



## Rising Obesity Rate Presents Imaging Obstacles

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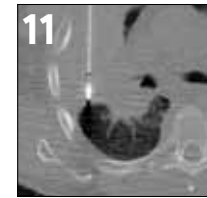
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**OPENING SESSION**

**Facial Restoration by Transplantation and the Role of Novel Imaging Technology**

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**The Doctor As Patient; The Patient As Advocate**

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**NEW HORIZONS LECTURE**

**The Future of Imaging Informatics—Meaningful Use and Beyond**

Keith J. Dreyer, D.O., Ph.D.  
Boston

**Meaningful IT Innovation to Support the Radiology Value Proposition**

Paul J. Chang, M.D.  
Chicago

**ANNUAL ORATION IN DIAGNOSTIC RADIOLOGY**

**The Story Behind the Image**  
Richard B. Gunderman, M.D., Ph.D.  
Indianapolis

**To Disclose or Not To Disclose Radiologic Errors—Should “Patient First” Supersede Radiologist Self-Interest?**

Leonard Berlin, M.D.  
Skokie, Ill.

**ANNUAL ORATION IN RADIATION ONCOLOGY**

**Radiation Oncology and Radiology—Should We Get Married Again?**

Anthony L. Zietman, M.D.  
Boston

**AAPM SYMPOSIUM**

**Breaking Angiographic Speed Limits: Accelerated 4D MRA and 4D DSA Using Undersampled Acquisition and Constrained Reconstruction**

Charles A. Mistretta, Ph.D.  
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**Ultrasound Goes Supersonic: Very-High-Speed Plane Wave Transmission Imaging for New Morphological and Functional Imaging Modes**

Mickael Tanter, Ph.D.  
Paris



Pomahac



Ross



Arscott



Dreyer



Chang



Gunderman



Berlin



Zietman



Mistretta



Tanter



Gore



Sandler



Lichtenstein



Barentsz

## SAR Bestows Honors

THE SOCIETY OF ABDOMINAL RADIOLOGY (SAR) awarded its 2012 Walter B. Cannon Medal to **Richard M. Gore, M.D.**, at its recent annual meeting. Dr. Gore is a clinical professor of diagnostic radiology at the North Shore University Health System in Evanston, Ill. A manuscript reviewer for *RadioGraphics*, Dr. Gore has served on the RSNA Refresher Course Committee and as chairman of the Scientific Program Committee's Gastrointestinal Subcommittee. **Carl M. Sandler, M.D.**, a professor at the University of Texas MD Anderson Cancer Center in Houston, was awarded the 2012 Howard M. Pollack Medal. Dr. Sandler has served as a manuscript reviewer for *RadioGraphics* and on RSNA's Scientific Program Committee's Genitourinary and Breast Imaging Subcommittees.

**Joel E. Lichtenstein, M.D.**, a professor of radiology at the University of Washington in Seattle, and **Jelle O. Barentsz, M.D.**, a professor of radiology and vice-chair for research at the Radboud University Medical Center Nijmegen, The Netherlands, were respectively awarded the GI and GU Lifetime Achievement Awards. Dr. Lichtenstein has served as a manuscript reviewer for *Radiology* and *RadioGraphics*. Dr. Barentsz is an associate editor of *Radiology* and served on the RSNA Oncologic Imaging and Therapies Task Force.

The Society of Gastrointestinal Radiologists and the Society of Uro-radiology recently merged to form the Society of Abdominal Radiology. The 2012 year marked the last year in which the awards would be given under the individual societies, as future awardees will receive the awards under the new society.

## Alektiar Named ABR Trustee

The American Board of Radiology (ABR) has appointed **Kaled M. Alektiar, M.D.**, a member of the Department of Radiation Oncology at the Memorial Sloan-Kettering Cancer Center in New York, as a new trustee for radiation oncology.

Dr. Alektiar has served as an ABR oral examiner since 2004 and as ABR gynecology oral exam section chair since 2007. He replaces Kian Ang, M.D., chair of the Division of Radiation Oncology for The University of Texas MD Anderson Cancer Center in Houston, who served as an ABR trustee for eight years.



## More Quantitative Imaging Projects Funded

RSNA, through its Quantitative Imaging Biomarkers Alliance (QIBA), has funded another 10 studies that explore quantitative imaging with CT, MR and nuclear medicine. Funding for the projects is supported by a \$2.4 million contract awarded to RSNA by the National Institute of Biomedical Imaging and Bioengineering (NIBIB) in 2010.

Twenty-six projects were funded in the first round of grants last year. Topics range from "Assessing Measurement Variability of Lung Lesions in Patient Data Sets" to "Impact of Dose Saving Protocols on Quantitative CT Biomarkers of COPD and Asthma."

The Quantitative Imaging Biomarkers Alliance (QIBA) was organized by RSNA in 2007 to unite researchers, healthcare professionals and industry stakeholders in advancing quantitative imaging and the use of biomarkers in clinical trials and practice. Quantitative imaging is defined as the acquisition, extraction and characterization of relevant quantifiable features from medical images for use in research and patient care. RSNA views this work as a step toward the ultimate goal of enhancing the use of quantitative imaging methods in clinical practice.

For more information, go to [RSNA.org/QIBA.aspx](http://RSNA.org/QIBA.aspx).

**IN MEMORIAM**

**John R. Hodgson, M.D.**  
RSNA Past-president **John R. Hodgson, M.D.**, died May 14, 2012. He was 97.

Dr. Hodgson joined the staff at the Mayo Clinic in Rochester, Minnesota, in 1947, where he served as chair of the Department of Diagnostic Radiology and was appointed to the Board of Governors and elected president of the staff.

He is recognized as a pioneer in the Mayo Clinic's outreach program, resulting in many regional satellite clinics and major facilities in Scottsdale, Ariz., and Jacksonville, Fla.

Noted for his work in gastrointestinal disease and improving resident education, Dr. Hodgson supervised the development of a straight diagnostic radiology residency program and frequently invited outside lecturers to speak at the institution. During his tenure, Mayo Clinic's Department of Radiology developed a strong cross-sectional imaging program and several new subspecialty areas.

Dr. Hodgson was a dedicated and active participant in the scientific and organizational aspects of local and state medical organizations, serving as president of the Minnesota Radiological Society.

Dr. Hodgson served as RSNA president in 1970 and received the RSNA Gold Medal in 1975.





Lennard Greenbaum, M.D. (left), and American Institute of Ultrasound in Medicine (AIUM) President Alfred Z. Abuhamad, M.D. (right), introduce Stephanie Wilson, M.D., at the society's award ceremony.

Marvin Ziskin, M.D., Ph.D. (left), and Dr. Abuhamad introduce Charles Church, Ph.D.



Copel

Barahona

Evans

Trudinger

## AIUM Bestows Honors

The American Institute of Ultrasound in Medicine (AIUM) presented its Joseph H. Holmes Pioneer Award to **Stephanie Wilson, M.D.**, and **Charles Church, Ph.D.**, at its recent annual meeting in New York. Dr. Wilson is a professor of radiology at the University of Calgary and a member of the Department of Diagnostic Imaging at Foothills Medical Centre in Calgary, both in Alberta, Canada. Dr. Church is an associate research professor at the University of Mississippi, Oxford, and a senior research scientist at the university's National Center for Physical Acoustics.

**Joshua Copel, M.D.**, an internationally known expert in maternal and fetal medicine and high-risk pregnancy, received the 2011 William J. Fry Memorial Lecture Award. A past-AIUM president, Dr. Copel is a professor of obstetrics, gynecology and reproductive sciences, professor of pediatrics and vice-chair of obstetrics at Yale University School of Medicine in New Haven, Conn.

**J. Oscar Barahona, B.S., R.D.M.S.**, president of Greenwich Ultrasound Associates, PC, Connecticut, for the past 25 years, received the Distinguished Sonographer Award.

**David Evans, Ph.D.**, and **Brian Trudinger, M.D.**, received AIUM Honorary Fellowships. Dr. Evans is an emeritus professor at the University of Leicester in Great Britain. Dr. Trudinger is professor of obstetrics and gynecology at the University of Sydney and director of fetal medicine at Westmead Hospital, both in Australia.

AIUM also presented its Memorial Hall of Fame awards posthumously to: **Charles Kleinman, M.D.**, whose work led to the birth of fetal echocardiography; **Wesley Nyborg, Ph.D.**, who helped establish a basis for much of the current knowledge of nonthermal mechanisms by which ultrasound interacts with biological materials; **David Robinson, D.Sc.**, who holds eight patents, helped produce exceptional fetal imaging and invented several techniques for the measurement of sound speed; and **Michael Wainstock, M.D.**, an influential pioneer in the use of ultrasound in ophthalmology.

## Numbers in the News

# 2.9

Amount, in millions of dollars, of grant funding awarded this year by the RSNA Research & Education Foundation. [Read more about this year's funding, and how donors help make it happen, on Page 15.](#)

# 5

Percentage of nearly 30,000 high-cost follow-up examinations included in a recent study which followed a radiologist's recommendation. [Turn to Page 7 to learn how these new data challenge assumptions about radiology referrals and have experts calling for new approaches to curbing imaging utilization.](#)

# 16

Percent increase in the number of female radiology residents since 2003, according to a recent survey. The total number of residents increased 29 percent during that time. [Read more on Page 20.](#)

# 2,300

Number of medical students who have taken online exams via ExamWeb. [Learn more about ExamWeb, a new database that compiles well-vetted questions and ready-made tests for educators to use after radiology rotations, on Page 13.](#)

## My Turn

# New Radiology Select Illustrates Road from Research to Patient Care

RSNA publishes many of our specialty's outstanding research and review articles. For several years we have been wondering how we might showcase the cream of the crop. How could we take the best quality research and bundle it in a way that is of value and interest to our readership and our authors?

One consideration was to develop a print-on-demand product that would allow radiologists to receive articles selectively in their subspecialty. Unfortunately, this turned out to be prohibitively expensive. But it gave us the idea that we could create specialty compilations ourselves. We are pleased to unveil a new publication called *Radiology Select*.

Volume I, Pulmonary Nodules, was introduced this winter. Each issue spans a time period of up to seven years. We intentionally chose articles that showed how new knowledge progressively built upon the work of previous investigators, with early experiments leading to clinical studies, and ultimately to illustrate how radiology research can lead to improved patient care.

Volume II, Stroke, will be released this summer. Volumes on Screening for Breast Cancer and Cardiac CT are planned for 2013. Wanting to stay current with the growing number of readers who prefer an online product, we also developed a tablet version as well as an online version. The online version includes the opportunity to earn CME/SAM credits. By adding podcasts, we offer users a chance to hear how researchers foresee future research and how this compilation of research has changed clinical care at their institutions.

For me, it has been a real pleasure to work with so many groups in RSNA, including experts from the publications, information technology and education departments. But the project could not

have been completed without our guest editors and the many authors who performed the original research, and then devoted additional time to writing CME/SAM questions. I hope our members find this useful, and I welcome any comments to [dlevine@rsna.org](mailto:dlevine@rsna.org).

Deborah Levine, M.D., is senior deputy editor of *Radiology*. Dr. Levine is a professor of radiology, vice-chair of academic affairs and director of obstetric/gynecologic ultrasound at Beth Israel Deaconess Medical Center in Boston.



## Rosen Named Radiology Chair at UMass

**Max P. Rosen, M.D., M.P.H.**, has been appointed chair of the Department of Radiology at University of Massachusetts (UMass) Medical School and UMass Memorial Medical Center in Worcester. Dr. Rosen, who will join UMass in September, is executive vice-chair of radiology, associate chief of radiology for community network services and interim chief of breast imaging at Beth Israel Deaconess Medical Center in Boston.



## Vadlamudi Recipient of AMA Leadership Award

The American Medical Association (AMA) awarded its 2012 Leadership Award to **Venu Vadlamudi, M.D.**, at its recent annual Excellence in Medicine Awards ceremony. Dr. Vadlamudi is a radiology resident at Hurley Medical Center in Flint, Mich., and plans to begin his fellowship in vascular and interventional radiology at William Beaumont Hospital. Dr. Vadlamudi was recognized for demonstrating outstanding non-clinical leadership skills in advocacy, community service and education.

### RSNA News

July 2012 • Volume 22, Number 7  
Published monthly by the Radiological Society of North America, Inc.  
820 Jorie Blvd., Oak Brook, IL 60523-2251. Printed in the USA.

POSTMASTER: Send address correction "changes" to: *RSNA News*, 820 Jorie Blvd., Oak Brook, IL 60523-2251  
Non-member subscription rate is \$20 per year; \$10 of active members' dues is allocated to a subscription of *RSNA News*.

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### LETTERS TO THE EDITOR

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# Rising Obesity Rate Presents Imaging Obstacles

Experienced radiologic technologist Maureen Seluta, R.T., (R), has never gotten used to the unpleasant task of telling a bariatric patient that he or she simply won't fit in the fluoroscopy machine.

WHILE fluoroscopy is routinely used to perform a gastrografin swallow study in post-gastric bypass patients, standard fluoroscopy equipment allows just 20 inches between the imaging device and the table, which has a 350-pound limit. "Some patients could not fit into the machine, and they were truly embarrassed," said Seluta, operations manager in the Department of Radiology at Massachusetts General Hospital (MGH) in Boston.

About five years ago, the staff was thrilled when a proposal for bariatric fluoroscopy equipment designed especially to accommodate obese patients was approved by the hospital. The GE Precision RXi accommodates up to 550 pounds and has an aperture opening of 48 inches.

Despite the sizeable price tag, Seluta says the peace of mind it affords patients and staff makes the equipment worth its weight in gold, especially considering the growing number of bariatric patients at MGH.

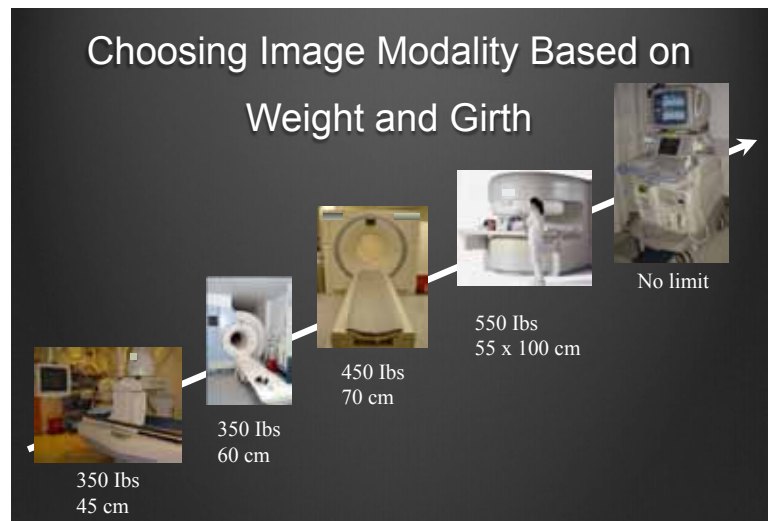
"Patients aren't even aware the machine is designed especially for the obese," she said. "We treat about two bariatric patients a day—numbers that are expected to keep rising. We are getting more than enough use out of it."

## Radiology Playing Catch-up on Obesity Epidemic

Along with the increasing popularity of bariatric surgery, the rising prevalence of obesity in the U.S. and around the world is making such specially designed equipment and other solutions more necessary in radiology departments that rarely faced such issues in the not-too-distant past.

While radiology is making inroads, the medical imaging industry is still playing catch-up on a problem that has literally become an epidemic almost overnight, said Raul N. Uppot, M.D., an assistant professor of radiology at Harvard Medical School and an interventional radiologist at MGH, who will present, "Challenges in Imaging and Performing Image-Guided Procedures in the Obese Patient," at RSNA 2012. (See sidebar) Dr. Uppot speaks regularly and has published extensively on the topic of imaging and obesity.

"The problem is definitely the most drastic in the U.S., but each time I speak on this issue, I become more aware that obesity is a global problem," said Dr. Uppot, pointing out that China and India are among the nations dealing with the issue.



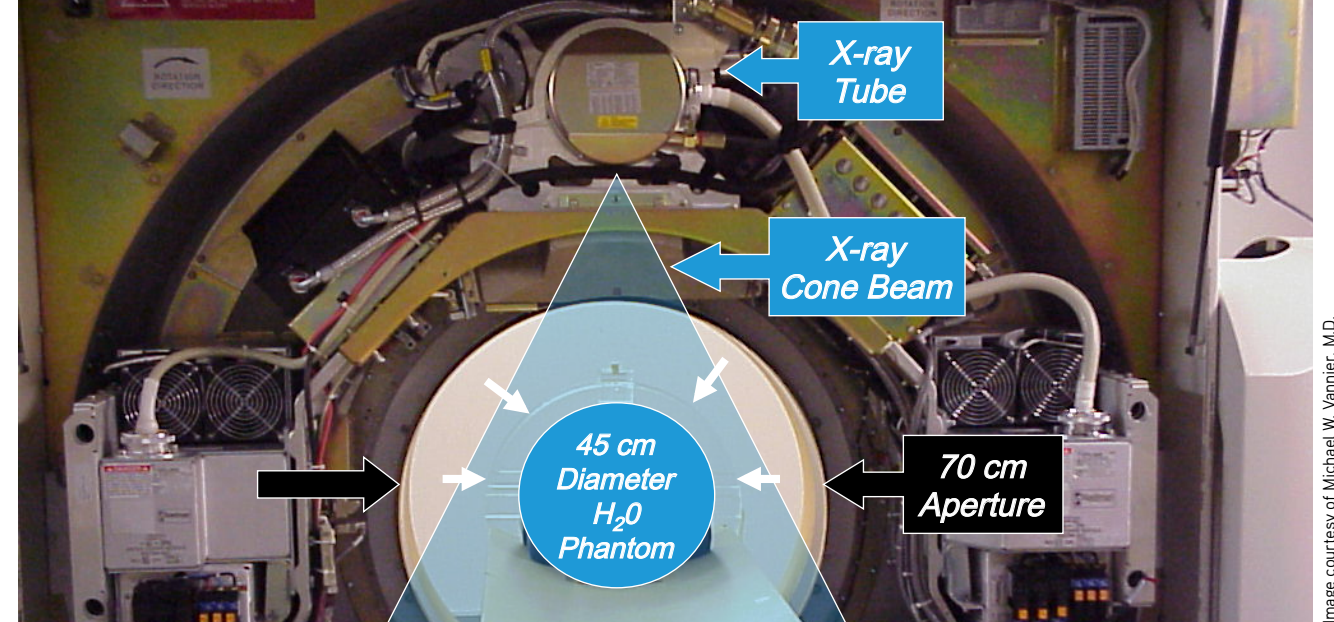
**Knowing a patient's weight and girth before scheduling an imaging examination is important since all medical imaging equipment has standard weight and bore/gantry diameter limits. "Radiologists must be cognizant of the limitations of their imaging equipment and be able to make the necessary technical and equipment adjustments to obtain quality imaging in obese patients," said Raul N. Uppot, M.D.**

Though his presentation is part of ASRT@RSNA 2012, an education program for radiologic technologists, Dr. Uppot said the talk will also be geared toward radiologists and manufacturers. Along with discussing the prevalence of obesity, Dr. Uppot will outline overall challenges in imaging obese patients, discuss the difficulties specific to each imaging modality and offer potential solutions.

"Increasingly, obesity is becoming an issue for radiologists and radiology departments," Dr. Uppot said. "Radiologists must be cognizant of the limitations of their imaging equipment and be able to make the necessary technical and equipment adjustments to obtain quality imaging in obese patients."

**"Increasingly, obesity is becoming an issue for radiologists and radiology departments."**

**Raul N. Uppot, M.D.**



Manufacturers are responding to the rise in obesity rates with advances in imaging equipment offering larger apertures and table weight limits. A larger aperture (up to 85 cm. in diameter) and increased table capacity (up to 650 lbs.) are among the features available with "big bore" CT scanners.

## Challenges are Specific to Each Imaging Modality

From patient transport and positioning issues to the financial and clinical impact resulting from cancelled imaging procedures when a patient is too large for the machine, obesity has created challenges for radiology on a number of fronts.

Even when the equipment is large enough, radiology departments are increasingly unable to adequately image and assess obese patients due to other limitations. While obesity affects each imaging modality differently, ultrasound is most directly limited by excessive fat tissue, Dr. Uppot said.

"Although ultrasound has the advantage of being performed portably and therefore is not limited by table weight or aperture diameter, it is compromised by fat attenuation, a small footprint and difficulties in patient positioning," he said.

Plain radiography and nuclear medicine are also limited by fat attenuation, while CT, MR imaging and fluoroscopy are also limited by the patient's size relative to the imaging equipment. "If a patient can fit on CT equipment, then CT is the preferred imaging modality in the obese patient," Dr. Uppot said.

While increased radiation dosage required for the overweight and obese is also an issue, researchers are working to determine acceptable dosage for those patients, Dr. Uppot said. "That is an issue that will evolve in coming years based on research," he said.

## Patient-centered Focus Could Speed Changes

While such challenges won't be addressed overnight, the medical imaging industry is making strides on a number of important fronts.

Manufacturers are responding with advances in CT and MR imaging equipment offering larger apertures and table weight limits. At the same time, technological advances including harmonics in ultrasound, dual-source CT and increased gradient strengths and matrix coils in MR imaging are poised to address the issues of limited image quality in obese patients.

*Continued on Page 8*

## IMAGING AND OBESITY, THE "OZ EFFECT" AMONG ASRT@RSNA 2012 SESSIONS

The 1½-day education program for radiologic technologists at this year's annual meeting, ASRT@RSNA 2012, will feature discussions of such wide-ranging topics as digital radiography image process and the "Oz effect"—Commercial, Social, and Government Media Driven Health Information on Medical Imaging.



Technologists may earn continuing education credit through ASRT@RSNA 2012. Sessions are:

### Wednesday, November 28

- Challenges in Imaging the Obese Patient
- Musculoskeletal Radiology: More Than Radiography Alone
- Radiation-conscious Imaging in CT of the Pediatric and Adult Patient
- The Oz Effect—Understanding and Mitigating the Impact of Commercial, Social, and Government Media Driven Health Information on Medical Imaging

### Thursday, November 29

- The Team Approach to Breast Imaging: A Model for All of Radiology
- ARRT Standard of Ethics: Overview
- The Roles and Contributions of Radiographers to Effective Gastrointestinal Medicine
- Digital Radiography Image Processing: What Every Technologist Needs to Know
- PACS as a Profession: Qualifications for Success
- A Simple Solution to a Complex Problem - How to Predict Future Health Care Workforce Staffing Levels

For more information about ASRT@RSNA 2012, go to [RSNA2012.RSNA.org](http://RSNA2012.RSNA.org)

# Radiologists Not the Drivers of High-cost Imaging

*While the data have shown that nonradiologists' self-referral contributes substantially to imaging utilization, it has been argued that radiologists also self-refer by making recommendations for additional imaging. New research, however, shows that radiologist recommendations actually account for only a small percentage of high-cost, outpatient imaging.*

IN A STUDY published in the February 2011 issue of *Radiology*, Susanna I. Lee, M.D., Ph.D., from Massachusetts General Hospital in Boston, and colleagues set out to measure the proportion of high-cost imaging generated by recommendations from radiologists. They examined a database of approximately 200,000 radiology examinations at one institution over a six-month period to find high-cost examinations that were preceded by one which contained a radiologist's recommendation.

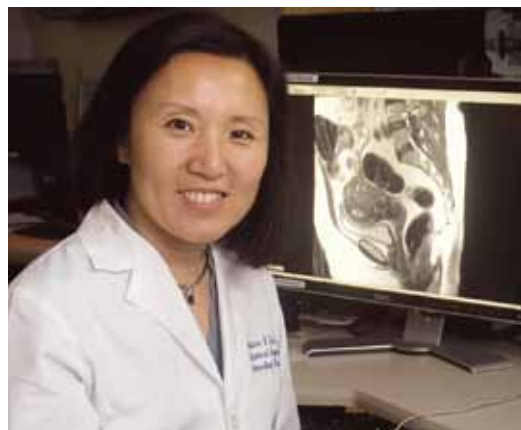
"We wanted to determine if radiologist recommendations for follow-up exam were one of the major drivers of high-cost imaging," Dr. Lee said. "Because if that were the case, we might take steps to modify their behavior and impact the volume of high-cost imaging."

However, results showed that only 1,558 of the 29,232 high-cost examinations—or about 5 percent—followed a radiologist's recommendation.

"The bottom line was that high-cost imaging studies such as CT, MR imaging and PET only accounted for 5 percent of the volume," Dr. Lee said. "This was a bit of a surprise, because preceding studies have shown a higher rate of radiologist recommendations in exam reports—closer to 15 percent to 30 percent."

One reason for the discrepancy, Dr. Lee noted, is that a radiologist's recommendation is only one of several tools used by physicians in determining how to proceed with a case. "There are many other options," she said. "The referring physician may choose to biopsy or recommend surgery, for instance."

"When people talk about self-referral, it's important to understand that there's a difference between a treating physician owning a CT scanner and referring the patient for a CT exam and a radiologist recommending an additional examination—advice that the treating physician has a choice to act upon or not," Dr. Lee continued. "Our study indicates that modifying radiologists' behavior would be unlikely to change the overall volume of high-cost imaging."



Lee



Kilani

## Financial Interest Tied to Increased Imaging Utilization

Adding more data to the debate, researchers at Duke University Medical Center in Durham, N.C., have found that physicians who have a financial interest in imaging equipment are more likely to refer their patients for potentially unnecessary imaging exams.

In research presented at RSNA 2011, Duke investigators examined differences in utilization of lumbar spine MR imaging based on the financial interest of the ordering physician.

Researchers reviewed 500 diagnostic lumbar spine MR imaging examinations ordered by two orthopedic physician groups serving the same community. One of the groups had a financial interest in the MR equipment that was used.

“The ultimate outcome of self-referral is increased utilization.”

Ramsey Kilani, M.D.

In the group that owned the equipment, 42 percent of patients referred for exams had negative scans, compared with 23 percent of the group that did not own the equipment. Orthopedic surgeons with financial interest in the equipment also were much more likely to order MR imaging exams on younger patients.

"The group that owned the equipment had a lower threshold for ordering exams," said Ramsey Kilani, M.D., an associate faculty member at Duke University Medical Center. "We don't know whether this represents a conscious or unconscious bias. Subconsciously, if you have easy access to imaging, you may be more likely to order an exam. Secondly, physicians might be a lot less likely to opt for watchful waiting if they have the imaging equipment right there."

Another Duke study that focused on knee MR imaging yielded similar results. Researchers reviewed 989 diagnostic knee MR imaging studies ordered over a six-month period by two separate orthopedic groups. Knee MR imaging studies referred by physicians with a financial interest in the imaging equipment—a statistically significant 52 percent increase in the negative scan rate over those referred by physicians with no financial incentive.

"The ultimate outcome of self-referral is increased utilization," said Dr. Kilani, who is working with other Duke researchers on similar studies of MR imaging patterns in other areas of the body. "Our study suggests that the fraction of increased imaging utilization due to self-referral is more likely to be unnecessary than non-incentivized utilization."

Radiologists like Dr. Kilani are concerned that this increased utilization due to self-referral places the patient at risk for adverse consequences while failing to yield medically useful information. However, some physician groups reject the suggestion that self-referral incentivizes imaging and have lobbied against efforts to curb the practice.

Statements from two physician groups—the American Urological Association and the American Academy of Orthopaedic Surgeons—maintain that there are benefits to self-referral, including more timely access to study findings and better patient compliance. □

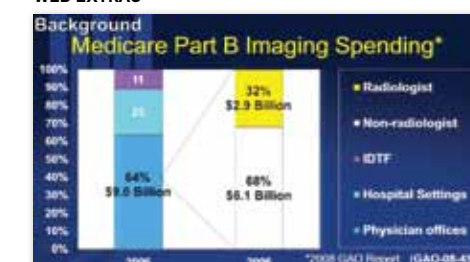
## Rising Obesity Rate Presents Imaging Obstacles

Continued from Page 6

Radiologic technologists and radiologists are also becoming better educated on the issues involved, leading to more efficient methods and protocols. While solutions are specific to each modality, some protocols apply across the board, Dr. Uppot said. He recommends knowing the patient's weight and girth, being aware of the limitations of current imaging equipment and knowing how to optimize imaging protocols and equipment settings.

As healthcare becomes more patient-focused, hospitals are more likely to invest in solutions for better accommodating this segment of the patient population. "We put in the proposal for new equipment

### WEB EXTRAS



To access the study, "When Does a Radiologist's Recommendation for Follow-up Result in High-Cost Imaging?" by Susanna I. Lee, M.D., Ph.D., go to [Radiology \(RSNA.org/Radiology\)](http://Radiology(RSNA.org/Radiology))

To watch a video presentation and hear Ramsey Kilani, M.D., and colleagues discussing their research, "A Case Study in Lumbar Spine MRI and Physician Self-referral of Imaging," (see slide, left) at RSNA 2011, go to [rsnanews.RSNA.org](http://rsnanews.RSNA.org).

## IMAGING BY NONRADIOLOGISTS GROWS DRAMATICALLY

Recent statistics show an increase in imaging among physicians who self-refer:

- Medicare PET scans performed on equipment owned or leased by nonradiologists grew 737 percent between 2002 and 2007, according to researchers at the Jefferson Medical College and Thomas Jefferson University Hospital in Philadelphia.
- Medicare payments to nonradiologists for noninvasive medical imaging recently surpassed those received by radiologists, according to studies at the same institutions.
- The proportion of nonradiologists billing for in-office imaging more than doubled from 2000 to 2006, according to the U.S. Government Accountability Office (USGAO).
- During that same time period, private office imaging utilization rates by nonradiologists that control patient referral grew by 71 percent, according to the USGAO.

three times before it was approved," Seluta said. "It's incredibly important because no patient should have to go through a potentially embarrassing experience." □

### WEB EXTRAS

To access an abstract of the studies, "Effect of Obesity on Image Quality: Fifteen-year Longitudinal Study for Evaluation of Dictated Radiology Reports," by Raul N. Uppot, M.D., and colleagues, and "Increased Radiation Dose to Overweight and Obese Patients from Radiographic Examinations," by Jacquelyn C. Yanch, Ph.D., and colleagues, in *Radiology*, go to [RSNA.org/radiology](http://RSNA.org/radiology).

# Iterative Reconstruction Techniques Reduce Radiation Dose in Head, Chest CT

Techniques of iterative reconstruction of CT images, such as adaptive statistical iterative reconstruction (ASIR) and the more advanced model-based iterative reconstruction (MBIR) algorithms, reduce radiation dose while preserving image quality in head and chest CT, according to new research.

COMPARING effective radiation dose and dose to the eye lens in multidetector CT (MDCT) brain examinations, lead researcher Jan Zizka, M.D., a professor of radiology at Charles University Teaching Hospital, Hradec Kralove, Czech Republic, and colleagues utilized either filtered-back projection (FBP) or iterative reconstruction in image space (IRIS). The research was presented at the European Congress of Radiology (ECR) 2012 in Vienna, Austria.

Researchers examined 400 routine adult brain CT examinations—200 performed using standard FBP and 200 using IRIS. Doses were calculated from CT dose index (CTDIvol, mGy) and dose length product (DLP, mGy.cm) values; the organ dose to the lens was derived from the actual tube current-time product value applied to the lens, according to Dr. Zizka.

Results showed that consistent application of as low as reasonably achievable (ALARA) principles, combined with iterative reconstruction, reduced the effective radiation dose as well as the risk of radiation-induced cataract in MDCT scans of the head without loss of image quality by at least 30 percent compared to FBP, and by at least 50 percent compared to reference standards of both the European Commission Quality Criteria and the International Commission on Radiological Protection (ICRP).

Based on the latest epidemiological studies on the threshold for absorbed dose to the lens of the eye, ICRP in 2011 issued a warning reducing the allowable dose from 2 Gy to 0.5 Gy, Dr. Zizka said. Using FBP, the dose to the lens could reach that level in as few as seven non-optimized CT head scans provided the lens is exposed to the primary beam, significantly increasing the risk for cataracts in a large population of subjects undergoing head CT, Dr. Zizka said.

By contrast, “with acquisitions using iterative reconstruction algorithms, patients can undergo as many as 20 MDCT head scans before the risk for cataracts becomes significant,” Dr. Zizka said.



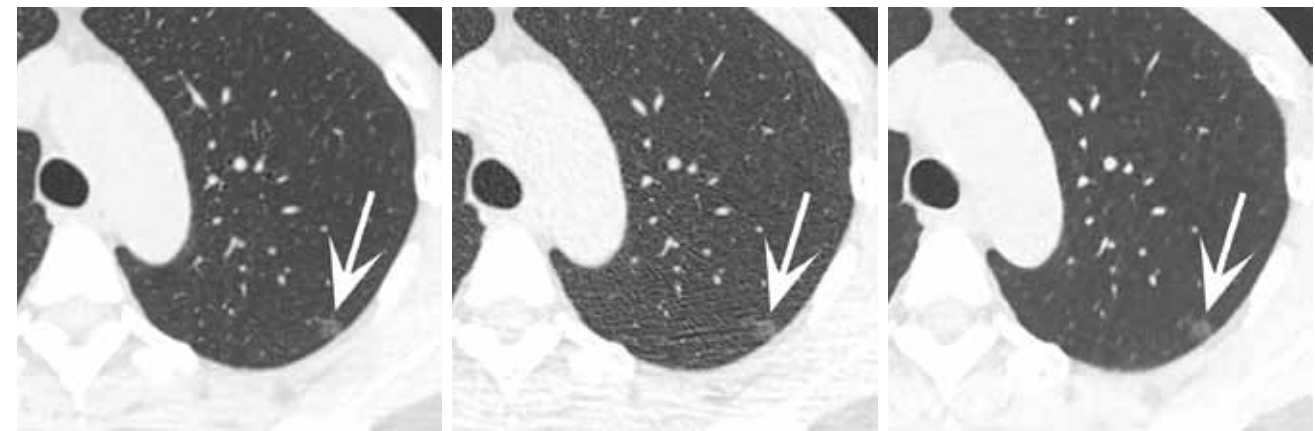
Zizka



Katsura

“With acquisitions using iterative reconstruction algorithms, patients can undergo as many as 20 MDCT head scans before the risk for cataracts becomes significant.”

Jan Zizka, M.D.



Research by Masaki Katsura, M.D., evaluated CT radiation dose and image quality in the same patients using both adaptive statistical iterative reconstruction (ASIR) and model-based iterative reconstruction (MBIR). (Left) Reference-dose CT images [dose-length product (DLP), 191.10 mGy/cm] reconstructed with ASIR, (center) low-dose CT images (DLP, 38.45 mGy/cm) reconstructed with ASIR, and (right) low-dose CT images reconstructed with MBIR in a 58-year-old woman (weight, 50 kg).

Images reproduced from: Masaki Katsura, Izuru Matsuda, Masaaki Akahane, et al (2012) Model-based Iterative Reconstruction Technique for Radiation Dose Reduction in Chest CT: Comparison with the Adaptive Statistical Iterative Reconstruction Technique. *Eur Radiol* DOI: 10.1007/s00330-012-2452-z.

## MBIR Shows Greater Potential than ASIR

While phantom experiments have shown that MBIR has the potential to reduce radiation dose without compromising image quality, a second study presented at ECR 2012 is among the first to evaluate CT radiation dose reduction and image quality characteristics in the same patients using both ASIR and MBIR, said lead author Masaki Katsura, M.D., of the Department of Radiology, Graduate School of Medicine at The University of Tokyo.

Researchers examined 100 patients who underwent reference-dose and low-dose unenhanced chest CT with 64-row multidetector CT (MDCT), according to Dr. Katsura. Images were reconstructed with 50 percent ASIR-FBP blending (ASIR50) for reference-dose CT and with ASIR50 and MBIR for low-dose CT. Objective image noise was measured in the lung parenchyma, Dr. Katsura said.

Results showed that “MBIR significantly improved image noise and artifacts over ASIR,” Dr. Katsura said. “With nearly 80 percent less radiation, diagnostically acceptable chest CT images were obtained using MBIR, which also showed improvement over ASIR for providing diagnostically acceptable low-dose CT images without severely compromising image quality.”

“Our results indicate that, in order to preserve diagnostic quality in chest CT acquired with nearly 80 percent less radiation, a pure iterative reconstruction technique such as MBIR should be used for image reconstruction as opposed to a reconstruction technique that uses a blend of FBP images with iteratively reconstructed images, such as ASIR,” Dr. Katsura said.

“We believe this prospective study is important because these two different reconstruction techniques were directly compared,” Dr. Katsura said.

## MBIR Holds Promise for Dose Reduction in Children

MBIR holds considerable potential for dose reduction, particularly in certain patients and settings, such as imaging of infants and young children and screening for lung cancer, Dr. Katsura said.

Although the prolonged processing time of MBIR (about one hour per case) may currently limit its routine use in clinical practice, the technique holds great promise for the future, he said.

“The ability of MBIR to detect and localize lesions, not only in the chest but in different body regions, is still to be investigated,” Dr. Katsura added. □

## WEB EXTRAS

☑ To access the European Congress of Radiology presentation “Reduction of Effective and Organ Dose to the Eye Lens in Cerebral MDCT Scans Using Iterative Image Reconstruction,” by Jan Zizka, M.D., go to [rsnanews.RSNA.org](http://rsnanews.RSNA.org).

☑ To access the 2012 study, “Model-based Iterative Reconstruction Technique for Radiation Dose Reduction in Chest CT: Comparison with the Adaptive Statistical Iterative Reconstruction Technique,” by Masaki Katsura, M.D., in the online version of *European Radiology*, go to [www.springerlink.com/openurl.asp?genre=article&id=d](http://www.springerlink.com/openurl.asp?genre=article&id=doi:10.1007/s00330-012-2452-z)

# Ablative Therapies are Promising Weapon in Fighting Cancer

*Irreversible electroporation (IRE) and microwave ablation are among the newest ablative therapies showing promise as targeted treatments for complicated and inoperable forms of cancer, including pancreas and lung.*

IRE HAS BEEN SUCCESSFUL in treating primary and metastatic liver cancer and is now in the first stages of treatment for pancreatic cancer, said Govindarajan Narayanan, M.D., an associate professor of clinical radiology at the University of Miami, Miller School of Medicine.

"The potential effectiveness of IRE in treating pancreatic cancer is exciting," said Dr. Narayanan, who has worked extensively with IRE and presented an RSNA 2011 Hot Topic session on the subject. "No other ablative modality is able to go into that organ without a high level of mortality and morbidity."

Unlike thermal ablative techniques, IRE doesn't damage the collagen skeleton protecting blood vessels, which means it could be particularly useful in treating cancer in organs close to major blood vessels. IRE uses an electric current, instead of heat or freezing, to permanently open cell membrane pores in the tumor. Once the cell membrane pores are opened, the tumor cells begin to die.

"Using heat to treat tumors creates 'heat sink,'" Dr. Narayanan said. "If a tumor is close to a blood vessel, the part closest to the vessel will not be completely treated because the flowing blood in the vessel will steal some of the heat. You don't get that with IRE."

The procedure is performed by placing electrodes, with CT or ultrasound guidance, in pairs around the tumor. The electrical pulses are delivered through each pair of electrodes—as few as two or as many as six, depending on the size of the tumor—in sequence. Each pair of electrodes needs 90 pulses to be effective and each treatment should last about 90 seconds, Dr. Narayanan said.

## Potential for IRE Hinges on Research

The potential for using IRE in clinical practice will depend on continued research and overcoming reimbursement obstacles, Dr. Narayanan said.

The NanoKnife® System by AngioDynamics, the first medical technology to use IRE, received U.S. Food and Drug Administration (FDA) clearance in 2006. Currently, fewer than 30 U.S. hospitals offer IRE as a treatment option. In his practice, Dr. Narayanan and his colleagues have performed procedures on 20 pancreatic cancer patients with few side effects.



Narayanan

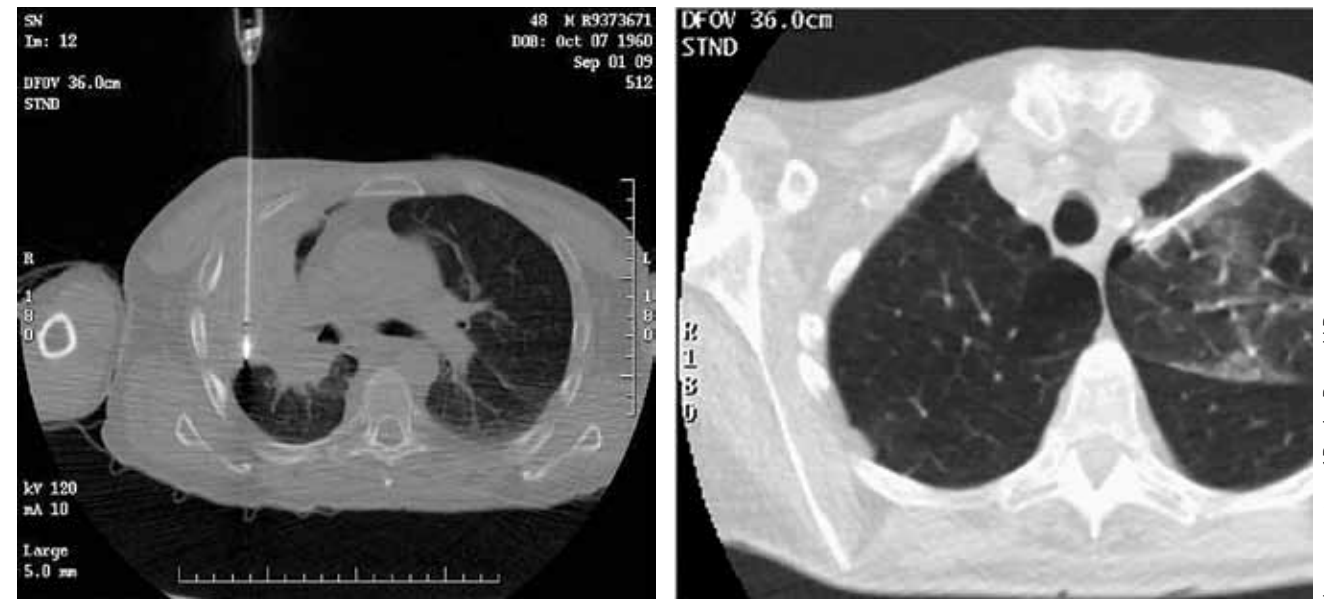


Dupuy

"We need more data and experience with IRE, but I think it will be a good complement to a busy interventional oncology practice," Dr. Narayanan said. "IRE can serve as a niche application when you have to go next to the aorta or near critical structures, and moving forward it has the potential to be a big player in the pancreatic cancer arena."

"The combination of hotter temperatures and the ability to penetrate air make microwave ablation more suitable than radiofrequency for treating lung tumors."

**Damian Dupuy, M.D.**



When treating lung cancer, microwave ablation could eventually replace radiofrequency ablation (RFA) as the thermal ablative treatment of choice, said researcher Damian Dupuy, M.D. *Left:* an axial CT fluoroscopy image shows a microwave antenna within a large, right upper-lobe lung cancer. This 48-year-old patient had been treated with radiation and chemotherapy, but the tumor recurred causing chest wall pain from tumor growth. Microwave ablation was successful in pain palliation; *right:* a CT fluoroscopy image of a single microwave antenna within an early stage left, upper-lobe lung cancer.

Images courtesy of Damian Dupuy, M.D.

## Microwave Ablation Targets Tumors with Heat

When treating lung cancer, microwave ablation could eventually replace radiofrequency ablation (RFA) as the thermal ablative treatment of choice, said Damian Dupuy, M.D., a professor of diagnostic imaging in the Division of Biology and Medicine at Brown University, Providence, R.I., who has published extensively about microwave ablation, most recently in the January 2012 issue of *Radiology*.

Because many lung cancer patients are long-time smokers who have also developed emphysema or cardiovascular disease, they are often unsuitable candidates for lobectomy, Dr. Dupuy said. While researchers discovered that therapies such RFA were useful in controlling early stage lung cancers, they soon found that microwave ablation held a significant advantage over RFA due to its heating properties, he said.

"A lung tumor is basically soft tissue, but it is surrounded by air in the lung that acts as an insulator to electrical current," Dr. Dupuy said. "With radiofrequency ablation, it is difficult for that current to penetrate far enough into the lung to create a margin. In fact the local recurrence rate is about 25 percent using radiofrequency."

Microwave ablation, on the other hand, involves broadcasting an electromagnetic wave that penetrates the tissue as well as the air surrounding the tumor, generating higher temperatures, Dr. Dupuy said. "The combination of hotter temperatures and the ability to penetrate air make microwave ablation more suitable than radiofrequency for treating lung tumors," he added.

## More Hospitals Moving Toward Microwave Ablation

A handful of microwave ablation manufacturers have received FDA approval, most within the last year and a half, Dr. Dupuy said. While he estimates that about three dozen facilities are now using microwave ablation and many more will be migrating in that direction, financial factors, including reimbursement, preclude widespread use in the near future. The focus now is on further researching the technology, Dr. Dupuy said.

"It is clear that patients who have lung cancer with limited treatment options are benefiting from image-guided ablation therapy, though the exact subset of patients who will benefit most and with what ablating technology remains unknown," Dr. Dupuy said. "Therefore, additional research must be conducted." □

## WEB EXTRAS

To access the study, "Intraoperative Microwave Ablation of Pulmonary Malignancies with Tumor Permittivity Feedback Control: Ablation and Resection Study in 10 Consecutive Patients," by Damian Dupuy, M.D., and colleagues in the January 2012 issue of *Radiology*, go to [RSNA.org/radiology](http://RSNA.org/radiology).



# Radiology ExamWeb™ Offers High-tech Radiology Testing Alternative

As a medical student, Matthew DeVries, M.D., faced a fairly typical final examination after completing his radiology rotations: a huge stack of paper filled with photocopies of photocopies of images.



WHEN he became radiology residency program director at the University of Nebraska Medical Center (UNMC) College of Medicine in Omaha, Dr. DeVries was fortunate to discover what he considers a better option for his students: Radiology ExamWeb™—a centralized, web-based quiz database and exam-taking system. After seeing Radiology ExamWeb demonstrated at the Association of University Radiologists (AUR) 2010 annual meeting, Dr. DeVries knew it would serve him well in his new position at UNMC and make a strong impression on his students.

“With iPhones and iPads, the med student of today is tech-savvy and wants technology integrated into the curriculum,” said Dr. DeVries, also an assistant professor of radiology at UNMC. “Programs grounded in technology get automatic street cred because they are in tune with how students study today.”

“Radiology ExamWeb has been a tremendous help in our department’s effort to train medical students,” Dr. DeVries added. “Having a highly structured, well-conceived test for our radiology rotation that is secure and can be easily proctored is a highly effective tool.”

That was the goal of Petra Lewis, M.D., who developed Radiology ExamWeb with her colleague Nancy McNulty, M.D., in part through a \$30,000 RSNA Education Seed Grant awarded in 2009. As a longtime member and former president of the Alliance of Medical Student Educators in Radiology (AMSER), Dr. Lewis was keenly aware of the time pressures on medical student educators like Dr. DeVries.

“Radiology clerkships and electives are highly variable among medical schools, and developing fair and comprehensive tests is both time-consuming and difficult,” said Dr. Lewis, a professor of radiology and obstetrics/gynecology at The Geisel School of Medicine at Dartmouth in Hanover, N.H. “Our database allows clerkship directors to contribute questions to a central bank which are then edited to improve their psychometric quality and then use this bank of questions to create exams, or use pre-existing exams from the database.”



DeVries



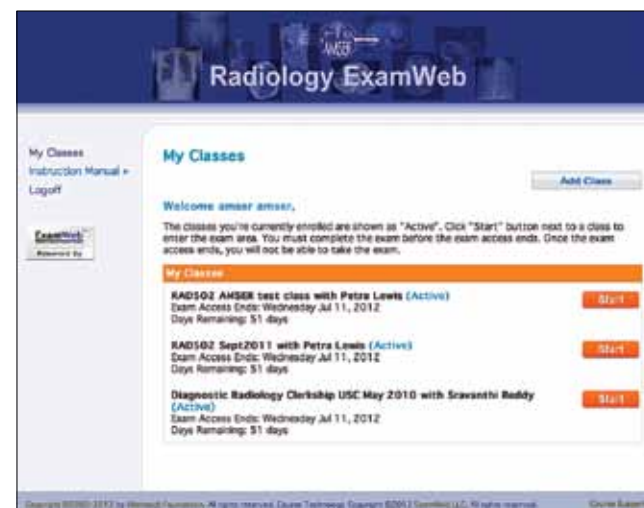
Lewis

## Radiology ExamWeb Evolves from AMSER Shared Resources

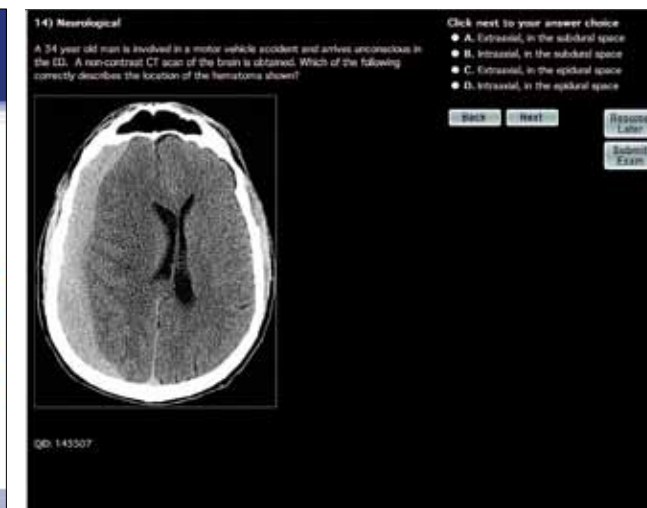
Radiology ExamWeb is a natural evolution of AMSER Shared Resources, which shares curricula, images and other teaching materials among members through a secure computer server, Dr. Lewis said. “AMSER promotes shared resources because we all have little dedicated time for the classroom,” she said.

“Having a highly structured, well-conceived test for our radiology rotation that is secure and can be easily proctored is a highly effective tool.”

**Matthew DeVries, M.D.**



Radiology ExamWeb ([Radiology.examweb.com](http://Radiology.examweb.com)), a web-based quiz database and examination-taking system developed by Petra Lewis, M.D., and Nancy McNulty, M.D., provides medical student educators with the means to evaluate their students in a systematic way. *Left:* Students can track courses on the My Classes Web page; *right:* An image from the database of examination questions.



With a total of \$45,000 awarded by the Hudson Foundation, Drs. Lewis and McNulty contracted with an experienced vendor, ExamWeb LLC, to develop the online testing software. With the RSNA grant funding and help from AMSER members, they completed Radiology ExamWeb by compiling and editing questions to National Board of Medical Examiners standard accepted format, creating a user manual and hosting workshops for radiology educators.

“AMSER members submitted an initial 800 exam questions and served as volunteer editors,” Dr. Lewis said.

Radiology ExamWeb hosts separate sites for students and educators. Radiology educators can combine questions to create their own examinations or use one of 200 examinations already created by other educators. Students use password access to take online examinations from any computer, and educators can analyze test results by student, class or examination.

The newest addition to Radiology ExamWeb is a much-needed standardized examination developed by the AMSER Electronics Committee, featuring 120 questions based on the AMSER radiology curriculum developed in 2005. “Third-year medical students know that at the end of various rotations such as surgery, internal medicine and OB/GYN, there will be an examination with results that allow them to compare themselves nationally,” Dr. DeVries said. “Having a radiology shelf examination will be a tremendous start to getting national standardized data for radiology.”

## Educators Laud High-quality Questions

Because radiology clerkships and electives vary widely among medical institutions, there is also significant variation in the level of expertise in writing questions—an issue effectively addressed by Radiology ExamWeb, Dr. DeVries said.

*Continued on Page 16*

## GRANTS IN ACTION

### NAME:

Petra Lewis, M.D.

### GRANT RECEIVED:

2009 RSNA Education Seed Grant

### STUDY:

“Development and Implementation of a National Web-based Examination System for Medical Studies in Radiology”

## CAREER IMPACT:

In a few short years, Radiology ExamWeb has expanded quickly within radiology, with help from promotional efforts via AMSER and AUR. Dr. Lewis, who was recently promoted to full professor at Dartmouth, says the national recognition resulting from this grant and the expansion of Radiology ExamWeb contributed significantly to the promotion.

## CLINICAL IMPLICATIONS:

Radiology ExamWeb has provided medical student educators in radiology with the means to evaluate their students in a systematic way, using a nationally edited, regularly reviewed web-based process.

For more information on all R&E Foundation grant programs, go to [RSNA.org/Foundation](http://RSNA.org/Foundation) or contact Scott Walter, M.S., Assistant Director, Grant Administration at 1-630-571-7816 or [swalter@rsna.org](mailto:swalter@rsna.org).

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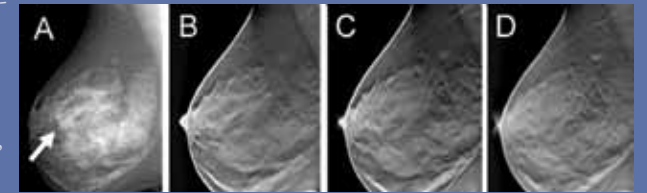


Building on two previous RSNA R&E Foundation research grant projects, **Despina Kontos, Ph.D.**, of the University of Pennsylvania in Philadelphia, has been awarded a four-year, National Institutes of Health (NIH) Research Project R01 Grant of \$1,052,440 for the study, "Effect of Breast Density on Screening Recall with Digital Breast Tomosynthesis."

Early studies suggest up to a 40 percent reduction in false positive recalls when digital breast tomosynthesis (DBT) is incorporated into the screening setting. Because the potential benefit of DBT must be carefully weighed against the modality's potentially higher radiation dose, identifying the subset of women who would benefit most from DBT imaging is critical. In her research, Dr. Kontos and colleagues will address this concern by comparing the effect of breast density and overall breast parenchymal complexity on the recall decision in breast cancer screening with digital mammography versus DBT. Researchers plan to develop a breast complexity index (BCI) for characterizing breast parenchymal tissue complexity, which could be used as a surrogate imaging marker to identify women with increased breast tissue complexity who may benefit most from DBT screening.

"If our hypothesis proves to be true, DBT could replace or complement digital mammography for the screening of women with dense and/or texturally complex breasts, and ultimately reduce unnecessary recalls and additional diagnostic imaging procedures," Dr. Kontos said.

The R&E Foundation thanks Agfa HealthCare and Siemens Healthcare for their support of Dr. Kontos' pioneering research that led to this NIH study.



An example of a mammogram (A) showing subareolar focal asymmetry. The reconstructed tomosynthesis slices "in-focus" in the area of concern (B-D) show no suspicious lesion, which was due to superimposed normal tissue in a texturally complex breast.

## Radiology ExamWeb™ Offers High-tech Radiology Testing Alternative

Continued from Page 14

"Historically, we haven't had the tools to construct a test with high-quality questions that reflected the full breadth of material we wanted students to know," Dr. DeVries said. "The fact that radiology is driven more and more by clinical production means academic time is harder to come by, which only compounds the problem."

Maria Shiao, M.D., director of medical student education radiology at New York University (NYU), agrees. "Radiology ExamWeb is a great resource, it is easy to administer and is the type of test that students like," she said.

Approximately 90 percent of the students enrolled in NYU's radiology "selective"—a hybrid between a clerkship and an elective—are bound for other medical specialties, leaving a small window of opportunity for radiology instruction, Dr. Shiao said. "The more students understand the basics of radiology, the better off they are," she said. "Radiology ExamWeb is one tool that really helps."

In addition to pre-and post-tests for the selective, Dr. Shiao has recently administered the AMSER-certified standard exam through Radiology ExamWeb.

### Radiology ExamWeb Off to Promising Start

Dr. Lewis' project has expanded quickly in a few short years. To date, Radiology ExamWeb has about 1,500 questions covering all imaging modalities and body systems, and some 2,300 medical students have taken online exams at 65 institutions including Michigan State University, the University of Chicago and NYU School of Medicine.

With the grant funds being depleted, Dr. Lewis is seeking additional funding to support the program.

"Radiology ExamWeb is huge benefit to radiology," Dr. Lewis said. "It's not simply, 'here is a test to use.' It's about facilitating the continued integration of radiology into the medical school curriculum." □

### WEB EXTRAS

For more information on Radiology ExamWeb ([Radiology.examweb.com](http://Radiology.examweb.com)) and to create an account, please contact Petra Lewis M.D., at [petra.lewis@hitchcock.org](mailto:petra.lewis@hitchcock.org).

## GRANT FUNDING FOR 2012 TOTALS \$2.9 MILLION

The R&E Foundation Board of Trustees, chaired by **Theresa C. McLoud, M.D.**, has approved \$2.9 million in funding—highest in the Foundation's history—for grant projects in 2012. "I would personally like to thank all of our generous contributors who made this possible.

With intense competition for grants we are pleased to achieve a 30 percent funding rate this year," Dr. McLoud said. "I am certain the research and education projects undertaken by our awardees will benefit our specialty and, most importantly, will make a significant difference in the lives and health of the patients we serve."

Maximizing the generous support of RSNA members, friends, private practice groups and corporate supporters, more than 85 percent of Foundation expenses go directly toward funding research and education grants. Since its inception in 1984, the Foundation has awarded \$37 million to nearly 1,000 young investigators. Surveys show that for every \$1 granted by the Foundation, recipients have received over 30 additional dollars in subsequent funding from other sources.



## Journal Highlights

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

### New Treatments and Imaging Strategies in Degenerative Disease of the Intervertebral Disks

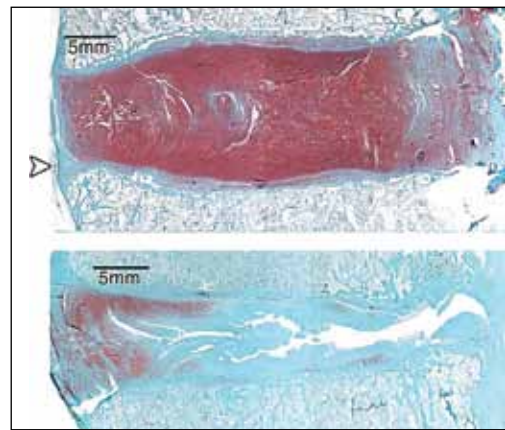
While MR imaging provides exquisite anatomic detail of spinal tissues that aids in surgical planning, conventional anatomic MR images do not help distinguish effectively between painful and nonpainful degenerating disks except in cases with nerve root compression, disk extrusion or central stenosis. More effective treatments for disk degeneration are under development to meet a rising clinical need.

**Radiology**

In the July issue of *Radiology* ([RSNA.org/Radiology](http://RSNA.org/Radiology)), Jeffrey C. Lotz, Ph.D., of the University of California, San Francisco, and colleagues summarize the biochemical processes in disk degeneration, the application of advanced disk imaging techniques and the novel biologic therapies that have the most clinical promise. Specifically, the authors discuss:

- T2 mapping
- T1ρ time constant
- Diffusion Imaging
- MR spectroscopy
- PET

"The imaging techniques that sensitively monitor biochemical and inflammatory processes have application in clinical trials of innovative therapies and ultimately in the selection of patients for treatment," the authors write.



Sagittally oriented safranin-O-stained sections of an adult human lumbar intervertebral disk (*top*) and a degenerated intervertebral disk (*bottom*). The disk matrix stains purple and collagen blue. In the adult disk, the peripheral annulus fibrosus, containing collagen, stains blue (*arrowhead*). The inner annulus fibrosus and nucleus pulposus, containing glycosaminoglycan (GAGs), stains purple. The central portion of the nucleus pulposus, where reticulin, collagen and elastin fibers are located, stains faintly blue. The degenerated disk has lost purple-staining GAGs from the nucleus pulposus and annulus fibrosus. Since the degenerated disk has lost height, it conforms to Pfirrmann grade III degeneration.

(*Radiology* 2012;264:1:6-19) ©RSNA, 2012. All rights reserved. Printed with permission.

### Radiofrequency Ablation of Lung Tumors: Imaging Features of the Postablation Zone

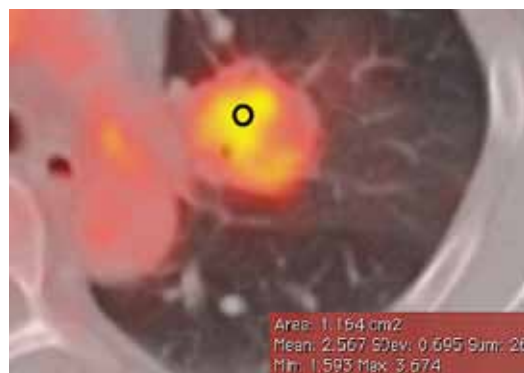
Although preliminary results are suggestive of a survival benefit when radiofrequency ablation (RFA) is used to treat pulmonary malignancies, local progression rates are appreciable. Because a patient can undergo repeat treatment if recurrence is detected early, reliable post-RFA imaging follow-up is critical.

In an article in the July-August issue of *RadioGraphics* ([RSNA.org/RadioGraphics](http://RSNA.org/RadioGraphics)), Fereidoun G. Abtin, M.D., of University of California, Los Angeles, Medical Center, and colleagues discuss the modalities and protocol for post-RFA imaging surveillance, the typical imaging features of the post-RFA ablation zone and the imaging features suggestive of partial ablation or tumor recurrence. Specifically the authors describe:

**RadioGraphics**

- An algorithm for post-RFA imaging surveillance
- CT appearance, size and enhancement and PET metabolic activity of the ablation zone
- CT, PET and PET/CT imaging features suggestive of partial ablation or tumor recurrence and progression

"Contrast-enhanced CT, PET, and PET/CT should be used in conjunction as routine follow-up or as problem-solving modalities, especially when CT findings are equivocal," the authors write. "Biopsy should be performed if imaging findings are not definitive. In all cases, diligent and rigorous patient follow-up is required and should be performed."



Fused PET/CT images of a left suprahililar non-small cell lung carcinoma in a 68-year-old woman. The image obtained after ablation shows a drop in SUV centrally, but there is an area of high SUV measuring 1.6 at the medial periphery—a finding that is suggestive of residual tumor and inadequate ablation.

(*RadioGraphics* 2012;32: 947-969) ©RSNA, 2012. All rights reserved. Printed with permission.

This article meets the criteria for AMA PRA Category 1 Credit™. CME is available in print and online.

## Radiology in Public Focus

Press releases were sent to the medical news media for the following articles appearing in recent issues of *Radiology*.

### Evaluation of Abdominal Aortic Aneurysm after Endovascular Repair: Prospective Validation of Contrast-enhanced US with a Second-Generation US Contrast Agent

CONTRAST-ENHANCED ULTRASONOGRAPHY yields good sensitivity, specificity and accuracy in endoleak detection and might be used as noninvasive tool in the follow-up of patients who undergo endovascular repair of abdominal aortic aneurysms (EVAR).

Rosa Gilabert, M.D., Ph.D., of the University of Barcelona, Spain, and colleagues prospectively assessed the accuracy of contrast agent-enhanced ultrasonography with a second generation ultrasound contrast agent in the detection and classification of endoleaks after EVAR compared with CT angiography (CTA).

Researchers evaluated the technique in 35 patients who underwent EVAR. CTA

and contrast-enhanced ultrasound studies were performed on patients at one- and six-month follow-ups and yearly thereafter. A total of 126 CTA and contrast-enhanced ultrasound studies were performed.

Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of contrast-enhanced ultrasound in endoleak detection were 97 percent, 100 percent, 100 percent, 98 percent and 99 percent respectively when compared with CTA, results showed. Contrast-enhanced ultrasound could replace CTA in the follow-up of patients with stable or decreasing aneurysm sac size and no evidence of endoleak at CTA, researchers concluded.



Endovascular repair of abdominal aortic aneurysms (EVAR) type IA endoleak in a 51-year-old man. Transverse contrast-enhanced ultrasonography image. Subtle intrasac enhancement located in the anterior and proximal parts of the sac (*arrow*) is seen and a diagnosis of type II mesenteric endoleak was made.

(*Radiology* 2012;264:1:269-277) ©RSNA, 2012. All rights reserved. Printed with permission.

### Pediatric Abdominal Pain: Use of Imaging in the Emergency Department in the United States from 1999 to 2007

USE OF CT in pediatric patients with abdominal pain increased in U.S. emergency departments (EDs) between 1999 and 2007 despite a stable incidence of appendicitis and severity of disease.

Anastasia L. Hryhorczuk, M.D., of Children's Hospital Boston, and colleagues examined data from the National Hospital Ambulatory Medical Care Survey between 1999 and 2007 when 16,900,000 pediatric visits were made for acute abdominal pain in U.S. EDs.

The odds of a child receiving a CT scan increased during each year of the study period, even though there were no statistically significant changes in ultrasound usage, numbers of patients admitted to the hospital, or numbers of patients with acute appendicitis. Only 3 percent of patients ultimately diagnosed with appendicitis were imaged with both ultrasound and CT. CT use in pediatric patients with abdominal pain was higher in adult-focused EDs than in pediatric-focused

units; the adjusted odds ratio of undergoing CT was 0.72 for patients seen in a pediatric setting versus those seen in an adult unit, researchers concluded. Factors affecting CT use include sex, race, age, insurance status and geographic region.

### Locally Advanced Breast Cancer: MR Imaging for Prediction of Response to Neoadjuvant Chemotherapy—Results from ACRIN 6657/I-SPY TRIAL

MR IMAGING findings are a stronger predictor of pathologic response to neoadjuvant chemotherapy (NACT) than clinical assessment in patients with stage II or III breast cancer, with volumetric measurement of tumor response early in treatment showing the greatest advantage.

Nola M. Hylton, Ph.D., of the University of California, San Francisco, and colleagues analyzed data from ACRIN 6657, the imaging component of the multicenter Investigation of Serial Studies to Predict

Your Therapeutic Response with Imaging And moLecular Analysis (I-SPY TRIAL) breast cancer trial. They compared MR imaging and clinical assessment in 216 female patients ranging from 26 to 68 years of age undergoing NACT for stage II or III breast cancer.

For prediction of both pathologic complete response (pCR) and residual cancer burden (RCB), MR imaging size measurements were superior to clinical examination at all time points, with tumor

volume change showing the greatest relative benefit at the second MR imaging examination, researchers concluded. Area under the receiver operating characteristic curve (AUC) differences between MR imaging volume and clinical size predictors at early, mid- and post-treatment time points, respectively, were 0.14, 0.09 and 0.02 for prediction of pCR and 0.09, 0.07 and 0.05 for prediction of RCB.

*Continued on Next Page*

## Radiology in Public Focus

Continued from page 18

### Media Coverage of RSNA

In April, media outlets carried 274 RSNA-related news stories. These stories reached an estimated 165 million people.

Print and broadcast coverage included *The Wall Street Journal*, *Los Angeles Times*, *The Washington Post*, *South Florida Sun-Sentinel*, KCAL-TV (Los Angeles), WCAU-TV (Philadelphia), KONG-TV (Seattle), WUSA-TV (Washington, D.C.), WKRC-TV (Cincinnati) and WPRI-TV (Providence). Online coverage included *CNN.com*, Yahoo! News, *The Wall Street Journal*, *Los Angeles Times* and *NPR.org*.

### Education and Funding Opportunities

## RSNA/AUR/ARRS Introduction to Academic Radiology Program

Applications due  
July 15

Sponsored by RSNA, the American Roentgen Ray Society (ARRS) and Association of University Radiologists (AUR), the Introduction to Academic Radiology program:

- Exposes second-year residents to academic radiology
- Demonstrates the importance of research in diagnostic radiology
- Illustrates the excitement of research careers
- Introduces residents to successful clinical radiology researchers.

Successful applicants will be assigned to either a seminar held during the RSNA Scientific Assembly in Chicago, November 25-29, 2012 or the ARRS Scientific Meeting in Washington, DC, April 14-19, 2013.

More information and nomination forms are available at [RSNA.org/Introduction\\_to\\_Academic\\_Radiology.aspx](http://RSNA.org/Introduction_to_Academic_Radiology.aspx). Questions can be directed to Fiona Miller at 1-630-590-7741 or [fmiller@rsna.org](mailto:fmiller@rsna.org).

## Final Call to Apply for RSNA Derek Harwood-Nash International Fellowship

Applications due  
July 1

INTERNATIONAL radiologists three to 10 years beyond training are invited to apply for this six- to 12-week fellowship at a North American institution. One or two fellows will be selected.

The application for this program is available at [RSNA.org/Derek\\_Harwood-Nash\\_International\\_Fellowship.aspx](http://RSNA.org/Derek_Harwood-Nash_International_Fellowship.aspx). For more information, contact Fiona Miller at [fmiller@rsna.org](mailto:fmiller@rsna.org) or 1-630-590-7741.



### JULY OUTREACH ACTIVITIES FOCUS ON IMAGING CHILDREN

In July, RSNA's 60-Second Checkup radio program focuses on imaging pediatric patients, including alternatives to CT scanning.

### Medical Meetings

#### July-September 2012

**JULY 11-14**  
Canadian College of Physicists in Medicine (CCPM), Annual Symposium, Westin Nova Scotian, Halifax, Nova Scotia, Canada  
• [www.ccpm.ca](http://www.ccpm.ca)

**JULY 12-13**  
Association of Educators in Imaging and Radiologic Sciences (AEIRS), Annual Meeting, Chateau Bourbon, New Orleans  
• [www.aeirs.org](http://www.aeirs.org)

**JULY 19-22**  
Society of Cardiovascular Computed Tomography (SCCT), SCCT2012 - 7th Annual Scientific Meeting, Baltimore Marriott Waterfront  
• [www.scct.org](http://www.scct.org)

**JULY 29-AUGUST 2**  
The American Association of Physicists in Medicine (AAPM), 54th Annual Meeting, Charlotte Convention Center, N.C.  
• [www.aapm.org/meetings/2012AM](http://www.aapm.org/meetings/2012AM)

**AUGUST 12-15**  
The Association for Medical Imaging Management (AHRA), 40th Annual Meeting and Exposition, Gaylord Palms, Orlando, Fla.  
• [www.ahraonline.org](http://www.ahraonline.org)

**AUGUST 30 - SEPTEMBER 2**  
Asian Oceanian Society of Radiology (AOCR), 14th Congress and 63rd Royal Australian and New Zealand College of Radiologists (RANZCR) Annual Scientific Meeting, Sydney Convention and Exhibition Centre, Australia  
• [www.aocr2012.com](http://www.aocr2012.com)

FIND MORE EVENTS AT  
[RSNA.org/calendar.aspx](http://RSNA.org/calendar.aspx)

## RSNA Faculty Development Workshop

September 12, 2012  
Chicago

REGISTRATION for the RSNA Faculty Development Workshop, a day-long course on the best techniques for designing and delivering radiology education, is now open to all members. The workshop, led by RSNA Refresher Course Committee Chair Valerie Jackson, M.D., John A. Campbell Professor of Radiology and chair of the Department of Radiology at the Indiana University School of Medicine in Indianapolis, and David J. DiSantis, M.D., associate residency program director, professor and quality, safety and compliance medical director in the Department of Radiology at the University of Kentucky, Lexington, will focus on how adults—especially physicians—best learn and how faculty can use test questions to improve their teaching.

The workshop will be held September 12, 2012 at the Westin O'Hare hotel, providing convenient access for attendees flying into Chicago. Most participants can fly in and out of Chicago on the same day. RSNA staff and faculty will be on hand to discuss specific questions with participants.

The workshop fee is \$150. Registration is available at [RSNA.org/Faculty\\_Development\\_Workshop.aspx](http://RSNA.org/Faculty_Development_Workshop.aspx). For more information, contact Jennifer Comerford at [jcomerford@rsna.org](mailto:jcomerford@rsna.org) or 1-630-590-7772.



Jackson



DiSantis

## RSNA Advanced Course in Grant Writing

Applications due  
July 31

APPLICATIONS are now being accepted for this course designed to assist participants—generally junior faculty members in radiology, radiation oncology or nuclear medicine programs—prepare and submit a National Institutes of Health (NIH), National Sciences Foundation (NSF) or equivalent grant application by the October 2013 deadline. The course, to be held at RSNA Headquarters in Oak Brook, Ill., will consist of four two-day sessions: October 12-13, 2012; January 25-26, 2013; March 15-16, 2013; and May 10-11, 2013.

For more information and an application, go to [RSNA.org/Advanced\\_Course\\_in\\_Grant\\_Writing.aspx](http://RSNA.org/Advanced_Course_in_Grant_Writing.aspx) or contact Fiona Miller at 1-630-590-7741 or [fmiller@rsna.org](mailto:fmiller@rsna.org).

## Residents & Fellows Corner

### Survey: Number of Studies Read by Residency Programs is Rising

Nearly a third of residency programs included in a recent survey reported reading more than 750,000 studies per year, up from 21 percent in 2009 and 12 percent in 2004.

The 2012 Annual Chief Resident Survey was conducted by Steven Sauk, M.D., on behalf of the American Alliance of Academic Chief Residents in Radiology (A<sup>3</sup>CR<sup>2</sup>). More than 180 individuals representing 135 unique programs completed the survey.

Survey results also offer a look at resident demographics—the number of female residents has increased 16 percent since 2003, with the total number of residents increasing 29 percent during that time—as well as working environments. Residency programs are increasing the number of hospitals they cover for training, with more than 70 percent

of programs recently surveyed reporting that they cover at least three hospitals.

Asked about changes in the format and timing of ABR examinations, more than half of respondents expressed mixed feelings. Beginning in October 2013, residents will take the Core Examination in Diagnostic Radiology 36 months after beginning residency training. Fall 2015 will see the debut of the new Diagnostic Radiology Certifying Examination, to be taken 15 months after completion of residency. The new image-rich, computer-based exams replace previous written and oral exams.

Perceived advantages of the new ABR tests cited by survey respondents include the way physics is incorporated into clinical knowledge and how more trainees will be encouraged to pursue fellowships and undertake focused training during

their fourth year. However, respondents were also critical of what they perceive as a diminished emphasis on verbal communication and noted that the post-graduation wait to be board-certified can make it more difficult to find a job.

Respondents also reported being somewhat apprehensive about the effects they believe healthcare reform will have on radiology, with more than 85 percent saying they feel practices will try to increase their volume to maintain similar salaries despite lower reimbursement rates. Sixty-five percent of respondents feel healthcare reform will discourage top-tier medical students from choosing radiology.

Read more survey results by going to [www.aur.org/A3CR2/index.cfm](http://www.aur.org/A3CR2/index.cfm) and clicking the Information tab.

Continued on Page 23

## Annual Meeting Watch

# Course Enrollment Begins July 11

The RSNA 2012 Advance Registration, Housing and Course Enrollment brochure will be mailed in late June to all RSNA members and 2012 non-member meeting registrants and will be available online at [RSNA2012.RSNA.org](http://RSNA2012.RSNA.org) starting July 11. Use this brochure to make the most of your RSNA 2012 experience. With information organized to help you complete your enrollment in just a few steps, find the courses you need, build your schedule and enroll quickly and easily online or via the print form.

### Guarantee Your Seat!

Tickets are required for various meeting components, including refresher and multisession courses, informatics workshops and RSNA tours and events.

All ticketed courses must be confirmed prior to November 21 to guarantee a seat. RSNA ticketed courses fill up fast, so ensure you get the courses you need by enrolling at [RSNA.org/register](http://RSNA.org/register). There is no onsite course ticketing. Registrants without tickets will be allowed entrance into a course after all ticketed registrants have been seated.



## BUY BISTRO RSNA TICKETS NOW

Avoid long lines and save money by purchasing Bistro RSNA tickets early this year.

Advance tickets to Bistro RSNA—which provides a comfortable setting for attendees to eat, meet and network during the annual meeting—are only \$21.

Bistro RSNA is located in all three Technical Exhibit Halls and the Lakeside Learning Center. The daily lunch menu includes salads, soup, entrée choices, vegetables, pasta and more. Menu price includes full meal, beverage choices and dessert.

To purchase tickets in advance, go to [RSNA.org/register](http://RSNA.org/register).



## RSNA 2012 Registration

### How to Register

There are four ways to register for RSNA 2012:

**1 INTERNET—Fastest way to register!**

Go to [RSNA.org/register](http://RSNA.org/register)

**2 FAX (24 hours)**

1-888-772-1888

1-301-694-5124

**3 TELEPHONE**

(Mon.-Fri. 8 a.m. – 5 p.m. CT)

1-800-650-7018

1-847-996-5876

**4 MAIL**

Experient/RSNA 2012

P.O. Box 4088

Frederick, MD 21705 USA

### Registration Fees

BY NOV. 2 AFTER NOV. 2

BY NOV. 2	AFTER NOV. 2	
\$ 0	\$100	RSNA/AAPM Member
0	0	RSNA/AAPM Member Presenter
0	0	RSNA Member-in-Training, RSNA Student Member and Non-Member Student
0	0	Non-Member Presenter
165	265	Non-Member Resident/Trainee
165	265	Radiology Support Personnel
750	850	Non-Member Radiologist, Physicist or Physician
750	850	Hospital or Facility Executive, Commercial Research and Development Personnel, Healthcare Consultant and Industry Personnel
300	300	One-day registration to view only the Technical Exhibits

### Important Dates for RSNA 2012

July 11	Course enrollment opens
Oct 19	Deadline for international badge mailing
Nov 2	Deadline for housing and discounted registration
Nov 21	Deadline for guaranteed seating to all ticketed courses
Nov. 25 – 30	RSNA 98th Scientific Assembly & Annual Meeting

## Hotel Deposits Required

A \$300 deposit is required to confirm your hotel reservation. Reservations may be secured with a major credit card at the time of booking. The credit card must be valid through December 2012 and will be charged by the hotel approximately two weeks before the annual meeting. Registrants may also send a check, money order or wire transfer

### Hotel Name Changes

Searching the RSNA 2012 list for a hotel where you previously stayed, but can't find the name? Please note these new hotel names (former names in parentheses):

- Acme Hotel Company Chicago (Comfort Inn and Suites)
- Hyatt Chicago-Magnificent Mile (Wyndham Chicago Hotel)
- MileNorth, A Chicago Hotel (Affinia Chicago Hotel)
- Waldorf Astoria Chicago (Elysian Hotel)



## New! “Patients First” 5K Fun Run

Tuesday, November 27, 6:30 a.m.

Arvey Field, South Grant Park, Chicago

Enjoy a 5K event with your colleagues along Chicago's beautiful Lake Michigan shore and help fuel critical research to enable the best



care for your patients. During online registration or onsite at McCormick Place, you can sign up as a runner or walker for the “Patients First” 5K Fun Run. The signup donation of \$30 will benefit the RSNA R&E Foundation and is fully tax deductible. Participants receive a commemorative T-shirt.

## Save on This Year's Airfare, Enter to Win Future Travel Credit

RSNA attendees who book air travel through Gant Travel by September 28 will be entered into a drawing to receive a \$500 (USD) travel credit good toward future airfare on United Airlines.

Benefits of using Gant Travel for RSNA 2012 include:

- Fare-checker technology (checking for lower fares until your return flight home)
- Seat-checker technology (checking for the best available seats per your preference)
- Emergency assistance available by phone
- Flight monitoring alerts

For more information, contact Gant Travel at 1-877-613-1192, international 1-630-227-3873, or [rsna@ganttravel.com](mailto:rsna@ganttravel.com).

## Tell a Colleague: Annual Meeting Admission Free with RSNA Membership

Encourage your colleagues to become RSNA members and receive free admission to RSNA 2012 with advance registration. Membership must be obtained by September 1. Go to [RSNA.org/Become\\_A\\_Member.aspx](http://RSNA.org/Become_A_Member.aspx).

## RSNA Seeks NPI Exhibitor Numbers During Registration

A provision within the federal Patient Protection and Affordable Care Act (PPACA) ([www.healthcare.gov/law/resources/authorities/title/vi-transparency-program-integrity.pdf](http://www.healthcare.gov/law/resources/authorities/title/vi-transparency-program-integrity.pdf)) requires healthcare companies to disclose any transfer of value to a healthcare provider to the U.S. Department of Health & Human Services beginning next year. To assist RSNA 2012 exhibitors in complying with this provision, RSNA requests its U.S. healthcare provider attendees supply their publicly available National Provider Identifier (NPI) number ([nppes.cms.hhs.gov/NPPES/NPIRegistryHome.do](http://nppes.cms.hhs.gov/NPPES/NPIRegistryHome.do)). The NPI number will be embedded in the bar code data on the attendee's name badge—it will not be printed on the badge. Exhibitors will obtain this information only when a registrant voluntarily scans their badge at the exhibit booth through the lead retrieval system.

For more information about registering for RSNA 2012, visit [RSNA.org](http://RSNA.org), e-mail [reginfo@rsna.org](mailto:reginfo@rsna.org) or call 1-800-381-6660 x7862.

## The Value of Membership

### RSNA 2011 Refresher Courses Now Online

A great addition to your education library, 20 refresher courses recorded at RSNA 2011 are now available online and for purchase on CD-ROM. New this year, an additional 10 refresher courses have been added to our online self-assessment modules (SAMs) library.

Each year, RSNA records a limited number of annual meeting refresher courses for future interactive, online sessions. Each course is presented in an audiovisual format, including slides and audio from each presentation. A course transcript and a detailed outline are available throughout the presentation. An integrated search feature allows users to search a presentation for specific terms that redirect them to a relevant portion of the course for enhanced learning.

Although refresher courses can be viewed free online, only RSNA members have the added benefit of earning *AMA PRA Category 1 Credit™* for each course. Online SAMs refresher courses are available free to all members; nonmembers pay \$50 to access the course and earn CME/SAM credit.

To view the newest courses, visit [RSNA.org/education/search](http://RSNA.org/education/search) and click on "Online Education" or call 1-800-272-2920 for more information.



### Use Fellowship Connect to Find, Post Fellowship Positions

With RSNA's online resource Fellowship Connect, residents and practicing radiologists can search for fellowship positions by specialty, location and institution. Users can read institutional profiles, find out if fellowship positions are available, get contact information and more.

#### Gaining access to Fellowship Connect:

**RSNA members:** Using their member login, RSNA members can personalize their searches by entering key words such as the name of the institution, state or specialty. Fellowship Connect provides a print feature and save option that allows members to store search results for later viewing.

**Institutions:** After creating an account, institutions can post company profiles, available fellowship positions, contact information and website links. Each institution is responsible for keeping fellowship information current on the website.

To access Fellowship Connect, go to [fellowships.RSNA.org](http://fellowships.RSNA.org).

### Residents & Fellows Corner

Continued from page 20

#### Members-in-Training Offered Dues Assistance

Members-in-Training can take advantage of the Transitional Dues Programs as they transition into a paid membership.

Each year, incoming residents are invited to join RSNA for free. An invitation letter and electronic application form are sent to the program director at each institution in the U.S. and Canada, as well as some programs in Mexico and overseas. This includes diagnostic radiology, radiation oncology and nuclear medicine programs. Membership begins on their

first day as a radiology resident—July 1. Beginning with the first year in practice, dues for transitioning resident and fellow members are \$100, and \$200 in the second year, allowing them time to settle into the profession through the Transitional Dues Program. Full dues are not required until their third year.

Under these programs, transitioning members receive all the benefits of full membership, including subscriptions to *Radiology*, *RadioGraphics* and *RSNA*

*News*, access to physics modules and other useful references and tools, free admission to the annual meeting and free access to CME credit through online education.

For more information, go to [RSNA.org/Become\\_A\\_Member.aspx](http://RSNA.org/Become_A_Member.aspx) or contact the Membership Department at 1-877-RSNA-MEM (1-877-776-2636) or [membership@rsna.org](mailto:membership@rsna.org).

## THE NEW RSNA.org

### Trainee Portal Connects Users to Resident/Fellow Resources

Because busy members-in-training don't have spare time to search for critical radiology tools and resources, RSNA's all-new trainee portal on the redesigned *RSNA.org* consolidates essential information in one place.

From jump-starting their research careers to finding the perfect fellowship/residency positions, trainees can link directly to a host of resources designed to meet their specific needs. Highlights of the portal—accessible on the top menu above the search field—include:

► **Trainee News:** Need-to-know information on free trainee benefits including RSNA membership, annual meeting registration and myPortfolio.

► **Trainee Resources:**

**Tools for Trainees:** Access peer-reviewed education materials, physics modules and useful references and tools designed with trainees in mind.

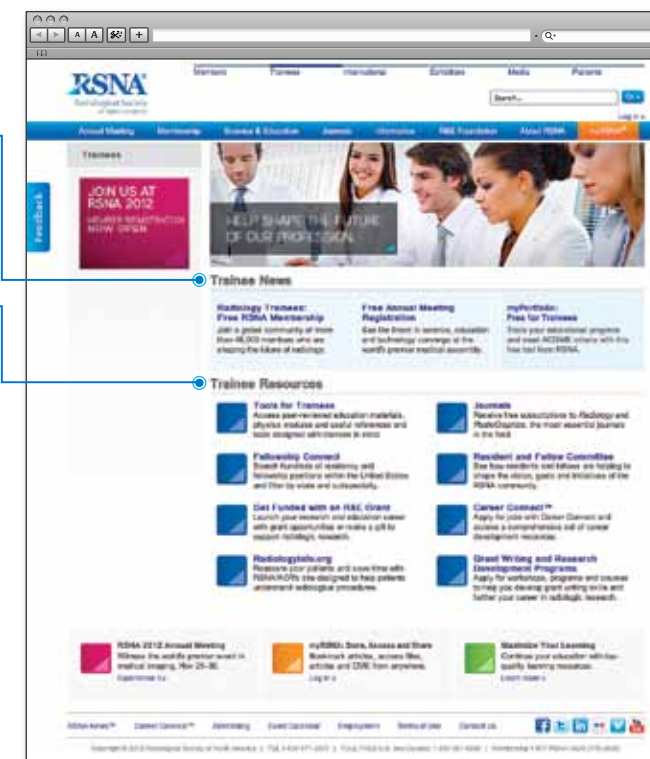
**Get Funded with an R&E Grant:** Get information on applying for grant opportunities or making a gift to support radiologic research.

**Career Connect:** Apply for jobs and access a comprehensive set of career development resources.

**Resident and Fellow Committee:** See how residents and fellows are helping to shape the vision, goals and initiatives of the RSNA community.

**Grant Writing and Research Development Programs:** Apply for workshops, programs and courses to help you develop grant writing skills and further your career in radiologic research.

In addition, colorful icons at the bottom of the page direct users to the RSNA Annual Meeting, myRSNA and educational offerings. Social media links are your resource for starting and joining conversations.



## COMING NEXT MONTH

Next month, *RSNA News* reports on how residents and radiologists can increase their value in a tight job market—or keep their jobs—by taking on responsibilities outside of imaging interpretation.

LIMITED TIME OFFER



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CME CREDITS AVAILABLE THROUGH OCTOBER 31, 2012

For more information, visit [RSNA.org/Education/Collections](http://RSNA.org/Education/Collections).  
Questions? Contact [ed-ctr@rsna.org](mailto:ed-ctr@rsna.org) or call 1-800-272-2920.



\*While supplies last.