this by design, but not all of them have," he said. "One company is testing these devices and will probably come out with products in the next few years. So if all we've done is to give a lightning rod to the device companies to make these devices MR imaging-safe, then I think we've done our jobs." □

■ To read the abstract for "Clinical Utility and Safety of a Protocol for Noncardiac and Cardiac Magnetic Resonance Imaging of Patients With Permanent Pacemakers and Implantable-Cardioverter Defibrillators at 1.5 Tesla," go to circ.ahajournals.org/cgi/content/abstract/114/12/1277.

Implantable Cardiac Devices with Satisfactory MR Imaging Testing

PACEMAKERS

■ Manufacturer: St Jude

Pacesetter AFP (262)
Trilogy (2360)
Entity (5326)
Affinity (5130, 5330)
Integrity (5142, 5342, 5346)
Identity (5172, 5370, 5376, 5380, 5386)

■ Manufacturer: Guidant

Vigor (1232)
Discovery (1272)
Insignia (1194, 1290)
■ Manufacturer: Medtronic
EnPulse (AT-500, E2SR01, E2DR01)
Kappa (701, 901)
Prodigy (7860)
In Sync BiV (8040, 8042)

DEFIBRILLATORS

■ Manufacturer: St Jude

Photon (V-194, V-230, V-232)
Atlas (V-240)
Epic (V-197, V-235, V-239)
■ Manufacturer: Guidant
Prizm (1850, 1851, 1852, 1860, 1861)
Contak (1823, H119, H170, H175)
Vitality (T125, T135)

■ Manufacturer: Medtronic

Maximo (7232)
Gem-II (7273)
Gem-III (7275)
Marquis (7274)
InSync (7272)

Source: MRIs Made Safe Project, Johns Hopkins Hospital

CT Leads in Pursuit of Noninvasive Exam for Coronary Artery Disease

MULTISLICE CT is superior to MR imaging for detecting coronary artery stenoses and is potentially useful in ruling out coronary artery disease in patients with low to intermediate likelihood of having it, according to new research.

The study compared CT and MR to conventional coronary angiography. The findings are another critical milestone in the pursuit of a noninvasive, painless and cost-effective approach to diagnosing coronary artery disease, which affects more than 13 million people in the U.S.

“This is a well-designed study addressing an important issue,” said Elliot K. Fishman, M.D., a professor of radiology, radiologic science and oncology at the Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins University and director of diagnostic imaging and body CT at the Johns Hopkins School of Medicine. “It’s hard to do three studies like this—it takes a yeoman’s effort.”

Previous studies had shown multislice CT was more accurate in diagnosing clinically significant coronary stenoses in patients referred for conventional angiography. However, there had existed no large, head-to-head comparison of multislice CT and MR imaging until the one conducted by Marc Dewey, M.D., and his colleagues at Charité Medical School in Berlin and published

in the Sept. 19, 2006, issue of the *Annals of Internal Medicine*.

“Before CT coronary angiography can be recommended for clinical routine exams, it is important to actually compare the two noninvasive tests in a single patient population,” said Dr. Dewey, who heads the graduate program at Charité.

All Modalities Have Pros, Cons

Dr. Dewey and colleagues examined 108 of 129 consecutive patients with both multislice CT and MR imaging approximately one day prior to conventional coronary angiography. In addition to discovering the potential utility of CT to rule out coronary artery disease in some patients—such as those with atypical chest pain and/or equivocal findings on noninvasive stress tests—researchers also determined that using 16-slice technology does not expose patients to a significantly higher effective radiation dose than conventional coronary angiography.

The study benefited, said Dr. Dewey, from an intention-to-diagnose design and the inclusion of patients with suspected—but not known—coronary disease, as well as the short time interval between both noninvasive tests and the invasive angiography. The study’s main disadvantage was its single-center design, he said.

The findings of Dr. Dewey’s team now enter the discourse over the optimal

Before CT coronary angiography can be recommended for clinical routine exams, it is important to actually compare [CT and MR imaging] in a single patient population.

Marc Dewey, M.D.



Marc Dewey, M.D.
Charité Medical School, Berlin

diagnostic approach for coronary artery disease, where all modalities’ pros and cons are considered. For example, said Dr. Dewey, neither CT nor MR imaging requires cardiac catheterization—note-worthy in light of conventional coronary angiography’s small, but not insignificant, risk of relevant complications in every 100th patient and mortality rate of approximately 0.1 percent.

CT is also faster than MR imaging, he said, with room time of about 20 minutes or less, versus an average of 1 hour for MR imaging. However, he added, CT and MR still have disadvantages. “MR imaging is limited by the narrow bore, which causes a feeling of confinement and claustrophobia in a considerable number of our patients,” he said. “CT, on the other hand, requires administration of an iodinated contrast agent and exposes our patients to ionizing radiation.”

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While the findings of the Charité study are consistent with clinical experience, they will be further changed with even newer CT technology, said David A. Bluemke, M.D., Ph.D., clinical director of MR imaging at Johns Hopkins Hospital in Baltimore and associate professor of radiology and medicine at the Johns Hopkins University School of Medicine. He said he would like to see the study conducted with a 64-slice CT scanner.

“The technologies used for CT and MR imaging were the available methods in 2004. Already there have been substantial improvements in CT and MR imaging technology,” said Dr. Bluemke, a co-author of a new study on MR imaging and implantable devices (see page 9).

Dr. Fishman noted that in the two years since the Charité study’s completion, 64-slice CT has reconciled many challenges, such as concerns about higher radiation doses. In fact, he said, some of the newest 64-slice CT scanners use even lower doses of ionizing radiation than 16-slice technology.

Drs. Dewey, Fishman and Bluemke will all lead courses on the coronary arteries at RSNA Highlights: Clinical Issues for 2007 (see sidebar).

Multicenter Studies Part of Ongoing Research

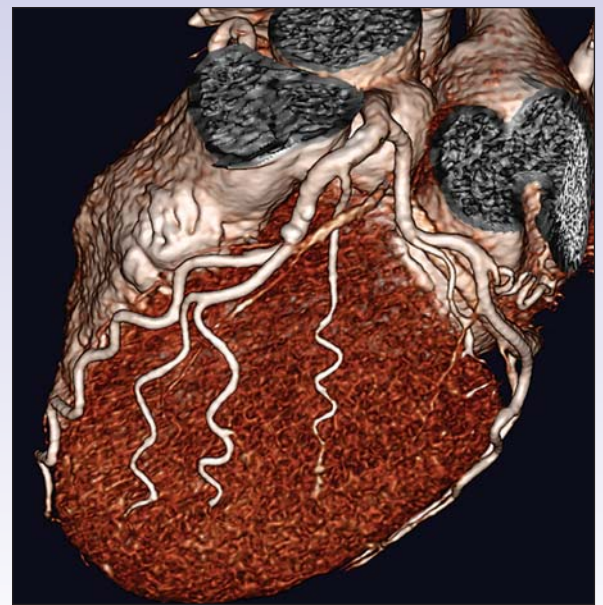
Dr. Dewey said he looks forward to the outcomes of other CT studies, such as

the Toshiba-sponsored, multicenter CorE64, of which he is a principal investigator. “Multicenter studies using 64-slice technology for detection of coronary artery stenoses will provide important insights into clinical practicality and utility of CT when it is performed in hospitals with varying experience,” he said.

CT can also be put to the test in randomized studies to track the progression of atherosclerosis, he said. These studies are highly desirable in showing whether lipid-modulating therapies can slow the progression of calcified and non-calcified coronary plaques.

In MR imaging, meanwhile, there are hopes of adding a contrast agent that will improve the sensitivity of the test. “We don’t yet have the technology for the coronary arteries, but plaque characterization in the carotid arteries is now readily performed with MR imaging,” said Dr. Bluemke.

Dr. Dewey agreed, noting that so-called blood-pool contrast agents—which selectively enhance the vessels for a long time period and thereby increase the contrast between coronary



69-year-old male patient with atypical symptoms. CT coronary angiography shows a normal left coronary artery in 3D display.

Image courtesy of Marc Dewey, M.D.

lumen and the surrounding tissue—could help MR imaging “kick it up another notch” and close the gap with CT coronary angiography. “That way, higher resolution MR imaging sequences along the coronary arteries could become feasible, improving diagnostic accuracy,” he said. □

■ To read the abstract for “Noninvasive Detection of Coronary Artery Stenoses with Multislice Computed Tomography or Magnetic Resonance Imaging,” go to www.annals.org/cgi/content/abstract/145/6/407.

Stay Ahead of the Latest Developments with RSNA Highlights

A STUDY indicating that CT is superior to MR imaging for detecting coronary artery stenoses is making headlines now, but RSNA 2004 attendees had the luxury of hearing about the abstract nearly two years before it was published.

“In a field as vibrant and rapidly changing as radiology, you have to attend conferences to keep up,” said Elliot K. Fishman, M.D., keynote speaker for RSNA Highlights: Clinical Issues for 2007. At the Highlights conference, like the annual meeting, radiologists

learn about the cutting-edge topics that will be the big news a year or two from now, Dr. Fishman said.

Cardiac imaging will be one area of concentration—along with PET/CT, breast imaging and sports injuries—at the Highlights conference, to be held February 26–28, 2007, in Phoenix.

In addition to delivering the keynote, Four to Sixteen to Sixty-Four Slice Multidetector CT: When is Enough Enough?, Dr. Fishman will

co-lead the course, What Every Radiologist Needs to Know about Coronary Arteries. Other cardiac imaging courses are Coronary Artery CT and CT Angiography, Cardiac MR Imaging: From Physics to Protocols, How to Perform and Interpret Cardiac MR Imaging: A Primer and Advances in Cardiac

Nuclear Imaging: SPECT, SPECT/CT and PET/CT.

For more information about the Highlights conference and to register, go to RSNA.org/HighlightsConference.



Alternative to Invasive Amniocentesis is Goal of RSNA Scholars

2006 RSNA Research Scholar Bonnie Joe, M.D., Ph.D., is poised to unlock the mysteries of amniotic fluid, using MR spectroscopy to explore its vast potential as an indicator of fetal health.

Working alongside Dr. Joe is 2006 RSNA Medical Student Research Assistant Kiarash (Kia) Vahidi, B.S., who joined Dr. Joe's research project while in medical school and is now applying to radiology residency programs.

Dr. Joe, assistant professor of radiology at the University of California, San Francisco (UCSF), began learning the capabilities and limitations of MR spectroscopy while working with breast tumors as an RSNA Research Fellow in 2002. Today, she is using MR technology on a project titled, Non-invasive Evaluation of Fetal Lung Maturity Using MR Spectroscopy: Development and Assessment of Ex Vivo and In Vivo Techniques."

Dr. Joe and Vahidi want to establish MR spectroscopy as a new noninvasive means for assessing fetal lung maturity in patients who are forced to deliver early due to conditions, such as placenta previa, that preclude natural



Kiarash Vahidi

Bonnie Joe, M.D., Ph.D. participated in an RSNA Research & Education Foundation Scholars Luncheon at RSNA 2006.

labor. For the youngest patients involved in these cases, determining lung maturity and avoiding respiratory distress syndrome (RDS) are often life or death propositions.

While amniocentesis remains standard of care for determining fetal lung

maturity, it is invasive and carries some potential risks such as infection, bleeding and premature labor. The biochemical testing of amniotic fluid for lung maturity also has a history of producing false-positives and inconclusive

Continued on next page

A LITTLE BIT MORE ABOUT...

Bonnie Joe, M.D., Ph.D.

If you were not a radiologist, what would your profession be?
Full-time mom.

What's playing in your reading room?
A very loud air conditioning unit.

What do you do for relaxation?
Play with my children, ages 7 and 3. Also, ballroom dancing.

Where have you been that you feel everyone should go?
Hawaii.

If you had one piece of advice for someone considering your field, what would it be?
Try to maintain a sense of humor, and don't work all the time.

What projects are you working on at home?
Learning how to convert home movies to DVD.

Kia Vahidi

Who is the person you most admire?
My grandfather.

What is your favorite way to relax?
Reading and running.

If you were not pursuing radiology as a profession, what would you do?
Field anthropology.

What was the last book you read?
The Kite Runner by Khaled Hosseini.

If you could visit any place in the world, where would it be?
Egypt.

What is the most daring thing you have ever done?
Skydiving—I was talked into it and loved it!

Continued from previous page

results requiring retesting.

“If we are successful, patients will be spared the risk associated with amniocentesis and the decision to administer maternal corticosteroids to reduce the risk of RDS will be based on this noninvasive test,” said Vahidi. “This project has already added to our understanding of third-trimester amniotic fluid composition and has the potential to advance the state of the art in neonatal diagnostic imaging and fetal MR imaging.”

Specifically, Dr. Joe is using spectroscopy to look for varying levels of choline in patients’ amniotic fluid. While choline is traditionally used as a tumor marker, Dr. Joe said she believes it is also a marker of lung maturity—surfactant compounds that cause the lungs to mature and indicate lung maturity have choline in them.

“There is a lot of potential here. It’s a very exciting area of research and there are not a lot of places like UCSF that have easy access to all of the pieces, including world-renowned spectroscopists,” said Dr. Joe.

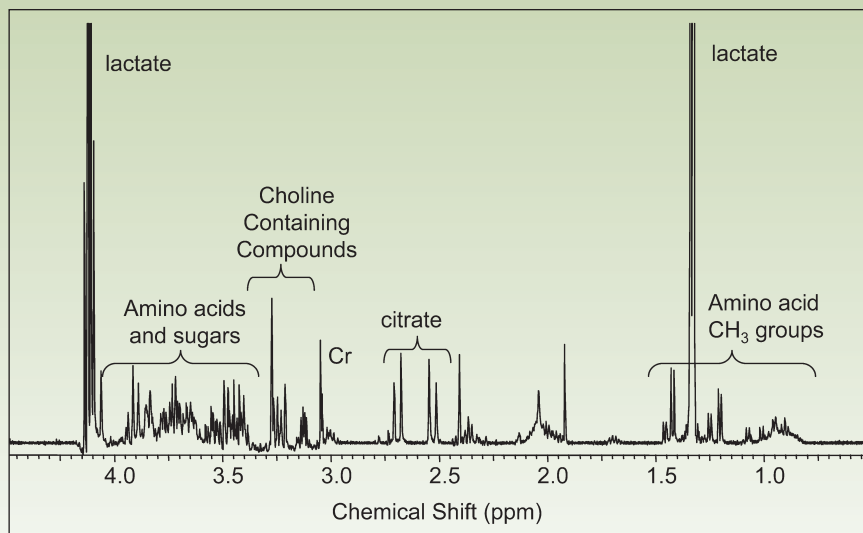
For the ex vivo phase of the research, Dr. Joe is collaborating with Mark Swanson, Ph.D., and John Kurhanewicz, Ph.D., to analyze discarded amniotic fluid with a spectrometer at a very high resolution and high-field strength.

“We have analyzed about 40 ex vivo samples and things are looking very promising,” she said. “Our data show a positive correlation of increasing choline with increasing surfactant:albumin ratios, the current biochemical test UCSF runs to indicate lung maturity.”

The research evolves as new discoveries are made. Choline is not all Dr. Joe found in her initial samples.

“We found that we can see numerous other metabolites well—not just choline, but lactate and also many unidentified metabolites,” she said. “There is a lot of information there. Once we realized this, we felt that we had to look at some of these other metabolites.”

Example of a high resolution ex-vivo MR spectrum obtained from a third-trimester amniotic fluid sample.



Choline-containing compounds (including surfactant) are observed from 3.20 – 3.25 parts per million. Two resonances of lactate—a doublet at 1.33 ppm and a quartet at 4.12 ppm—are shown, as are other compounds as labeled.

Reprinted from *Journal of Pediatric Surgery* 41:4:768–773. Clifton, M.S., et al. "Feasibility of Magnetic Resonance Spectroscopy for Evaluating Fetal Lung Maturity." © 2006, with permission from Elsevier.

Dr. Joe hopes to spend time analyzing those other metabolites if an R01 grant application she submitted to the National Institutes of Health in October is approved. “If the R01 is funded, we can really branch off and start looking more closely at other potential markers of fetal lung maturity in addition to choline. MR spectroscopy of amniotic fluid may have potential applications for evaluating other fetal conditions,” she said. “Ultimately, the goal is to understand the metabolic profile of what normal amniotic fluid looks like, so that we can start looking at abnormal fetuses. That’s definitely on the horizon.”

For now, while continuing to analyze her ex vivo data, Dr. Joe also anticipates the transition to in vivo. Dr. Joe has encountered some technical challenges associated with this phase, over and above the rather tricky timing involved in recruiting and screening her patient population. Working on a technique to minimize motion and improve the signal-to-noise ratio, the team has successfully scanned eight in vivo patients.

“We have successfully detected choline in a couple of in vivo patients

and I think that’s a big breakthrough, considering how complicated this system is,” Dr. Joe said. “Over the next year we are going to keep working to improve our in vivo MR imaging technique and to fine tune our imaging parameters.”

Dr. Joe attributes her success to a supportive network of family, friends and colleagues. “I have a lot of family support and I have a great working group in the abdominal imaging section who allow me protected research time,” she said. “I also have an impressive and enthusiastic group of collaborators. I think that’s all the pieces that make this come together.”

Meanwhile, Vahidi feels his RSNA experience has helped him to find his future. “When I began working with Dr. Joe, I was undecided about my career path,” he said. “This work, along with my radiology rotation, has given me a deeper appreciation for the breadth of radiology and its importance across all branches of medicine. The RSNA grant allowed me to confirm my future career in radiology and to discover a real interest in pursuing academic radiology.” □



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 Nadja M. Lesko, M.D. & Kerry M. Link, M.D.
 Gwilym S. Lodwick II, M.D.
 Eileen Biunno, M.D. & Francisco Lopez
 Jaime Machado Gallas, M.D.
 Katarzyna J. Macura, M.D., Ph.D. & Robert Toni Macura, M.D., Ph.D.
 Frank P. Maguire, M.D.
 Mary C. Mahoney, M.D.
 Magie M. Malaro, M.D. & Anthony Malaro
 Carroll R. Markivee, M.D.
 Silvio G. Marugg, M.D.
 William W. Mayo-Smith, M.D.
 Henry L. McClintock Jr., M.D.
 Alice A. & David A. McEwen, M.D.
 John G. McGue, M.D.
 Laura L. McLeod, M.D.
 Michael P. McNamara Jr., M.D.
 Alex J. Megibow, M.D., M.P.H.
 Elisabeth T. & John T. Melvin, M.D.
 Ari D. Mintz, M.D.
 Ann & Timothy E. Moore, M.D.
 Beth D. Kruse, M.D. & Thomas Moore
 F. Reed Murtagh, M.D.
 Koon Kwan Ng, M.D.
 Phuc Tito Nguyen, M.D.
 Margaret J. & John D. Noonan, M.D.
 Roseanne Oliverio, M.D.
 Linda K. Olson, M.D.
 Juliane & David S. Owens, M.D.
 Rhonda K. McDowell, M.D. & Robert W. Patton Jr., M.D.
 Ruth A. & Orrin W. Perkins, M.D.
 William E. Purnell Jr., M.D.
 Christine & Robert M. Quencer, M.D.
 Fernando Machado Quintana, M.D.
 Connie S. Crawford-Rahn & Norman H. Rahn III, M.D.
 Elke Reiser, M.D. & Maximilian F. Reiser, M.D.
 John W. Roberts Jr., M.S.
 Susan & Henry S. Rose, M.D.
 Sudipta Roychowdhury, M.D.
 Calvin L. Rumbaugh, M.D.
 Kamal B. Russell, M.D.
 Rafia S. Saleem, M.D.
 Peter C. Samu, M.D.
 Frederic G. Sanford II, M.D.
 Mark S. Schiffer, M.D.
 Robert J. Schmall, M.D.
 Thomas M. Schmidlin, M.D.
 Sari Rose & Neil F. Schneider, M.D.
 Steven M. Schonfeld, M.D.
 Martin W. Schularick, M.D.
 Leo Sheiner, D.O.
 Eleanor & Joseph R. Simpson, M.D., Ph.D.
 Linda C. & Robert M. Snow, M.D.
 Leo J. Spittler, M.D.
 Cande L. Sridhar, M.D.
 Cary J. Stegman, M.D.
 Nina & Joel D. Swartz, M.D.
 Carol & Lawrence C. Swayne, M.D.
 Mary Ann & Donald A. Swayze, D.O.
 Carol J. & Frank J. Szarko, M.D.
 Isao Takasaka, M.D.
 James S. Teal, M.D.
 Arkom Tivorsak, M.D.
 Rojilee & Philip C. Trotta, M.D.
 Hiroyuki Ueda, M.D.
 Manuel Viamonte Jr., M.D.
 Reynold M. Villedrouin, M.D.
 Neil F. Wasserman, M.D.
 Blake H. Watts, M.D.
 Donna & Josef C. Wenker, M.D.
 Lewis H. Westmoreland III, D.O.
 Gary J. Whitman, M.D.
 Beatrice & Robert J. Wilson, Ph.D.
 Carl P. Wisoff, M.D.
 Robert Wolek, M.D.
 Susan T. & James H. Wolfe, M.D.
 Ira S. Wolke, M.D., Ph.D.
 Daniel J. Wunder, M.D.
 Wendell Y. Yap, M.D.
 Mark Ming-Yi Yeh, M.S., M.D.
 Andrej J. Zajac, M.D.
 Hope & Jack A. Ziffer, M.D., Ph.D.
- \$1 - \$199**
 Harri E. Aalto, M.D.
 Richard R. Abello, M.D.
 Harold L. Atkins, M.D.
 Carole Leduc & Mostafa Atri, M.D.
 Donald T. Barnes, M.D.
 George R. Baumgardner, M.D.
 James L. Beall, M.D.
 Patricia G. Becker, M.D. & Gary J. Becker, M.D.
In memory of Mrs. Frances Jean Thomas
 Sherwin M. Borsuk, M.D.
 Charles W. Bower, M.D.
 Lawrence M. Bost, M.D.
 Brian D. Briscoe, M.D.
 Yves D. Bruecker, M.D.
 Gwendolyn M. Bryant-Smith, M.D.
 Rodney W. Burns Jr., M.D.
 George W. Calvosam, M.D.
 Cathy & J. William Charboneau, M.D.
 Annemarie Relyea-Chew & Felix S. Chew, M.D.
 Frank A. Chia, M.D.
 Tilden L. Childs III, M.D.
 Kyunghee C. Cho, M.D.
 Jill Ostrager-Cohen & Bruce C. Cohen, M.D.
 Patricia A. Barry, M.D. and John Cosgrove, M.D.
 Jennifer M. Cutts, M.D.
 Thuan T. Dang, M.D.
 Ellen R. Blatt, M.D. & Jesse Davidson
 Lawrence P. Davis, M.D.
 James M. Debnam, M.D.
 Dennis DeJesus, M.D.
 Yvonne N. Fokkema & Cees Devries, M.D.
 Catherine & Philip A. Dinauer, M.D.
 Mary Adair & William D. Dockery III, M.D.
 Brett D. Ferdinand, M.D.
 Iyad M. Megherbi Feteih, M.B.B.Ch.
 Martin J. Fine, M.D.
 Rose H. & Ezekiel Freed, M.D.
 Hajime Fujimoto, M.D.
 Kunihiko Fukuda, M.D.
 Zoe K. Ghahremani, D.D.S. & Gary G. Ghahremani, M.D.
 Anne M. Glaser, M.D.
 Thomas F. Glass III, M.D.
 Gary E. Gold, M.D., M.S.E.E.
 Paul Goldberg, M.D.
 Navraj S. Grewal, M.D.
 Rajiv Gupta, Ph.D., M.D.
 Yuusuke Hirokawa, M.D.
 Esther & Juerg Hodler, M.D.
 Jason C. Hoffmann, M.D.
 Diane B. & Julian B. Holt, M.D.
 Kumiko & Masaaki Hori, M.D.
 Michele & Reed M. Horwitz, M.D.
 Joan & Howard L. Hudson, M.D.
 Yumi & Mitsuru Ikeda, M.D.
 Blaise V. Jones, M.D.
 Cecilia M. Jude, M.D.
 Rathachai Kaewlai, M.D.
 Adrienne & Alan D. Kaye, M.D.
 Mary A. King, M.D. & Terence E. Kilroy, M.D.
 John R. Knorr, D.O.
 Mark S. Kristy, M.D.
 Mary B. Leonard, M.D. & Curtis P. Langlotz, M.D., Ph.D.
 Paul M. Leiman, M.D.
 Deborah & James A. Lyddon, D.O.
 Sharon & Guy R. Matthew, M.D.
 Paula & David W. McVinnie, M.D.
 Joel R. Meyer, M.D.
 Margaret E. Mones, M.D.
In memory of A. Francis Summa
 Kobkun Muangsomboon, M.D. & Sorranart Muangsomboon
 Tracy Hampton & Randy A. Musack, D.O., D.V.M.
 Craig A.W. Nasralla, M.D.
 Alexis V. Nees, M.D.
 Sacha & Matthew G. Niemi, M.D.
 Tomohisa Okuma, M.D.
 Virginia S. Owen, M.D.
 Brian D. Petersen, M.D.
 Stasia J. Frank, M.D. & Richard J. Powers, M.D.
 Thomas Ptak, M.D., Ph.D.
 Sarah M. Puchalski, D.V.M.
 Robert O. Rausch, M.D.
 Albert A. Rayle Jr., M.D.
 Stanley B. Reich, M.D.
 Caroline Reinhold, M.D. & Dr. Winter
 Clarissa F. Rhode, M.D.
 Brittmarie Ringertz, M.D. & Hans Gosta Ringertz, M.D., Ph.D.
 Dayle D. Robson, M.D.
 Elizabeth A. Krupinski, Ph.D. & Michel M. Rogulski, Ph.D.
 Friederike Rohlfing, M.D.
 Mary Beth & Richard J. Rolfes, M.D.
 Lindsey C. Satre, M.D. & Michael A. Satre, Ph.D.
 Leah E. Schafer, M.D.
 Barbara & Lloyd B. Schnuck Jr., M.D.
 Andrew I. Shedden, M.D.
 Wenjing Yan & Charles Shen, M.D.
 Richard A. Silver, M.D.
 Rajwinder Singh, M.D., M.B.B.S.
 Ellen L. Wolf, M.D. & Gary Slater, M.D.
 Barbara Stoutjesdijk-Lyddane & Mark J. Stoutjesdijk, M.D., M.S.E.E.
 Kathryn H. & John P. Tampas, M.D.
In honor of Robert E. Campbell, M.D.
 Ina L. Tonkin, M.D. & Allen K. Tonkin, M.D.
 Mary & Allen F. Turcke, M.D.
 James F. Tustin, M.D.
 Kimberly & Theodore L. Vander Velde II, M.D.
 Anthony Vasilas, M.D.
 Jason M. Wagner, M.D.
 Kyle R. Walker, M.D.
 Alfred F. Weitzman, M.D.
 Kurt H. Wetzler, M.D.
 Clifford K. Yang, M.D.
 Eileen Mercado-Yap, M.D. & Wendell Yap
 Steven A. Young, M.D.

Journal Highlights

The following are highlights from the current issues of RSNA's two peer-reviewed journals.

Recent Advances in Chest Radiography

THE rapid conversion from film-based to digital radiographic systems has yielded new opportunities to enhance the diagnostic capabilities and influence of chest radiography. In an **Radiology** article in the State of the Art section of the December issue of *Radiology* (RSNA.org/radiologyjnl), H. Page McAdams, M.D., and colleagues discuss the inherent challenges of chest radiography and advances made to address those challenges.

Even with recent developments in cross-sectional imaging of the thorax, chest radiography remains the mainstay for diagnosing many pulmonary diseases, Dr. McAdams and colleagues

note. "Consistently high-quality images and a marked reduction in the number of repeat examinations required because of technical causes have made digital imaging a favorite of physicians and technologists alike," they write. "The ability to readily incorporate digital images into a picture archiving and communication system (PACS) allows for much improved communication between radiologists and referring physicians and has eliminated the problem of the 'lost film.'" Specifically, Dr. McAdams, of the Department of Radiology and Duke Advanced Imaging Laboratories at Duke University Medical Center, and



Temporal subtraction radiography in a middle-aged patient. Subtraction image suggests new masses in both upper lobes (arrows).

Radiology 2006;241:663-683. © RSNA, 2006. All rights reserved. Printed with permission.

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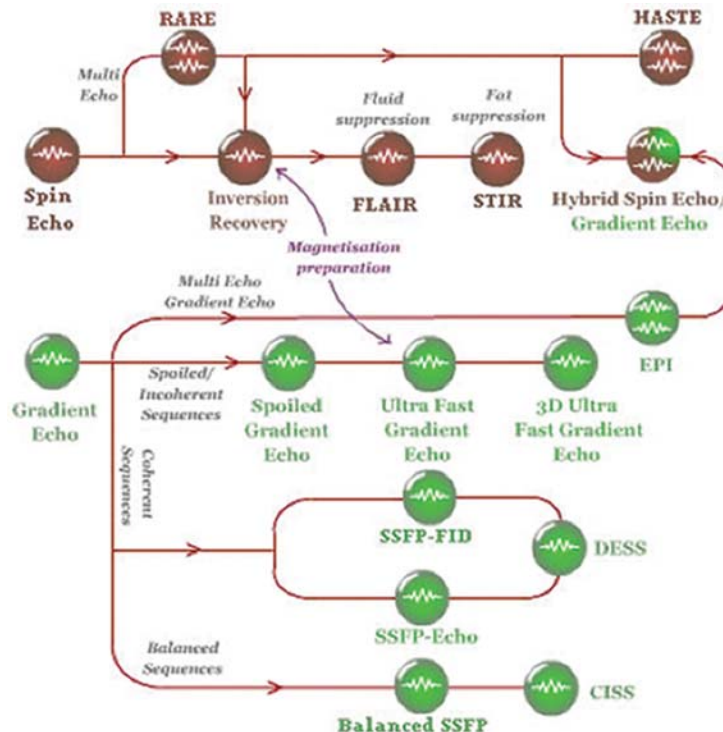
An Interactive Taxonomy of MR Imaging Sequences

WITH EACH MR imaging sequence having its own physics, characteristics and typical applications, radiology students and clinical users can find it challenging to learn the sequences. Links, differences and similarities among sequences are multidimensional and too complex for tabular presentation on the printed page.

In an online-only *RadioGraphics* article available at radiographics.rsna.org, Gerard E. Boyle, Ph.D., and colleagues present the sequences in an interactive format.

"This exhibit allows the user to attain an overview of the range of sequences available, while allowing in-depth study of sequence physics,"

Continued on next page



In this interactive taxonomy of MR imaging sequences offered as an online-only *RadioGraphics* article, spin-echo sequences are shown in red and gradient-echo sequences in green. Users can click on a circular sequence node to see an overview of that sequence and links to the physics and applications associated with that sequence.

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Recent Advances in Chest Radiography

Continued from previous page

colleagues address:

- New digital detector and image display technologies
- Developments in image-processing techniques
- CAD and CADx applications for chest radiography

- Advanced applications such as dual-energy and temporal subtraction radiography and chest tomosynthesis

There is endless potential for improvements in the diagnostic accuracy of conventional chest imaging, they conclude. “Obviously, the effect of these new technologies and of those

still to come will need rigorous scientific validation to ensure that the reality truly fulfills the promise of these exciting new advancements,” they note.

An Interactive Taxonomy of MR Imaging Sequences

Continued from previous page

writes Dr. Boyle, of the Department of Medical Physics and Bioengineering at St. James Hospital in Dublin, Ireland.

The exhibit encourages a nonlinear approach to the study of MR imaging

sequences, according to Dr. Boyle and colleagues. “The student can enter the taxonomy at any point and work through sequence overviews, physics and applications in any order,” they write. “The flexibility of usage and the

high level of interactivity provide a learning environment not possible with a textbook approach.”

(*RadioGraphics* 2006;26:6. Available at [radiographics/rsna.org/cgi/content/full/26/6/e24](http://radiographics.rsna.org/cgi/content/full/26/6/e24).)

Media Coverage of Radiology

IN October, 162 media outlets carried news stories generated from articles appearing in *Radiology*. These stories reached an estimated 62 million people.

Radiology press releases highlighted findings from a study on the development of a fracture risk formula for women with osteoporosis (*Radiology* 2006;241:190-196) and a multi-center study on performance benchmarks for screening mammography (*Radiology* 2006;241:55-66). Also

highlighted was a report on an analysis technique to identify early cellular damage in cases of mild cognitive impairment (*Radiology* 2006;241:197-205).

Media coverage of these and other *Radiology* studies included placements in *More*, *Woman's World*, *The Indianapolis Star*, *The Guardian* (New York edition), *The Washington Times*, *Deseret Morning*



News, *The News Sentinel* (of Fort Wayne, Ind.), *Diagnostic Imaging* and *El Diario*. Stories also appeared on the Associated Press, Reuters and United Press International newswires, BBC News, Canadian Broadcast News, American Health Line, WebMD, Medscape, *Forbes.com* and *Discovery.com*.

EDUCATION RESEARCH

Program and Grant Announcements

Oncologic Image-Guided Interventions: Opportunities for Collaboration

February 1-2, 2007 • Bethesda North Marriott, Maryland

THIS meeting is designed to encourage collaboration among industry, academia, and federal agencies in oncologic image-guided interventions (IGIs) such as clinical trials of IGI cancer therapies and procedural and systems simulation for imaging guidance and therapy delivery. Also addressed

will be ideas such as a “plug and play” environment to improve intra-operability among guidance and therapy modalities.

The conference is sponsored by the Advanced Medical Technology Association, Medical Device Manufacturers Association and National Electrical

Manufacturers Association. The National Cancer Institute, Centers for Medicare & Medicaid Services and the U.S. Food and Drug Administration will also participate. For more information, go to <https://cms.palladianpartners.com/cms/1154973321/index.shtml>.

Program and Grant Announcements

NIH Director's Pioneer Award

Application period closes January 16, 2007

A NEW ROUND of competition for the National Institutes of Health (NIH) Director's Pioneer Award is open through January 16, 2007. Scientists at all career levels and engaged in any field of research may apply.

Each Pioneer Award provides \$2.5 million in direct costs over 5 years. NIH funded 35 scientists in the first 3 years of the program and expects to award between five and 10 more grants in September 2007.

The centerpiece of the streamlined, electronic application process for the award is an essay on the investigator's vision for addressing a biomedical challenge, the importance of the problem and the person's qualifications to engage in groundbreaking research. More information on the Pioneer Award is at nihroadmap.nih.gov/pioneer. Application instructions are at grants.nih.gov/grants/guide/rfa-files/RFA-RM-07-005.html.

Tools for Success in the Practice of Radiology

June 29–30, 2007 • RSNA Headquarters, Oak Brook, Ill.

This course will focus on leadership basics, defining the roles and responsibilities of an effective leader, as well as the necessary values and skills. Strategic, financial and operational planning will be addressed, and participants will gain tools to cultivate and promote communication within work settings and establish an effective programmatic approach to staff development and evaluation.

This course, the first educational course offered in the

new RSNA Conference Center, is designed to foster network building and information sharing among participants. Registration will be limited, as intimate and informative lectures will be complemented by interactive breakout sessions and discussions of individual case-based scenarios.

More information will be available in the next issue of *RSNA News* and online at RSNA.org/education.

Working For You

RSNA Committees

This month *RSNA News* continues its series highlighting the work of RSNA's volunteer committees with a look at the Refresher Course Committee.

Refresher Course Committee

IN ADDITION to organizing the curriculum and selecting faculty for the refresher courses offered at the annual meeting, the committee also arranges other annual meeting events such as the Sunday Image Interpretation Session.

More than 300 refresher courses at RSNA 2006 covered topics ranging from sinonasal imaging to radiologic education in developing countries.

"For many, the Refresher Course

Program is the highlight of the RSNA annual meeting," said James A. Brink, M.D., the new chair of the committee.

*Working
for you*
COMMITTEE
PROFILE

"Refresher courses allow attendees to learn new concepts and brush up on important topics in radiology. Moreover, a variety of learning styles and certifications are offered to satisfy every educational need."



James A. Brink, M.D.

More information about the Refresher Course Committee, including current members and the 2005 committee chair report, can be found at RSNA.org/About/whoswho/committees/refresher.cfm. To learn about all committees and opportunities to volunteer, go to RSNA.org/About/volunteer.cfm.

Working For You

Making MIRC Work

This month *RSNA News* continues its profiles of real-world users of RSNA's Medical Imaging Resource Center (MIRC). This month's user is **John Freymann**, informatics manager for the Cancer Imaging Program at the National Cancer Institute. Freymann talked about how MIRC is improving the use of imaging in today's cancer research and practice.

Making **MIRC** *Work*

RSNA'S FREE ONLINE RESEARCH AND EDUCATION TOOLS

EFFICIENT and flawless file moving is critical in many business settings, but perhaps nowhere more so than at the National Cancer Imaging Archive (NCIA), where data are used to develop software for such vital functions as lesion detection and classification, accelerated diagnostic imaging decisions and quantitative imaging assessment of drug response.



John Freymann

A searchable repository providing the cancer research community, industry and academia with access to in vivo cancer images, NCIA is a part of the Cancer Imaging Program of the National Cancer Institute (NCI). And thanks to MIRC, which was incorporated into the design of the NCIA submission process from its inception, the repository can accept data across firewalls from a variety of different file systems and PACS.

"Without MIRC, we would likely be dealing with data on CDs in many different ven-

dor-specific formats," said Freymann, who shared his experience with MIRC in demonstrations and lectures at RSNA 2006.

With image data coming from cancer centers, research sites and the pharmaceutical industry, MIRC's ability to manage deidentification schemas—while allowing local sites to make modifications to comply with specific institutional review board conditions—is particularly appreciated, Freymann said.

NCIA customized MIRC for its special needs by adding extensive code, said Freymann, to tie the MIRC server to a relational database. In keeping with the MIRC approach of users supporting other users, Freymann made the code open-source and available at the NCIA Web site at <https://imaging.nci.nih.gov/ncia/>.

MIRC is a critical part of the National Cancer Imaging Archive, which provides access to resources that will improve the use of imaging in today's cancer research and practice by:

- Increasing the efficiency and reproducibility of imaging cancer detection and diagnosis
- Leveraging imaging to provide an objective assessment of therapeutic response
- Ultimately enabling the development of imaging resources that will lead to improved clinical decision support

Membership Cards in the Mail

RSNA members who recently joined the Society will receive their membership cards, with an attached 2006 sticker, within the next few weeks. Do not discard the membership card, as a 2007 sticker will be mailed in the spring. Replace the 2006 sticker with the 2007 version.



Career Connection Redesigned

Career Connection, the RSNA Web site that links job-searching radiology professionals to employers looking for candidates, has been redesigned. New features make the site easier to navigate. Career Connection can be accessed at RSNA.org/career.



If you have a colleague who would like to become an RSNA member, you can download an application at RSNA.org/mbrapp or contact the RSNA Membership and Subscriptions Department at 1-877-RSNA-MEM [776-2636] (U.S. and Canada), 1-630-571-7873 or membership@rsna.org.

News about RSNA 2007

Submit Abstracts for RSNA 2007

RSNA 2006 just ended, but it's still not too early to think about submitting an abstract for RSNA 2007. The online abstract submission system will be activated in January. **The submission deadline is April 15, 2007.**

Abstracts are required for scientific

papers, scientific posters and education exhibits.

To submit an abstract online, go to RSNA.org/abstracts.

The online system is easy to use and makes it more efficient for the Scientific Program and Education

Exhibit committees to evaluate submissions. For more information about the abstract submission process, contact RSNA at 1-877-776-2227 within the United States or 1-630-590-7774 outside of the United States.

Important Dates for RSNA 2007

- April 15** Deadline for abstract submission
- April 23** RSNA/AAPM member registration and housing opens
- May 21** Non-member registration and housing opens
- June 18** Refresher course enrollment opens
- Nov. 5** Final housing deadline
- Nov. 9** Final advance registration deadline
- Nov. 25–
Nov. 30** RSNA 93rd Scientific Assembly and Annual Meeting

RSNA 2006 – Scientific Abstracts Accepted by Country

North America

Canada	37
United States	876
ASTRO*	45

International

Argentina	9	Ireland	18
Australia	4	Israel	28
Austria	39	Italy	176
Belgium	8	Japan	202
Brazil	16	Netherlands	76
Chile	1	Norway	3
China	152	Poland	3
Czech Republic	2	Portugal	3
Denmark	1	Qatar	2
Egypt	18	South Korea	126
Finland	5	Spain	28
France	47	Sweden	3
Germany	224	Switzerland	18
Greece	7	Taiwan ROC	11
Hong Kong	4	Turkey	7
Hungary	1	Ukraine	1
India	13	United Kingdom	56

Total North America . . . 958

Total International 1,313

*Abstracts transferred from the American Society for Therapeutic Radiology and Oncology

TOTAL 2,271

In the Lakeside Learning Center at RSNA 2006, attendees could view electronic scientific posters and education exhibits pertaining to one subspecialty in that subspecialty area or view the entire electronic program at a computer in the center of the hall.



RSNA Highlights: Clinical Issues for 2007

Early Bird Registration Ends December 15

RSNA Highlights: Clinical Issues for 2007 will be held February 26–28, 2007, at the J.W. Marriott Desert Ridge Resort & Spa in Phoenix. For more information on course content, see the story on page 12.



The RSNA Highlights Course Registration Guide is available for download at RSNA.org/highlightsconference. Potential attendees can also request a copy be sent by regular mail.

United.com offers RSNA Highlights attendees a 10 percent discount on select United Airlines, United Express and TED qualifying flights. Use the electronic certificate number 553SB to make your discounted airline reservation online at United.com. If you prefer, call United (1-800-521-4041) or your personal travel agent and mention the United discount ID number 553SB to be eligible for the discounted fares.



Registration

Save \$100 when you register before December 15.

	Early Bird Discount Deadline: Dec. 15, 2006	Advance Registration Deadline: Feb. 5, 2007	Onsite Registration
RSNA Member	\$450	\$550	\$650
Non-Member	\$600	\$700	\$800
RSNA Resident Member	\$150	\$150	\$150
Non-Member Resident	\$450	\$550	\$650

EXHIBITOR NEWS **RSNA 2006**

RSNA 2006 Technical Exhibit Tops Record

At 521,600 square feet, the RSNA 2006 technical exhibition is the biggest it has ever been. Among the 764 exhibitors are 162 participating in the RSNA annual meeting for the first time.



Product News

Time	Room	Duration	Time	Room	Duration
08:30 AM	CT #1	55	08:30 AM	CT #1	40
08:35 AM	CT #1	55	08:35 AM	CT #1	40
08:40 AM	CT #1	55	08:40 AM	CT #1	40
08:45 AM	CT #1	55	08:45 AM	CT #1	40
08:50 AM	CT #1	55	08:50 AM	CT #1	40
08:55 AM	CT #1	55	08:55 AM	CT #1	40
09:00 AM	CT #1	55	09:00 AM	CT #1	40
09:05 AM	CT #1	55	09:05 AM	CT #1	40
09:10 AM	CT #1	55	09:10 AM	CT #1	40
09:15 AM	CT #1	55	09:15 AM	CT #1	40
09:20 AM	CT #1	55	09:20 AM	CT #1	40
09:25 AM	CT #1	55	09:25 AM	CT #1	40
09:30 AM	CT #1	55	09:30 AM	CT #1	40
09:35 AM	CT #1	55	09:35 AM	CT #1	40
09:40 AM	CT #1	55	09:40 AM	CT #1	40
09:45 AM	CT #1	55	09:45 AM	CT #1	40
09:50 AM	CT #1	55	09:50 AM	CT #1	40
09:55 AM	CT #1	55	09:55 AM	CT #1	40
10:00 AM	CT #1	55	10:00 AM	CT #1	40
10:05 AM	CT #1	55	10:05 AM	CT #1	40
10:10 AM	CT #1	55	10:10 AM	CT #1	40
10:15 AM	CT #1	55	10:15 AM	CT #1	40
10:20 AM	CT #1	55	10:20 AM	CT #1	40
10:25 AM	CT #1	55	10:25 AM	CT #1	40
10:30 AM	CT #1	55	10:30 AM	CT #1	40
10:35 AM	CT #1	55	10:35 AM	CT #1	40
10:40 AM	CT #1	55	10:40 AM	CT #1	40
10:45 AM	CT #1	55	10:45 AM	CT #1	40
10:50 AM	CT #1	55	10:50 AM	CT #1	40
10:55 AM	CT #1	55	10:55 AM	CT #1	40
11:00 AM	CT #1	55	11:00 AM	CT #1	40

PRODUCT UPDATE

Faster, Easier Scheduling

A NEW call center scheduling module is one of the features in Fusion RIS Version 3.1, released recently by Merge eMed (www.merge-emed.com). Designed with customer input to facilitate scheduling patient appointments in 90 seconds or less, the module incorporates flexible block scheduling to offer more appointment options when setting up exams.

Also included in the new version are mammography updates for compliance with the newest American College of Radiology BI-RADS® standards. A new configuration also accommodates film in a picture archiving and communication system (PACS) environment.

NEW PRODUCT

Tracking Technology

Ascension Technology Corporation (www.ascension-tech.com) has introduced a pulsed-DC magnetic tracker, its newest 3D guidance tracking technology.

Designed especially for medical use, the new device has multiple sensors and transmitter options that can be customized for various procedures. Sensors typically embedded in the distal tip of instruments for localization now include flat transmitter plates that can be positioned beneath a patient to negate the distorting effects of ferrous metals in hospital beds and procedural tables. The new device is medically compliant Class 1, Type CF and defibrillator-proof.

NEW PRODUCT

Faster Access to Archived Data

Active Archive Appliance (A3™) from PowerFile® keeps fixed content data such as documents, images and media files accessible on the user's network, rather than on tape that can be difficult to access. Committing data to a virtualized array of DVD optical media, A3 leaves a copy of frequently accessed data in primary cache for fast retrieval. Pooling the DVD subsystem storage creates reliable volumes of storage up to 30.6 Terabytes. The system also protects against accidental erasure, unauthorized modification, data corruption and viruses. Designed and tuned as a long-term online archive, A3's power usage is about 5 percent of that of a typical spinning disk.



NEW PRODUCT

Table Pads and Positioning Cushions

Tempur-Pedic® Medical, Inc. (www.tempurmed.com) has collaborated with IES-Patient Comfort System, Inc. (www.iespcs.com) to offer medical imaging table pads, knee wedges and positioning cushions made with TEMPUR® pressure-relieving material. Intended to replace original equipment pads as they wear out, the pads and wedges make it easier for the patient to lie still so that clearer images can be obtained and fewer repeat scans are necessary. TEMPUR redistributes pressure away from weight-bearing contact points and is designed to be thin so that the maximum amount of free space inside a scanner is available to the patient.



RSNA HIGHLIGHTS

CLINICAL ISSUES FOR 2007

PHOENIX, ARIZONA – FEBRUARY 26–28, 2007

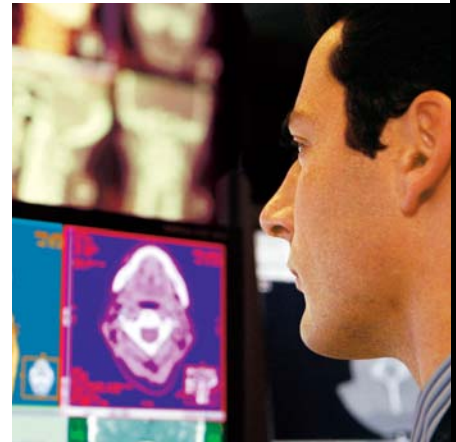
J.W. Marriott Desert Ridge Resort & Spa

Introducing a new RSNA Conference...

This new RSNA educational
conference will focus on:

- Cardiac imaging
- PET/CT
- Breast imaging
- Sports injuries

All courses will be taught in an
interactive format, using audience-
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Registration is under way.

Register online at
RSNA.org/HighlightsConference

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RSNA Highlights: Clinical Issues for 2007

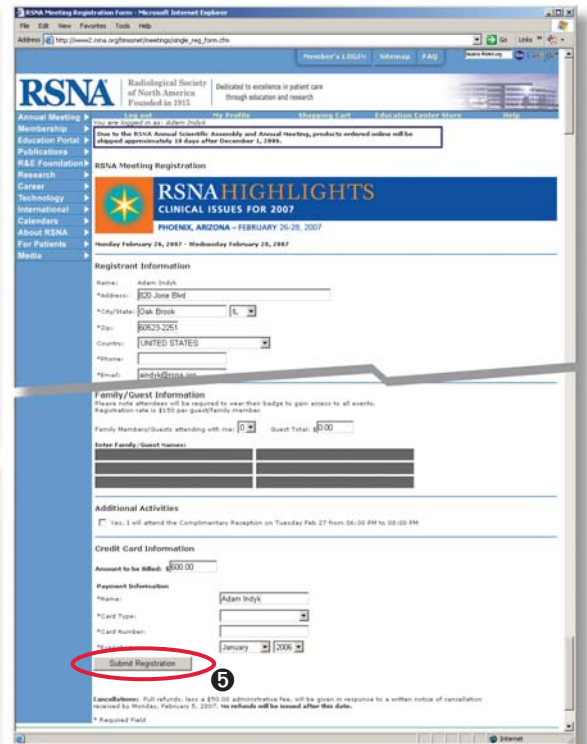
MAKE your preparations for RSNA Highlights: Clinical Issues for 2007 educational conference by visiting RSNA.org/Highlights Conference.

For detailed conference information, click Brochure ❶ to view the meeting brochure or request a brochure by mail. To view course titles and times, select Course Descriptions ❷ from the bulleted list. Click View Description ❸ for more details about a particular class, including instructor names and learning objectives.

To register, click Register ❹. After you've provided your personal information, be sure to click Submit Registration ❺.

To make a hotel reservation, select Reserve a Room ❻.

For tour information, click Tours ❼ and enter "RSNA" as a username and "tours" as a password. Note that both username and password are case sensitive.



connections

Your online links to RSNA

RSNA.org

Radiology Online
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CME Gateway
CMEgateway.org

RSNA Medical Imaging Resource Center
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RSNA Career Connection
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RadiologyInfo™
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RSNA 2006
rsna2006.rsna.org

RSNA Highlights: Clinical Issues for 2007
RSNA.org/Highlights/Conference

NEW
RSNA 2007
rsna2007.rsna.org

Medical Meetings

January – March 2007

JANUARY 4-7

Indian Radiological & Imaging Association (IRIA), 60th Annual Congress, Renaissance Hotel & Convention Center Powai Lake, Mumbai, India • www.iria2007.com

JANUARY 18-20

American Society for Therapeutic Radiology and Oncology (ASTRO)/American Head and Neck Society (AHNS)/American Society of Clinical Oncology (ASCO), Multidisciplinary Head and Neck Cancer Symposium, Westin Mission Hills, Palm Springs, Calif. • www.astro.org

JANUARY 19-21

Academy of Molecular Imaging (AMI)/American Society of Nuclear Cardiology (ASNC), Clinical Molecular Cardiology and Oncology: Advances in Therapy and Diagnostics, Loews Miami Beach Hotel, South Beach • www.ami-imaging.org

JANUARY 25-27

European Society of Gastrointestinal and Abdominal Radiology (ESGAR), 6th Hands-on Workshop on CT-Colonography, Le Meridien, Nice, France • www.esgar.org

JANUARY 28-31

American College of Radiology (ACR), PET/CT Update, Boca Raton Resort & Club, Florida • www.acr.org

JANUARY 31-FEBRUARY 4

Sociedad Mexicana de Radiología e Imagen (SMRI), 41st Annual Radiology and Imaging Course, Hotel Sheraton Centro Histórico, Mexico City • www.smri.org.mx

FEBRUARY 1-2

Advanced Medical Technology Association (AdvaMed)/Medical Device Manufacturers Association (MDMA)/National Electrical Manufacturers Association (NEMA), Oncologic Image-Guided Interventions: Opportunities for Collaboration, Bethesda North Marriott, Maryland
• <https://cms.palladianpartners.com/cms/1154973321/index.shtml>

FEBRUARY 1-4

Radiation Therapy Oncology Group (RTOG), Annual Meeting, Tampa Marriott Waterside Hotel, Florida • www.rtog.org

FEBRUARY 11-15

International Society for Magnetic Resonance in Medicine (ISMRM), MR Physics & Techniques for Clinicians Workshop, Fairmont Chateau Lake Louise, Alberta, Canada
• www.ismrm.org/workshops/MRPhysics/index.htm

FEBRUARY 15-18

Society of Nuclear Medicine (SNM) Mid-Winter Educational Symposium, Hyatt Regency San Antonio • www.snm.org

FEBRUARY 17-18

Armed Forces Institute of Pathology (AFIP), 22nd Annual Washington Neuroradiology Course, Hyatt Regency Bethesda Hotel, Maryland • www.afip.org/Departments/edu/upcoming.htm

FEBRUARY 25-28

ISMRM, Non-Cartesian MR Imaging Workshop, Enchantment Resort, Sedona, Ariz.
• www.ismrm.org/workshops/Non_Cartesian_MRI/index.htm

FEBRUARY 25-MARCH 1

Healthcare Information and Management Systems Society (HIMSS), Annual Conference and Exhibition, Ernest N. Morial Convention Center, New Orleans • www.himss07.org

FEBRUARY 26-28

RSNA Highlights: Clinical Issues for 2007, J.W. Marriott Desert Ridge Resort & Spa, Phoenix
• RSNA.org/HighlightsConference

MARCH 1-6

Society of Interventional Radiology (SIR), 32nd Annual Scientific Meeting, Seattle • www.sirmeeting.org

MARCH 5-9

Society of Computed Body Tomography and Magnetic Resonance (SCBT-MR), 30th Annual Course, Portofino Bay Hotel at Universal Orlando, Florida • www.scbtmr.org

MARCH 9-13

European Congress of Radiology (ECR), Annual Meeting, Austria Center, Vienna • www.ecr.org

MARCH 15-18

American Institute of Ultrasound in Medicine (AIUM), Annual Convention, Marriott Marquis, New York • www.aium.org

MARCH 25-28

ISMRM, Advances in High Field MR Workshop, Asilomar Conference Center, Pacific Grove, Calif.
• www.ismrm.org/workshops/HighField/venue.htm

NOVEMBER 25-30

RSNA 2007, 93rd Scientific Assembly and Annual Meeting, McCormick Place, Chicago • rsna2007.rsna.org

RSNANews

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