

Image courtesy of Heike E. Dadrup-Link, M.D., Ph.D.

Stem Cells Tracked with MR Imaging

ALSO INSIDE:

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See Page 23



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The RSNA promotes excellence in patient care and healthcare delivery through education, research and technologic innovation.

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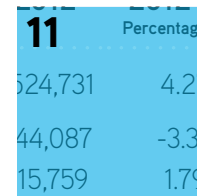
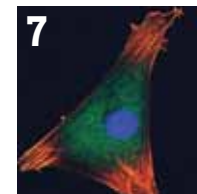
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ASTRO Awards Gold Medals

ASTRO awarded gold medals to **Amato J. Giaccia, Ph.D.**, **Radhe Mohan, Ph.D.**, and **Prabhakar Tripuraneni, M.D.**, at its recent annual meeting in Atlanta.

- **Dr. Giaccia** is director of the Division of Radiation and Cancer Biology at the Stanford University School of Medicine.
- **Dr. Mohan** is a professor of radiation physics in the Division of Radiation Oncology at MD Anderson Cancer Center in Houston.
- **Dr. Tripuraneni** is head of the Division of Radiation Oncology at Scripps Clinic in La Jolla, Calif. He currently serves on RSNA's Public Information Advisors Network.

RSNA Awarded Second NIBIB Contract to Support QIBA Activities

RSNA was recently awarded a one-year contract for approximately \$1.25 million from the National Institute of Biomedical Imaging and Bioengineering (NIBIB) to support research groundwork by the Quantitative Imaging Biomarkers Alliance (QIBA). Part of the funding has been earmarked for 13 projects that will characterize the performance and sources of variability associated with

Quantitative Imaging Biomarkers Alliance



quantitative imaging. Planning and development of digital reference objects (DRO), physical phantoms, and profile field testing have already begun and will continue over the months ahead. The QIBA Technical Committees will hold working meetings during RSNA 2013. RSNA received \$2.4 million from the NIBIB in 2010 to support QIBA. To learn more about QIBA, go to www.rsna.org/QIBA_.aspx.

Aldrich Receives COMP Gold Medal

John E. Aldrich, Ph.D., was awarded the Canadian Organization of Medical Physicists (COMP) Gold Medal at its recent annual scientific meeting in Halifax, Canada. Dr. Aldrich is a clinical professor emeritus of radiology at the University of British Columbia in Vancouver. The gold medal is the highest award given by COMP and recognizes an active or retired member who has made a significant contribution to medical physics in Canada.



2014 RSNA Membership Renewal Underway

RSNA MEMBERSHIP RENEWAL for 2014 is underway. Renew online at RSNA.org/renew or by mail with the invoice sent to you early in October. When renewing, take a moment to update your profile with current contact information.

All RSNA members have access to RSNA journals online. Because online access to *Radiology* and *RadioGraphics* is tied to membership status, if your payment has not been received by December 31, 2013, your online subscriptions will be automatically deactivated.

Practices can take advantage of RSNA's group billing option. For more information on the option and/or to renew membership by phone, contact the RSNA Membership Department toll-free at 1-877-RSNA-MEM or at 1-630-571-7873, or send an e-mail to membership@rsna.org.

Numbers in the News

4.02

Percentage increase in median compensation for interventional radiologists in 2012, according to the latest results from an annual survey. Diagnostic radiologists saw a 1.3 percent decrease in 2012. [Read more on Page 11.](#)

40:1

The ratio of subsequent grant dollars awarded to RSNA Research & Education (R&E) Foundation grant recipients as principal or co-investigator from sources such as the National Institutes of Health for every dollar awarded by the Foundation. [Read about an R&E grant recipient survey on Page 16.](#)

53

Number of passengers and crew treated by a medical team including radiologists, residents and radiologic technologists, at San Francisco General Hospital in the wake of the Asiana Airlines disaster. [Read how radiology departments are playing an increasingly critical role in managing medical care following such traumatic incidents on Page 9.](#)

615,000

Number of visitors each month to *RadiologyInfo.org*, the third most highly traveled healthcare website. [Read about the website's ongoing expansion and the results of usability testing with consumers on Page 13.](#)

RSNA Expands its Support of Imaging Physics Residencies

With medical physicists soon to be required to complete an accredited two-year residency program in order to take board exams and achieve the Qualified Medical Physicist (QMP) designation, RSNA has increased its financial commitment to the American Association of Physicists in Medicine to support a total of eight new Commission on Accreditation of Medical Physics Educational Programs (CAMPEP)-accredited imaging physics residencies over the next six years.



"Qualified medical physicists are vital to the growth of radiology, and it is critical that they grasp the increasing complexity and quality focus of diagnostic imaging, as well as know how to evaluate the dose and image quality of our imaging systems, and help us to optimize critical parameters to benefit our patients," said Ronald L. Arenson, M.D., the Alexander R. Margulis Distinguished Professor and chair of the Department of Radiology and Biomedical Imaging at the University of

California, San Francisco and chairman of the RSNA Board of Directors. "RSNA is pleased to support these residencies through the AAPM/RSNA Imaging Physics Residency Grant Funding program."

John D. Hazle, Ph.D., the Bernard W. Biedenharn Chair in Cancer Research at The University of Texas MD Anderson Cancer Center and AAPM president, added, "This requirement for residency training by the ABR was implemented based on the recommendation of the AAPM board several years ago.

It reflects the need for qualified medical physicists to meet minimal clinical training standards, just like our radiology and radiation oncology counterparts, in order to be considered ready for independent practice.

"The AAPM, like RSNA, is committed to making this program a success in establishing sustainable new imaging physics residency programs," Dr. Hazle said. "We very much appreciate the RSNA's financial and programmatic support in this effort."

The requirements for accredited residency training from the American Board of Radiology go into effect in 2014. Dr. Arenson noted that while there are a number of approved residencies in medical physics, most are for radiation oncology—there are not enough residencies producing physicists for diagnostic radiology. In order to encourage more programs to become CAMPEP-approved, AAPM and RSNA have joined together to fund 50 percent of the trainee's cost. After completion of the grant, the programs are expected to pick up the full trainee funding. Three institutions were awarded funding beginning in 2013: Memorial Sloan-Kettering Cancer Center, the University of Alabama at Birmingham and the University of Wisconsin.

Applications are being accepted through Dec. 6, 2013, from academic radiology programs, large private practice groups and other organizations interested in establishing an accredited residency program. Go to aapm.org/education/GrantsFellowships/main.aspx?id=12 to learn more and apply.

CALL FOR CENTENNIAL ARTICLES FOR RADIOGRAPHICS

To mark RSNA's 100th anniversary, *RadioGraphics* has issued a call for historical articles highlighting the contributions of the Society, its meeting and its education journal to the development of clinical practice and continuing education in radiology. Submissions may be short or full length and should be image rich. Possible topics include: technical advances first presented in exhibits at the RSNA annual meeting; comparisons of clinical practices or continuing education activities before and after the development of advanced personal computers and mobile devices; improvements in the quality of patient care; and biographical sketches of innovators in technology, practice or education.

Prospective authors may submit a proposal/outline to Jeffrey S. Klein, M.D., Editor of *RadioGraphics* (e-mail: jklein@rsna.org), or William A. Murphy Jr., M.D., *RadioGraphics* editorial board member, for historical papers (e-mail: wmurphy@mdanderson.org). The deadline for manuscript submission is September 2, 2014.

To ensure consideration, follow the Guidelines for Preparing a Centennial Series Manuscript at <http://pubs.rsna.org/page/radiographics/centennial>. Manuscripts meeting the criteria for publication will be peer reviewed under the oversight of Dr. Murphy.



IN MEMORIAM

Mutsumasa Takahashi, M.D.

Mutsumasa Takahashi, M.D., one of the world's most prolific radiology writers who focused his research on MR imaging, died September 16, 2013. He was 78.

A native of Japan, Dr. Takahashi received his doctor of medicine from Kyushu University of Medicine in 1960. He completed residencies in radiology at Kyushu University Hospital and at the University of Michigan Hospital, and in 1966, held a fellowship in cardiovascular radiology at Stanford University Hospital.

Dr. Takahashi served as a radiology instructor at various schools of medicine before ultimately being appointed professor and chairman in radiology, Kumamoto University School of Medicine, in 1980. He held the position until 2001, when he was appointed professor emeritus.



Dr. Takahashi was the primary editor of 28 books, wrote 85 book chapters and completed 450 articles in English and 290 articles in Japanese. He was the editor-in-chief of *Neuroradiology* and served on the editorial boards of six Japanese journals and 11 international journals.

Dr. Takahashi was named an honorary member of RSNA in 1994 and received the RSNA Gold Medal in 2001. Dr. Takahashi was named an honorary member of the Chinese Medical Association, the European Society of Radiology, the French Radiological Society and the American Society of Neuroradiology.

Dr. Takahashi served as president of the Japanese Radiological Society, the Japanese Neurological Society, the Japanese Society of Magnetic Resonance in Medicine, the Japan Tomographic Imaging Society and the Japanese Association for Cancer Detection and Diagnosis.

RSNA Board of Directors Report

At its September meeting, the RSNA Board of Directors approved collaborations with other radiologic and medical societies and appointed volunteers to RSNA committees for the coming year.

Committee Members, R&E Trustees Appointed

The Board approved appointments to RSNA's many committees. The Board is grateful to the hundreds of dedicated volunteers who help RSNA to meet its mission every year.

In the committee appointment process, the RSNA Board aims to maximize volunteer participation in the Society and involve members in training to help ensure that RSNA products, services, programs, and activities meet the needs of trainees now and as they develop professionally. More than 1,000 members are serving the Society on committees and editorial boards, and as representatives to other organizations.

N. Reed Dunnick, M.D., was appointed as a new RSNA Research & Education Foundation board trustee, and trustees Gregory C. Karnaze, M.D., and Thomas N. McCausland were reappointed. G. Scott Gazelle, M.D., Ph.D., and Dr. Karnaze were appointed as secretary and treasurer, respectively. Burton P. Drayer, M.D., was appointed as Foundation chairman-elect and will become chair at the conclusion of RSNA 2014.

Collaborations Support Imaging Physics Residencies, BRAIN Initiative

RSNA has increased its financial commitment to the American Association of Physicists in Medicine to support a total of eight imaging physics residencies over the next six years. Read more about the

AAPM/RSNA Imaging Physics Residency Grant Funding Program on Page 2.

RSNA has agreed to be a sponsor of "Imaging in 2020," a meeting designed to facilitate effective communication among basic and clinical researchers from many different fields, to be held in Jackson Hole, Wyo., in September 2014.

RSNA joined the American Society of Neuroradiology in a statement on the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, to be presented to the National Institutes of Health (NIH) BRAIN Working Group.

Also in the area of brain research, the RSNA Research Development Committee will be charged with developing an RSNA vision of opportunities in the area of brain mapping, including RSNA's role as convenor on this topic.

Looking Ahead

With 2014 just around the corner, plans continue for a number of RSNA programs and services to be offered in the coming year. The Board approved the transfer of \$500,000 from the RSNA operating reserves to the RSNA Research & Education Foundation during fiscal 2014. The Board approved two Country Presents



Ronald L. Arenson, M.D.
Chairman, 2013 RSNA
Board of Directors

sessions, featuring Korea and Canada, for RSNA 2014.

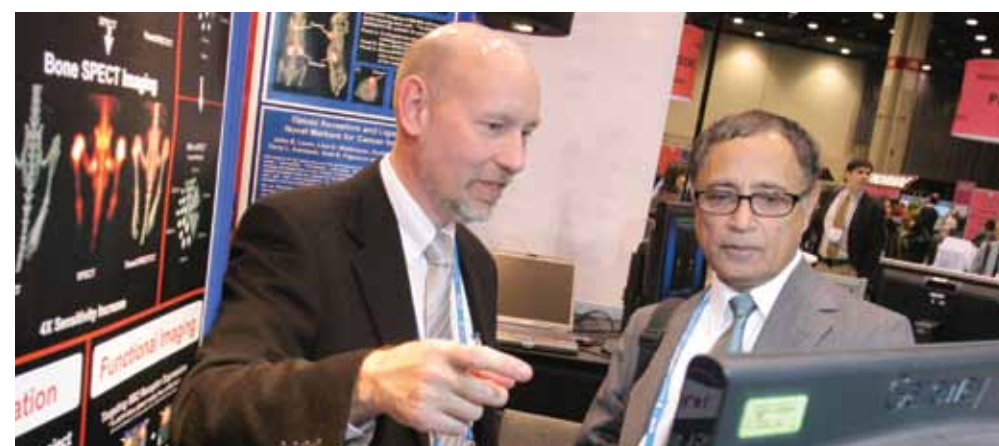
A big part of RSNA 2014 will be the celebration of the RSNA Centennial, which is occurring over the next two years. A Centennial Pavilion at RSNA 2014 and RSNA 2015 will feature RSNA and radiology artifacts and interactive presentations, and a special supplement to *Radiology* in late 2014 will take a look back at a century's worth of the high-quality radiology research. Watch upcoming issues of

RSNA News and the *RSNA.org*

website for more information about centennial activities and how you can get involved.

As a co-chair of the Ad-Hoc RSNA Centennial Planning Committee, I'm excited as we begin to celebrate 100 years of accomplishments and look forward to what is to come. RSNA always has been a force in radiologic science and education and my fellow Board members and I thank you for helping continue that tradition.

RONALD L. ARENSON, M.D.
CHAIRMAN, 2013 RSNA BOARD OF
DIRECTORS



RSNA has pledged its support of multidisciplinary communication with its sponsorship of "Imaging in 2020," to be held in Jackson Hole, Wyo. in September 2014.

My Turn

The Importance of Radiology Showing Value

In this issue of *RSNA News*, I'd like to draw your attention to the feature article about hospital nerve centers that are set up in radiology departments during disasters. In the acute setting, as the examples demonstrate, the value of imaging is immediately obvious. Similarly, in the emergency room, imaging is essential for triage to surgery or observation. In the diagnosis of such conditions as ovarian torsion, appendicitis, and aortic aneurysm, imaging serves a vital role.

Imaging is also used more and more for guiding surgery and minimally invasive surgical procedures, providing the roadmaps for treatment. Interventional radiology and neuro-interventional radiology rely on imaging to perform their procedures, and so does cardiology, in a variety of ways, and neurosurgery, with brain tumor mapping. There is little doubt that CT drastically has reduced the number of exploratory laparotomies.

However, in the outpatient or less critical inpatient settings, we have not done a very good job of demonstrating the essential role that imaging, and more generally, radiology plays in the outcomes for our patients. Some good

examples come to mind, in which imaging makes large contributions by detecting and following complications after surgery, and diagnosing and following fractures and pneumonias. In the screening environment, mammography, virtual colonoscopy, lung cancer screening, and cardiac CT are well proven, although their penetration in the U.S. is somewhat variable and not without controversy.

Imaging has increased dramatically over the past couple of decades. In fact, it is the fastest growing category of physician-generated orders, excluding drugs. Imaging is under attack by the government and insurance companies who look for easy targets to reduce the rapid rise in healthcare costs. Adding to these concerns about the rising cost of imaging, consider the impact of the ever-increasing medical needs of aging baby-boomers on the system, as well as the increasing life expectancy of our population as a whole.

With accountable care organizations (ACOs) and trends toward bundling of services, radiologists will need to continue to find ways to add value to the services we provide. With ACOs, it will be to develop cost-effective ways of

distributing imaging services efficiently across large networks.

Throughout America, we are in the process of transforming radiology departments into more patient-centric care environments, charged with delivering the highest quality subspecialty diagnoses and treatments at the convenience of patients, not ourselves, and hopefully meeting or exceeding their expectations. I believe that proper use of imaging resources leads to faster diagnoses, more accurate treatments, and quicker recoveries. Radiology departments can, in many ways, become your hospital's "nerve center," with the power to improve outcomes and reduce overall costs.

Ronald L. Arenson, M.D., is chairman of the RSNA Board of Directors. Dr. Arenson is the Alexander R. Margulis Distinguished Professor of Radiology and chairman of the Department of Radiology and Biomedical Imaging at the University of California, San Francisco.

See "Radiology Becomes 'Nerve Center' During Tragedies," Page 9.



THIS MONTH IN THE RSNA NEWS TABLET

Get more of this month's news with the *RSNA News* Tablet edition, available for download through the App Store and Google Play.

As part of this month's story on radiology's response to national tragedies, we feature a video of a radiology professor at NYU Langone Medical Center describing the impact when Hurricane Sandy broke through the radiology department, as well as a collection of images of the Lodox Statscan Critical Imaging System used to image victims of the Navy Yard shootings. We also link you to the new Screening and Wellness section and other interactive content on *RadiologyInfo.org*.

Access the *RSNA News* tablet edition on the App Store at itunes.apple.com/us/app/rsna-news/id444083170?mt=8 and Google Play at <https://play.google.com/store/apps/details?id=air.org.rsna.rsna-news&hl=en>.



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Website Offers Guidance on Breast Density Notification Laws

Nine months before the California breast density reporting law took effect in April 2013, a group of breast imagers and breast cancer risk specialists were already preparing for the enormous impact the legislation could have on America's most populous state.

THE CALIFORNIA LAW mandates written notification to women, after screening mammography, of their tissue density and the need to discuss screening options with their primary care physicians. Because nearly 50 percent of women who undergo screening mammography are classified as having either heterogeneously or extremely dense breast tissue, as many as two million notification letters could go out in California alone, with a resultant significant increase in supplementary screening by MR imaging and ultrasound.

"Patients who receive one of these notification letters generally ask, 'What do I do now?' and 'Does this mean that I am likely to get breast cancer?'" according to Jafi A. Lipson, M.D., assistant professor of radiology at Stanford University School of Medicine. "The upshot is that a woman will read the letter and look to her primary care doctor for guidelines that the law does not provide. Radiologists might not be on the front lines, but they also need to be ready to answer questions with evidence-based information that offers clear guidance."

Soon after the law was passed, Debra Ikeda, M.D., chief of breast imaging and professor of radiology at Stanford University School of Medicine, and colleagues formed the California Breast Density Information Group (CBDIG) to develop a common response framework to help referring physicians, patients and radiologists navigate the new challenges posed by the law. The result of their efforts is a user-



Lipson



Harvey



Cappello

friendly, evidence-based website (www.breastdensity.info) that contains information about breast density, breast cancer risk assessment and supplementary imaging, along with educational tools for patients and physicians. For example, physicians can access flow charts illustrating clinical scenarios that they may encounter while complying with the law in California. (See sidebar.)

A special report on the CBDIG findings published online September 10, 2013, in *Radiology* (before print) was authored by Elissa R. Price, M.D., assistant professor of clinical radiology of the Department of Radiology and Biomedical Imaging at the University of California, San Francisco, and her colleagues.

“Breast density notification laws are a reality. That was the focus of CBDIG when developing these resources—not discussing whether the laws are right or wrong.”

Jafi A. Lipson, M.D.

Legislation Should “Trigger a Discussion”

Regardless of the debate, “the laws are a reality,” said Dr. Lipson, spokesperson for CBDIG. “That was the focus of CBDIG when developing these resources—not discussing whether the laws are right or wrong.”

Dr. Lipson and colleagues researched scientific evidence to develop a response to the key elements of the law. Overall, CBDIG recommends an individualized risk-based approach for guiding decision-making. Women with a high risk of breast cancer, such as those with BRCA genetic mutations, are more likely to benefit from additional screening with MR imaging, ultrasound or tomosynthesis. For women with intermediate risk, the decision to have screening MR imaging should be made on a case-by-case basis using a shared decision-making approach, Dr. Lipson said.

The benefits of additional screening are diminished in women who are not at high risk for breast cancer, while the potential harms remain the same, Dr. Lipson said.

She stressed that supplemental screening recommendations should be based in the context of other breast cancer risks, rather than just density, and that the notification letter should “trigger a discussion between women and their doctors about the overall breast cancer risk,” as the law intended.

Radiologists, according to Dr. Price and colleagues, should also be part of the conversation. “In our era of patient-centered care and personalized medicine, breast density notification legislation provides an opportunity for radiologists to engage with referring clinicians and patients,” Dr. Price noted.

Legislation Presents Drawbacks

Since the first breast density notification law was passed in Connecticut in 2009, the movement for more widespread legislation has gained considerable momentum based largely on a grassroots effort by organizations including Are You Dense, Inc., and Are You Dense Advocacy, Inc., led by executive director and founder, Nancy M. Cappello, Ph.D., who received an advanced breast cancer diagnosis in 2004 within weeks of a normal mammogram. “I was told my extremely dense breast tissue prevented my years of mammograms from detecting my cancer at an earlier stage,” Dr. Cappello said.

As of October 2013, 12 states have passed similar legislation, while 10 others are considering breast density notification laws. A federal breast density notification law is pending, and the U.S. Food and Drug Administration (FDA) is also considering modifications to national mammography reporting guidelines to include breast density notification.

While mammography is still considered the best modality for population-based breast cancer screening, its sensitivity decreases by up to 20 percent in women with dense breast tissue and up to 50 percent in women at high lifetime risk of breast cancer who also have extremely dense breasts, research shows.

Dr. Cappello stresses that breast density laws are critical to realizing the ultimate goal “of women



Created by the California Breast Density Information Group (CBDIG), the user-friendly, evidence-based website (www.breastdensity.info) contains information about breast density, breast cancer risk assessment and supplementary imaging along with educational tools for patients and physicians.

being notified of their breast tissue composition to inform their conversations with healthcare providers about their personal screening surveillance,” and says no roadblock will stop her from getting this critical health information out to women.

Nevertheless, some physicians point to potential drawbacks to breast density laws, including patients' confusion about screening follow-ups, an increase in false-positives, and reimbursement issues. In addition, the broad classification of breast density does not take into account the varying levels of risk among patients with different breast densities, Dr. Lipson said.

Although the American College of Radiology (ACR) supports including information about breast density in the mammography report sent to physicians, the organization is cautious about supporting mandatory notification to patients. “While the ACR is not opposed to including parenchymal breast information in the lay summary, we urge strong consideration of the benefits, possible harms and unintended consequences of doing so,” the ACR position statement on breast density states.

While she supports the breast density notification law in effect in Virginia since 2012, Jennifer A. Harvey, M.D., head of the Division of Breast Imaging and a professor of radiology at the University of Virginia Hospital Health System, Charlottesville, stresses that education for all those affected is critical.

“I’ve had more questions from healthcare providers about supplementary screening than I have from patients,” said Dr. Harvey, a presenter of the RSNA 2013 Special Interest Session: Breast Density: Risk Assessment, Communication, and Approaches to Supplemental Imaging. “But I believe patients have a right to this information. I think it gets to the issue of trust between a patient and physician regarding decision making.” □

WEB EXTRAS

Access the California Breast Density Information Group (CBDIG) website at www.breastdensity.info. The site features a PDF of guidelines for healthcare providers and an ACR patient brochure that can be printed out and distributed.

To access the CBDIG report in *Radiology*, go to radiology.rsna.org/content/early/2013/08/28/radiol.13131217.full

To access the American College of Radiology (ACR) Position Statement on Reporting Breast Density in Mammography Reports and Patient Summaries, go to ACR.org/About-Us/Media-Center/Position-Statements.

Access Are You Dense, Inc., at www.areyoudense.org.

Read an abstract of the CBDIG report in *Radiology* in Public Focus on Page 20.

MR Imaging Plays Pivotal Role in Stem Cell Tracking

Intravenous iron can be used to safely and effectively label stem cell transplants for tracking with MR imaging in arthritic joints and other target tissues, according to a recent *Radiology* study.

BONE MARROW-DERIVED mesenchymal stem cells (MSCs) have great potential in tissue regeneration and cell-based therapy, according to Heike E. Daldrup-Link, M.D., Ph.D., co-author of the study that appeared in the October issue of *Radiology*. Once transplanted from donor into recipient, MSCs can help repair damaged joints by giving rise to connective tissue, bone and cartilage, but the stem cells should be tracked to confirm the procedure's success, Dr. Daldrup-Link said.

"The most common problem is that stem cells, when transplanted, die and disappear from the transplant site," said Dr. Daldrup-Link, an associate professor in the Department of Radiology and a member of the Molecular Imaging Program at Stanford University School of Medicine. "Alternatively, they stay in the correct site but don't differentiate into cartilage."

Current labeling methods involve removing stem cells from a donor and then placing the cells in a culture dish with an iron oxide solution. The iron oxide-labeled cells are then transplanted into the recipient patient. Such ex-vivo labeling requires handling of the stem cells between harvest and transplantation, introducing the possibility of contamination.

"Orthopedic surgeons want labeled stem cells, but not the ones that are manipulated between the bone marrow harvest and transplantation," Dr. Daldrup-Link said.

The Stanford researchers theorized that they could more effectively label the stem cells through an in-vivo approach.

"Our solution was to give an iron supplement to the stem cell donor intravenously before harvesting," Dr. Daldrup-Link said. "The donor cells, including bone marrow stem cells, pick up the iron oxides, and these stem cells can then be tracked with MR imaging."



Daldrup-Link



Bulte

In-Vivo Approach Shows Promise

Prior to testing in humans, researchers conducted an animal study, injecting rats with ferumoxytol, an FDA-approved iron supplement for treating patients with iron deficiency anemia, 48 hours prior to extraction of the stem cells from bone marrow. They then compared the ferumoxytol uptake by the stem cells with results from traditional ex-vivo-labeling procedures.

"To our surprise, we found that the stem cells take up significantly more iron with the intravenous labeling procedure than they do if we label them ex vivo," Dr. Daldrup-Link said.

After transplanting the labeled stem cells into cartilage defects in the knees of seven rats, researchers performed MR imaging to track the cells for up to four weeks. Microscopic examination confirmed the presence of iron in the labeled transplants and showed evidence that repair was underway in the damaged joints.

In-vivo labeling not only eliminates the risk of contamination from ex-vivo labeling procedures, but also provides more immediate feedback on the status of the cells.

"Our solution was to give an iron oxide supplement to the stem cell donor intravenously before harvesting."

Heike E. Daldrup-Link, M.D., Ph.D.

"The current approach to determine successful engraftment requires long-term follow up that imaging studies weeks or months after cell transplantation, even though the stem cells may die relatively soon after the procedure," Dr. Daldrup-Link said. "With this method, we could show more quickly if cells disappear from the transplant site or if they proliferate too much after the transplant."

The Stanford researchers are completing more examinations and plan to study the technique in rabbits before patient trials begin. Since the intravenous iron solution is widely used on anemic patients, Dr. Daldrup-Link believes that patient trials are just around the corner.

MR Imaging Holds Great Potential in Cell Tracking

The findings point to the ultimate clinical role of MR imaging for cell tracking: monitoring the accuracy of cell injection in real time with MR-compatible catheters, according to Jeff W.M. Bulte, Ph.D., director of cellular imaging at Johns Hopkins University's Institute for Cell Engineering in Baltimore, Md., and one of the world's leading authorities on stem cell transplantation and tracking.

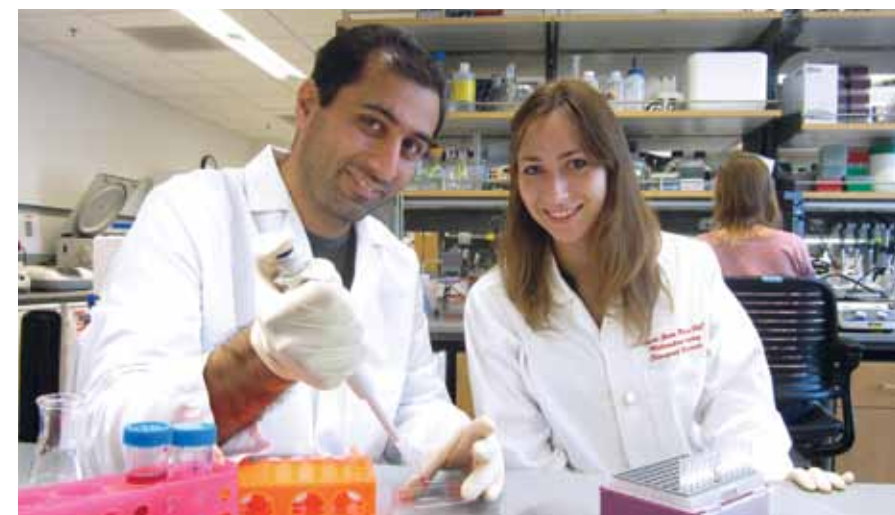
Dr. Bulte, who authored a *Radiology* editorial accompanying the research, said that the ability to track MR-labeled MSCs safely and effectively will have myriad clinical applications well beyond the treatment of damaged joints.

"These techniques are universal and could have many potentially useful applications, including heart repair and repair of brain neurons," he said.

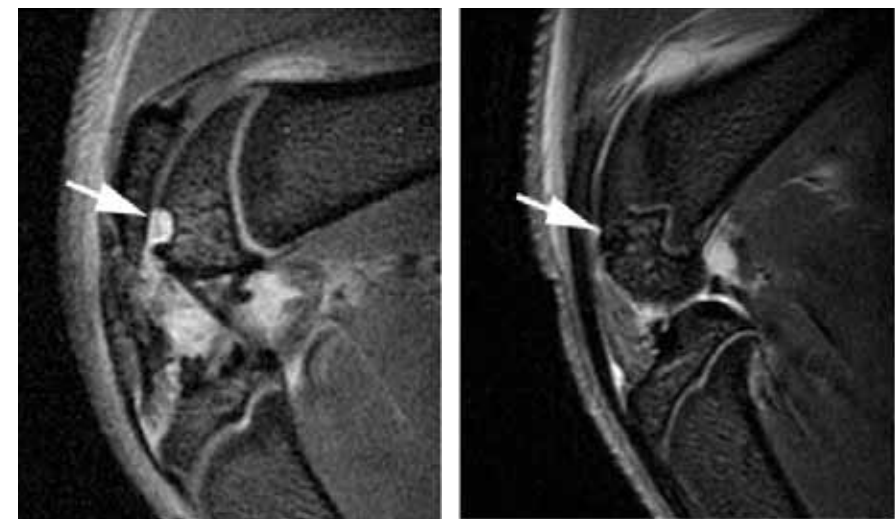
Noninvasive monitoring of the movement and accumulation of stem cells would enable clinicians to determine whether cell delivery has occurred in the appropriate location and whether transplanted cells have reached the appropriate location for each patient.

"We can't take biopsies, so noninvasive imaging is the way to go in the future," Dr. Bulte said. "It's sort of like FedEx tracking your packages to make sure they reach their destination."

Dr. Bulte cautioned that there are several limitations to the iron-oxide labeling approach. Not all donors yield sufficient numbers of MSCs and efforts to get a sufficient number may dilute the ferumoxytol label to uncertain cellular detection levels. In addition, the approach cannot distinguish live cells from dead cells and has difficulty differentiating between labeled MSCs and macrophages—the immune cells that engulf cellular debris and pathogens.



Stanford researchers, including, above, Hossein Nejadnik, M.D., Ph.D., and Fanny Chapelin, M.D., demonstrated that intravenous iron can be used to safely and effectively label stem cell transplants for tracking with MR imaging in arthritic joints and other target tissues.



Left: MR image of ferumoxytol labeled stem cells implanted in a rat cartilage defect model; right: the dark transplant shows the labeled cells (arrows show the location of the implanted cells).

Labeling stem cells with fluorine represents a promising alternative that may overcome some of the limitations of the iron oxide method, Dr. Bulte said. Because fluorine resonates at a different frequency than hydrogen, the MR imaging coil can be tuned to its specific frequency. Since there is little to no fluorine in the body, the signal from the labeled fluorine can then be easily distinguished from any background noise and the quantity of the labeled cells can be determined with accuracy.

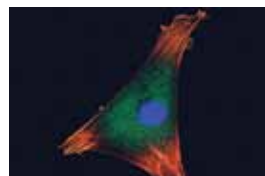
The labeled fluorine approach was first tested on a patient in April at the University of Pittsburgh Cancer Institute in Pittsburgh, and studies are ongoing. □

WEB EXTRAS

Access the *Radiology* study, "Iron Administration Before Stem Cell Harvest Enables MR Imaging Tracking after Transplantation," at radiology.rsna.org/content/269/1/186.full.

ON THE COVER

Confocal image of ferumoxytol-labeled cells (ferumoxytol had been conjugated with green fluorescent fluorescein isothiocyanate [FITC]).



Radiology Becomes 'Nerve Center' During Tragedies

Unfortunately, in many large cities—and even smaller ones—medical emergencies involving a large number of casualties have become a fact of life in America. What is also emerging as these tragedies unfold year after year is the increasingly critical role radiology is playing in managing the medical care needed following such traumatic incidents.

"RADIOLOGY PLAYS SUCH AN INTEGRAL ROLE in the work up and treatment of trauma patients," said Mark Wilson, M.D., professor and chief of radiology at San Francisco General Hospital, who was on duty in the aftermath of the Asiana Airlines disaster at San Francisco International Airport on July 6, 2013. "That really came to light here."

That day, Dr. Wilson was visiting friends in Lake Tahoe and decided to make a 3 ½-hour dash back to San Francisco after learning of the crash. By the time he got to the hospital, the first wave of victims had already gone through the emergency department (ED). Along with Dr. Wilson, four other attending radiologists were on-site along with three residents and a number of radiologic supervisors and technologists, making it possible for the department to scale up to handle the initial wave of 53 passengers and crew brought to the hospital's trauma center that day.

The big questions, Dr. Wilson said, became, "What do we do with the patients after they are imaged? How do we triage them? How do we decide what kind of treatment they need?" Those decisions were complicated by the fact that trauma physicians were chasing down radiologists to review imaging findings in person.

That's when inspiration hit: Why not make the radiology reading room the nerve center for reviewing patient imaging and clinical data? So, at around 5 p.m. that day, radiologists, trauma team physicians representing the ED, trauma surgery, neurosurgery, neurology, pediatrics and orthopedics, as well as several high-level nurses, gathered around a PACS station and began reviewing imaging and clinical data for each patient. Every imaging study on every patient was reviewed by one of the radiology attendings at that time.

"We then decided how to triage the patient," Dr. Wilson said. "Would the patient go to the operating room, be admitted to the hospital or be discharged?" The team faced other decisions including whether a parent(s) was available to make a decision in case a child needed to undergo surgery.

"All those decisions were made at that one moment and it was very impressive to see everyone working together," Dr. Wilson said. "At our trauma center, essentially every patient has to come through radiology for something, so it made sense for radiology to be the nexus for all this activity."

The approach was so successful it will be codified as an ongoing procedure at San Francisco General in times of disaster. Hopefully,

“Radiology plays such an integral role in decision making. To a large extent the ED was waiting for our reads on these patients so they could decide how to triage them.”

James P. Borgstede, M.D.

the new process won't be necessary any time soon, but as Dr. Wilson pointed out, "this is earthquake country, so anything can happen at anytime."

Radiology Responds to Colorado Shootings

At 3 a.m. on July 20, 2012, James P. Borgstede, M.D., professor of radiology and vice-chair for professional services, clinical operations and quality at the University of Colorado School of Medicine, Denver, was awakened by a phone call informing him that the ED was about to receive casualties from a mass shooting at an Aurora movie theater showing of the "The Dark Knight Rises."

A number of victims made their way to the ED, some by ambulance and some loaded into police cars. In one case, Dr. Borgstede said, a man ran from the movie theater all the way to the hospital with what turned out to be a relatively minor bullet wound. In all, the radiology department ended up imaging 23 victims in the aftermath of the shooting.

The event re-emphasized something physicians there already knew, Dr. Borgstede said. "Radiology plays such an integral role in decision making," he said. "To a large extent the ED was waiting for our reads on these patients so they could decide how to triage them."

While it was certainly a trying time, "everyone in the ED and radiology worked very efficiently," Dr. Borgstede said. In all, the radiology department performed a large volume of CT and radiographs, but was able to keep up with the workload. Still, Dr. Borgstede said, there were lessons learned.

For example, in those early morning hours when it became clear that he and another attending radiologist



Borgstede

could handle the workload, Dr. Borgstede refrained from calling in any more staff.

"I knew that some of these patients were going into the operating room and that when they came out they were going to need further imaging," Dr. Borgstede recalled. "I wanted to keep my staff fresh and elected not to call in anyone else. Sure enough, around 7 a.m., patients started coming back from the OR for more imaging and I had fresh staff ready. It's important to have a measured response."

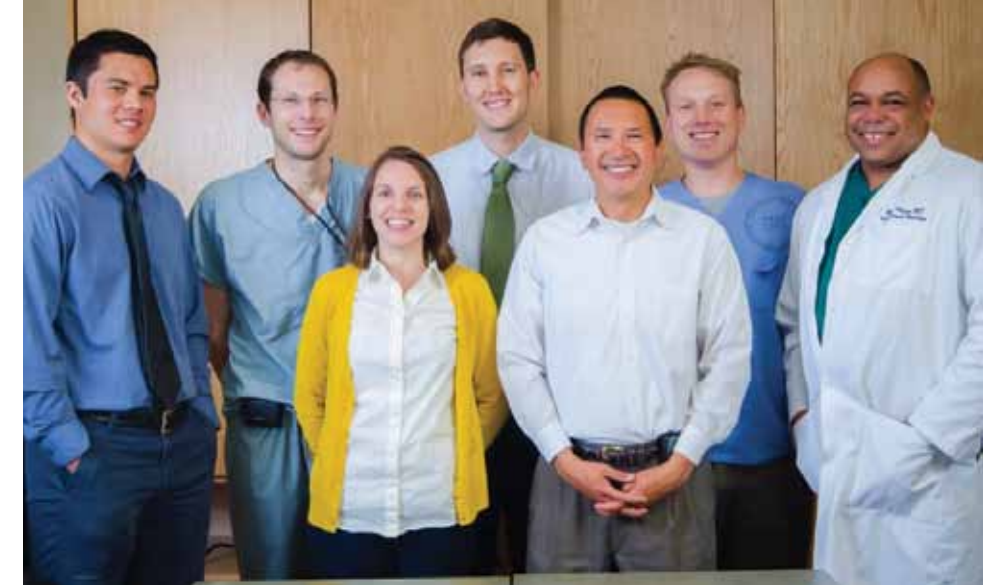
All in all, everything went very well, Dr. Borgstede said. "Every patient who made it to the ED survived—we didn't lose anyone." And even though medical professionals are trained to handle such calamities, "You can always learn a lesson from an actual disaster," Dr. Borgstede added.

Statscan Imaging Technology Aids in Navy Yard Shootings

As a Level 1 verified facility, the trauma center at MedStar Washington Hospital Center is a primary patient destination for medical emergencies involving mass casualties.

Those incidents include the crash of American Airlines Flight 77 into the Pentagon on 9/11 and the Washington Metro train collision in 2009 that killed nine people and injured more than 80. Most recently, the hospital treated the victims of the September 16, 2013, shooting spree at the Washington Navy Yard that ended in the deaths of 12 people and the wounding of eight others, including three by gunfire.

The three gunshot victims were brought to MedStar Washington Hospital Center, which is equipped with a Lodox Statscan Critical Imaging System—one of only a handful in the U.S.—capable of taking head-to-toe X-ray images in 15 seconds. James Jelinek, M.D., chairman of the hospital center's Department of Radiology, said the scanner is particularly useful for victims who have been sprayed with gunfire or suffered shrapnel wounds from explosive devices like improvised explosive devices (IEDs). Medstar Washington Hospital



In the aftermath of the Asiana Airlines disaster, the radiology reading room at San Francisco General Hospital became the 'nerve center' for treatment. The team on duty that day included (from left to right) diagnostic radiology residents Valentin Lance, M.D., Aaron Miracle, M.D., Kim Kallianos, M.D., and Marc Mabray, M.D., and radiologists Thienkhai Vu, M.D., Thomas Urbania, M.D., and Mark Wilson, M.D.
Image courtesy of San Francisco General Hospital

Center is the only adult Level 1 facility verified by the American College of Surgeons, Dr. Jelinek said.

The scanner gives the trauma team a maximum diagnosis as quickly as possible, allowing physicians to treat patients in the "golden hour"—the time in which there is the greatest likelihood that treatment can prevent death.

"That first hour is critical," Dr. Jelinek said. "It's all about speed. In a large hospital any one patient could need a general surgeon, a neurosurgeon, a thoracic surgeon and an orthopedic surgeon. When you have that whole body X-ray within 15 seconds, you're able to make those images available immediately."

Although the hospital treated just three victims from the Naval Yard shootings, the facility did implement some new emergency procedures. For example, depending on the number of expected casualties, the trauma center can cancel routine imaging procedures to ensure that scanners are readily available. In this case, Dr. Jelinek said, some patients were diverted away from CT scanners near the trauma center to free up capacity.

"We were expecting more," he said. "But, as our chief medical officer, Dr. Janis Orlowski, said, we've become the experts when it comes to this, and we'd like to see someone put us out of business." □

HURRICANE SANDY "VICTIMIZES" NY RADIOLOGY DEPARTMENT

While catastrophes can demonstrate the key role radiology plays in emergencies, disasters can also end up damaging radiology departments. That happened last October in New York when the impact of Hurricane Sandy caused NYU Langone Medical Center's imaging department to lose access to millions of dollars in imaging equipment and supplies.

The first order of business was to get imaging services back up and running as quickly as possible,

so in the days after the hurricane, staff worked feverishly to recover and move imaging equipment and supplies into temporary spaces, said Michael Recht, M.D., chair of the medical center's radiology department.

Within days, outpatient ultrasound services were available in a building four blocks from the main hospital previously used for offices and research. Radiologists were also able to use MR scanners reserved

for dedicated research for clinical purposes. "Our first response was to get imaging services back up and running so we could serve patients," Dr. Recht said.

While it was apparent that NYU Langone would need a new imaging center and equipment, the damage gave the hospital a unique chance to reinvent its processes.

"What we need to do now is build the best imaging center we can," he said. "Our goal is to utilize all of

Continued on Page 14

Latest Radiology Compensation Data Show Ups and Downs

Despite an overall slowing of compensation increases across all medical specialties, interventional radiologists (IR) saw their incomes take a sizeable leap in 2012, while salaries for diagnostic radiologists (DR) dipped slightly for the second year in a row.

Of the 30 specialties surveyed for the 2013 American Medical Group Association (AMGA) 26th Annual Medical Group Compensation and Financial Survey, more than 60 percent experienced compensation increases from 2011 to 2012. Nevertheless, the overall weighted average of 1.6 percent marked the third consecutive year salaries increased below the approximate 3 percent average threshold, according to AMGA.

AMGA mailed the survey questionnaire to medical groups across the country in January 2013 and received responses from 280 groups representing more than 67,000 providers.

The survey showed that the median compensation level for interventional radiologists was \$504,277, a 4.02 percent increase from 2011 to 2012, while median compensation for diagnostic radiologists fell by 1.3 percent to \$453,216 in that time. In terms of compensation levels, radiologists again ranked fourth and fifth, respectively, among specialties surveyed.

Nevertheless, the sizeable salary increase in 2012 for interventional radiology actually falls in line with more moderate increases in other specialties, after factoring in the year-to-year percentage change from 2011-2013, said Brad Vaudrey, M.B.A., C.P.A., principal at Sullivan, Cotter & Associates, Inc., which administered the AMGA survey.

"I was surprised by the 4.02 percent increase," Vaudrey said. "We've seen a definite slowing down on the revenue side with radiology. It looks like a blip in compensation for this year, but if you look at it overall between 2011 and 2013, the average change for interventional was 2.5 percent. So overall, it's still been fairly level."

Changing demographics among the medical groups surveyed could be a factor in the increase seen by interventional radiologists, Vaudrey said. Medical groups continue to merge and make acquisitions, which sometimes provide the acquired physician some guaranteed salary or one-time retention bonuses.

"Our surveys show that groups are getting bigger," Vaudrey said. "There's a bit of a population shift underway. Medical groups as acquisitions are occurring in large numbers, and that includes radiology. Our demographics have traditionally been very much focused on larger multispecialty groups, and those are the groups that are acquiring these practices."



Vaudrey

Fisher

Yousem

"We're seeing increasing integration throughout the country, with groups affiliating or merging to form larger health systems to focus on population health," said Donald W. Fisher, Ph.D., CAE, AMGA's president and chief executive officer. "Also, new payment models are emerging that rely on various specialties collaborating to achieve outcomes. Radiologists are a central part of any multispecialty medical group or organized system of care seeking to treat patients for their entire life span, so the specialty is still in high demand. These may be contributing factors to the increase in compensation for interventional radiologists. It will be interesting to monitor over the next few years as these trends continue to evolve."

Overall Flatness in Compensation Continues in 2012

Compensation for primary care specialties increased by approximately 2.8 percent—the same increase as in 2011—while the survey showed compensation increased by only 1.5 percent for other medical specialties and even less for surgical specialties (0.5 percent).

The troubled U.S. economy and uncertainty in payment reform models continued to be a factor in keeping overall compensation increases to below the approximate 3 percent average, which historically tracks at or slightly above the overall inflationary index, Vaudrey added.

"Overall we're seeing a relative flattening in compensation rates," Vaudrey said. "In some cases we're seeing decreases, but overall we're anticipating a low-rise increase for the next year or two. We're not going to see significant jumps like we've seen in the past for some of the surgical and medical specialties. I still expect primary care to experience bigger compensation increases down the line."

Cath lab cardiologists overtook cardiac/thoracic surgeons to become the high-

"I was surprised by the 4.02 percent increase. We've seen a definite slowing down on the revenue side with radiology,"

Brad Vaudrey, M.B.A., C.P.A.

AMERICAN MEDICAL GROUP ASSOCIATION (AMGA) 2013 MEDICAL GROUP COMPENSATION AND FINANCIAL SURVEY: 2013 REPORT BASED ON 2012 DATA

TOP PHYSICIAN COMPENSATION

Specialties	2013	2012	2012-2013 Percentage Change	2011	2010	2011-2013 Percentage Change	2010-2013 Percentage Change	2010-2013 Dollar Change
Cardiology — Cath Lab (Invasive Interventional)	\$547,112	\$524,731	4.27%	\$504,099	\$484,092	8.53%	13.02%	\$63,020
Cardiac/Thoracic Surgery	525,944	544,087	-3.33%	532,567	533,084	-1.24%	-1.34%	-7,141
Orthopedic Surgery	525,000	515,759	1.79%	501,808	500,672	4.62%	4.86%	24,328
Diagnostic Radiology (Interventional)	504,772	485,277	4.02%	492,102	478,000	2.57%	5.60%	26,772
Diagnostic Radiology (Non-Interventional)	453,216	459,186	-1.30%	461,250	454,205	-1.74%	-0.22%	-989

TOP PHYSICIAN RVUs

Specialties	2013	2012	2012-2013 Percentage Change	2011	2010	2011-2013 Percentage Change	2010-2013 Percentage Change	2010-2013 Dollar Change
Cardiac/Thoracic Surgery	9,229	9,500	-2.86%	10,519	10,519	-3.98%	-12.26%	-1,290
Ophthalmology	8,813	8,649	1.90%	8,583	8,583	-0.09%	2.68%	230
Cardiology — Cath Lab (Invasive Interventional)	8,491	8,298	2.32%	8,633	8,633	-1.60%	-1.64%	-142
Gastroenterology	7,947	7,992	-0.56%	8,165	8,165	-1.56%	-2.67%	-218
Diagnostic Radiology (Interventional)	7,892	7,813	1.02%	7,597	8,530	3.88%	-7.47%	-638
Diagnostic Radiology (Non-Interventional)	7,892	7,423	6.32%	8,296	8,053	-4.87%	-2.00%	-161

*Work relative value units (RVUs) are the primary measure of a physician's productivity for the majority of participating medical groups.

est-paid specialty, earning a median average salary of \$547,112, a 4.27 percent increase from 2011. Cardiac/thoracic surgeons were second with a median salary of \$525,944, a decrease of 3.33 percent, while orthopedic surgeons received a median salary \$525,000, a 1.79 percent drop from the previous year.

The biggest increases in annual compensation were seen in endocrinology (up 5.81 percent to a median \$234,258), infectious disease (up 5.64 percent to a median \$242,477), rheumatology (up 4.89 percent to a median \$240,250) and anesthesiology (up 4.6 percent to a median \$394,734).

Radiology Continues Downward Trend in RVUs

Relative Value Units are a measure of physician output based on the value assigned to each Current Procedural Terminology (CPT) code through the resource-based relative value scale used partially by Medicare and nearly all health maintenance organizations. Reimbursement by the Centers for Medicare & Medicaid Services (CMS) is based on the RVU system, so overall revenue rises when RVUs increase, as they did in 2012. Overall, weighted-RVUs increased by approximately 1.5 percent across all specialties in 2012.

According to the survey, RVUs for medical and surgical specialties remained flat, increasing 0.1 percent and 0.8 percent, respectively, while RVUs for primary care specialties increased by 2.5 percent on average. The highest work RVU increases were seen in psychiatry (10.5 percent) and infectious disease (10.3 percent). Diagnostic radiology was next with a 6.32 percent average increase while interventional radiology saw only a 1.02 percent increase from the previous year.

Over two years (2010 and 2012), the survey shows a downward trend in work RVUs for both diagnostic (-2 percent) and interventional (-7.5 percent) radiology. Experts believe this could be related to the recent CMS Medicare Physician Fee Schedule guidelines lowering fees for multiple studies provided to the same patient by the same physician during a single health-care visit and for imaging contiguous body parts in the same session.

"The CMS change has affected radiology to a great degree," said David Yousem, M.D., M.B.A., a professor in the Department of Radiology, vice-chair of program development and director of neuroradiology at Johns Hopkins Hospital in Baltimore, and a nationally recognized expert on radiology economics. "RVUs are down because of the new way they are calculated. When radiologists conduct a chest and abdomen exam, the second study only gets credited for 50 percent of the RVUs, as opposed to the previous rate of 100 percent."

Overall Compensation Increases Likely to Remain Flat

Vaudrey said he once again expects between a 1 to 3 percent increase in the year-to-year annual compensation rates across all specialties, including radiology. He also said an overall decrease in annual compensation is unlikely.

"I don't think we'll see a decrease unless there is a decrease in the production level overall," Vaudrey said. "We'll see moderate increases for the next two or three years and the same with productivity. RVUs will probably remain fairly steady, barring CMS value changes." □

WEB EXTRAS

More information about the American Medical Group Association is available at www.amga.org.

Patients View *RadiologyInfo.org* as Trustworthy, Helpful

We live in a plugged-in society, spending an average of four hours a day on the Internet using our computers and mobile devices to browse some 555 million websites.

AND AS PATIENTS continue to take a more active role in their own healthcare, more are devoting at least part of their online time to visiting healthcare websites for trusted, up-to-date information. With more than 615,000 visits per month last year, *RadiologyInfo.org*, the RSNA-ACR (American College of Radiology) public information website, is the third most highly traveled healthcare website, according to the market research firm eBizMBA, Inc. The top two spots are held by WebMD and the Mayo Clinic website.

"*RadiologyInfo.org* is a tremendous resource and a valuable public service that provides people undergoing radiologic procedures and their families with knowledge and comfort," said Geoffrey Rubin, M.D., co-chair of the RSNA-ACR Public Information Website Committee which oversees *RadiologyInfo.org*. "We have a singular focus on radiologic information that is unavailable on other websites."

To ensure *RadiologyInfo.org* is keeping pace with the changing landscape of the online world—and the evolving needs of patients—the committee recently engaged a Chicago-area market research firm to conduct one-on-one usability testing of the website and focus group research on how people search out healthcare information.

"It's important to check in and see how we're doing," said Elliot K. Fishman, M.D., co-chair of the RSNA-ACR Public Information Website Committee. "What we believe to be important as radiologists may not be what our patients think is important."

Staying in tune with patient needs is especially critical as the website continues to build on its library of resources. Since *RadiologyInfo.org* was launched in 2000 with 18 descriptions of common radiologic procedures, the breadth and depth of the website have grown considerably. Today, the site covers more than 155 procedures, exams and disease topics—with others under development—and offers sections on patient safety, diseases/conditions and children's procedures as well as a video and image library. A Spanish version of *RadiologyInfo.org* drew more than 1.8 million visits alone last year, and the site is mobile-optimized for tablets and smartphones.

New to the site is a Screening and Wellness section which offers readers an in-depth overview of screening exams, who should consider screening, how it's performed, the benefits/risks, what happens if something is detected, and more. This section currently features lung cancer, breast cancer and colorectal cancer screening. Forthcoming topics include carotid artery and cardiac screening.

Each year, new and existing content for the website is developed, reviewed and updated by a vast team of radiologists, medical physicists and other radiology professionals serving as writers, reviewers and section stewards.

In its ongoing expansion, the committee's goal for *RadiologyInfo.org* continues to be informing patients and the general public about medical imaging examinations and radiologic treatment, as well as the latest trends and developments in radiologic care.

"Our goal, which has never changed, is serving patients by

helping them better understand radiologic procedures," Dr. Fishman said. "This website is the crown jewel of our public information efforts and a testament to the hard work of hundreds of radiology professionals and support staff at the RSNA and ACR."

RadiologyInfo.org "demystifies radiologic procedures"

To better understand how both consumers and healthcare professionals get their health information, the committee hired a market research firm to conduct two focus groups. Not surprisingly, respondents said they rely heavily on the Internet, look for websites with URL extensions such as .org and .edu, and consider a lack of advertising a sign of a website's credibility.

The firm also conducted one-on-one usability testing sessions with healthcare consumers. During the one-hour sessions, participants were questioned about their familiarity with radiology and online information sources and then asked to use *RadiologyInfo.org* to learn more about specific radiologic procedures or health conditions. Participants were then invited to discuss their impressions, identifying areas of the website that were helpful as well as those they felt could use improvement.

When participants used Google to search for common keywords such as "X-ray" or "CT," *RadiologyInfo.org* often came up on the first page of results—largely due to its highly effective search engine optimization strategy. When presented with a list of Google results, participants often selected *RadiologyInfo.org* as the best choice, and once on the site, they found it to be helpful, trustworthy and written at an appropriate level and tone.

"Part of the value of *RadiologyInfo.org* is to demystify radiologic procedures, to explain in simple terms what a patient can expect

"We need to make certain that *RadiologyInfo.org* is giving patients what they want, the way they want it."

Elliot K. Fishman, M.D.



Fishman



Rubin

in a format that is straight-forward and easy to navigate," Dr. Rubin said.

Participants' suggestions for improving *RadiologyInfo.org* included better organization of the site's content and adding more patient-friendly images and videos.

"We need to make certain that *RadiologyInfo.org* is giving patients what they want, the way they want it," Dr. Fishman said. "People's needs are so different today than they were 10 years ago. Today, Internet users expect more interactivity, a more entertaining experience."

Radiologists need to do their part as well, according to Drs. Fishman and Rubin, who stress the importance of radiologists actively promoting *RadiologyInfo.org* to their patients. With downloadable fact sheets that can be used as patient handouts, *RadiologyInfo.org* is a turnkey communication tool for radiology practices.

"As radiologists, we have often not had the opportunity for direct patient communication," Dr. Rubin said. "*RadiologyInfo.org* gives us a virtual presence and a tangible way to reach out to and engage patients when they are ready and able to receive information."

Planning for the Future

The committee plans to use the insight gained from the market research along with interviews with key stakeholders to formulate a strategic plan for *RadiologyInfo.org* to be implemented in 2014 and beyond. The plan will include a new set of performance metrics to be used in future evaluations of the site.

Given the drastic changes to the Internet in just the last decade, it's anyone's guess what the digital world will look like in 2023. Will mobile connectivity make desktops, laptops and even tablets obsolete? Will patients participate in online support groups and regularly email their physician? Whatever the future holds, the committee is working to keep *RadiologyInfo.org* in step with the changes.



Launched in 2000, *RadiologyInfo.org* now includes more than 130 videos and nearly 675 images and covers more than 155 procedures, exams and disease topics—with others under development—and offers sections on patient safety, diseases/conditions and children's procedures as well as a video and image library.

"RSNA members should feel comfortable that we're working very hard to hit a moving target," Dr. Fishman said. "At the end of the day, we need to ensure that we continue to be the preferred website for patient-directed radiology information." □

WEB EXTRAS

📄 To access more than 30 articles and 18 videos on patient safety, download the *RadiologyInfo.org* Patient Safety in Imaging app for your iPhone, iPad and Android tablet here www.rsna.org/radinfoapp/.

📄 Check out the *RadiologyInfo.org* NEW Screening and Wellness section at www.radiologyinfo.org/en/Sitemap/ScreeningMenu.cfm.

HURRICANE SANDY "VICTIMIZES" NY RADIOLOGY DEPARTMENT

Continued from Page 10

the advantages of IT infrastructure that have been developed over the last several years and make this center incredibly patient- and employee-centric."

Improvements include an electronic "grease board" that allows technologists to view the department in real

time and to triage patients in such a way that improves department efficiency. The hospital is also performing imaging utilization studies.

There is already evidence that the new approach is working. Before the hurricane, NYU Langone had three CT scanners available



Recht

for outpatient imaging, but lost one in the storm. "Even down one machine we're doing more CTs now than before the hurricane," Dr. Recht said. "And we're doing it significantly more efficiently."

The team that previously used the lost CT scanner has now been incorporated into the two other teams, allowing staff to provide better, more efficient service. Radiology is moving patients through CT exams so quickly, Dr. Recht said, that the department has increased its on-time performance rate to nearly 95 percent—"significantly

better than our previous rate."

Other efficiencies are also being achieved. For example, the department—using the electronic grease board—can track how much time has lapsed since a patient had ingested contrast material, allowing radiology staff to plan more efficiently and scan patients faster.

The disaster also prompted a renewed perspective among hospital staff, Dr. Recht said.

"We came to the realization that people are more important than machines," Dr. Recht said. "That's the most important lesson we learned."

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- 89 percent of the respondents remain in academics, 27 percent of those are currently department chairs or division heads.
- On average, each recipient of an R&E grant has published a total of 45 peer-reviewed manuscripts in high-impact journals, including *Radiology* and *RadioGraphics*, since receiving their award; of these, 50 percent were first or senior author.
- 73 percent received extramural funding after the R&E grant award. Recipients received, on average, more than \$3 million in extramural funding subsequent to their R&E grant. Almost 40 percent of the respondents have been principal investigators on an NIH grant.
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DEADLINES FOR 2014 GRANT APPLICATIONS

The application process for 2014 R&E Foundation grants is now open.

Deadlines are:

- January 10, Education Grants
- January 15, Research Grants
- February 1, Research Medical Student Grant

Learn more about applying for R&E grants at RSNA.org/Foundation.

Education and Funding Opportunities



Writing a Competitive Grant Proposal Program

March 7-8, 2014
RSNA Headquarters,
Oak Brook, Ill

REGISTRATION is open for the Writing a Competitive Grant Proposal workshop, designed for researchers in radiology, radiation oncology, nuclear medicine and related sciences who are interested in actively pursuing federal funding.

Guided by a faculty of leading researchers with extensive experience in all aspects of grant applications and funding, the program will focus on developing realistic expectations and will provide tools for getting started. Faculty includes G. Scott Gazelle, M.D., Ph.D., M.P.H., and Udo Hoffmann, M.D., of Massachusetts General Hospital in Boston, Ruth Carlos, M.D., of the University of Michigan Health System in Ann Arbor, and Francis Blankenberg, M.D., of Lucile Packard Children's Hospital at Stanford University in Palo Alto, Calif.

The course fee is \$175. Register online at RSNA.org/CGP. Contact Fiona Miller at 1-630-590-7741 or fmiller@rsna.org for further information.

Access RSNA 2013 Courses from Your Mobile Device

At each RSNA annual meeting, the RSNA Education Center records several courses to be posted online in the following months.

New this year, RSNA will post these presentations in a mobile-accessible, online format—including the side-by-side transcripts and audiovisual presentations—as educational materials for RSNA members.

The RSNA Education Center thanks the faculty who agreed to participate in recording their courses at RSNA 2013, as well as those



who presented self-assessment modules (SAMs) at the annual meeting. As part of presenting a SAM, faculty must write SAM questions

for their course and provide references for each question. With the help of SAM faculty, the Education Center was able to provide 35 SAMs courses at RSNA 2013.

For information on educational products, contact the Education Center at ed-ctr@rsna.org or 1-800-272-2920.

Medical Meetings

January-March 2014

JANUARY 6-9

Society of Nuclear Medicine and Molecular Imaging (SNMMI), 2014 Mid-winter Meeting, Renaissance, Palm Springs, Calif.

• www.snmni.org

JANUARY 16-18

American Gastroenterological Association (AGA) Institute, the American Society of Clinical Oncology (ASCO), the American Society for Radiation Oncology (ASTRO) and the Society of Surgical Oncology (SSO), Co-sponsored Gastrointestinal Cancers Symposium, Moscone West Building, San Francisco

• <http://gicasym.asco.org>

JANUARY 23-26

Indian Radiological & Imaging Association (IRIA), 67th Annual Congress, Hotel J.P. Palace & Convention Center, Agra, India

• www.iria.in/index.php

JANUARY 27-31

Integrating the Healthcare Enterprise (IHE®) North American Connectathon, Hyatt Regency Chicago

• www.ihe.net/Connectathon

FEBRUARY 13-16

American Society of Spine Radiology (ASSR), Annual Symposium, Fontainebleau Hotel, Miami

• www.theassr.org

FEBRUARY 15-20

International Society for Optics and Photonics (SPIE), Medical Imaging 2014, Town & Country Resort and Convention Center, San Diego

• www.spie.org

FEBRUARY 20-22

American Society for Radiation Oncology (ASTRO) Multidisciplinary Head and Neck Cancer Symposium, JW Marriott Camelback Inn Resort and Spa, Scottsdale, Ariz.

• www.headandnecksymposium.org

FEBRUARY 23-27

Healthcare Information and Management Systems Society (HIMSS), Annual Conference and Exhibition, Orlando, Fla.

• www.himssconference.org

MARCH 3-7

American Physical Society (APS), March Meeting, Denver Convention Center

• www.aps.org

MARCH 6-10

The European Society of Radiology (ESR), European Congress of Radiology (ECR), Austria Center Vienna

• www.ecr.org

FIND MORE EVENTS AT
RSNA.org/calendar.aspx

Radiology in Public Focus

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

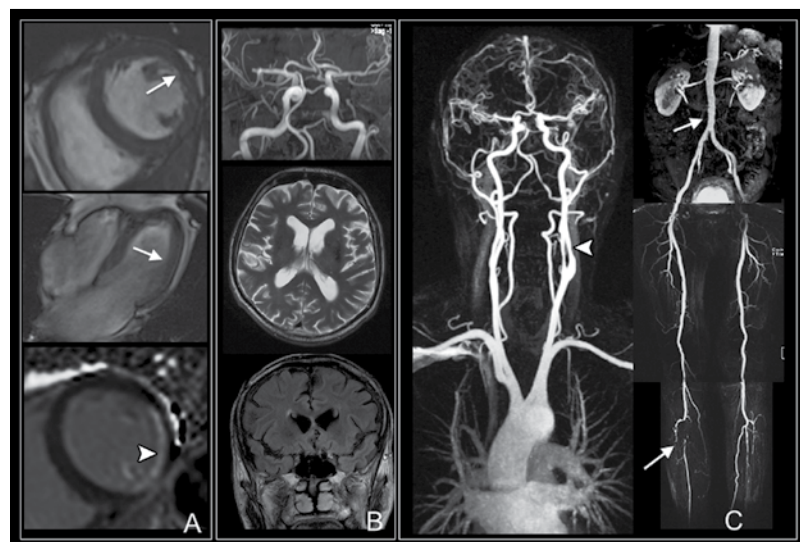
Diabetes Mellitus: Long-term Prognostic Value of Whole-Body MR Imaging for the Occurrence of Cardiac and Cerebrovascular Events

CARDIOVASCULAR DISEASE as assessed with whole-body MR imaging confers strong prognostic information in patients with diabetes mellitus (DM), according to new research.

Fabian Bamberg, M.D., Ph.D., of Ludwig Maximilians University, Munich, Germany, and colleagues studied the predictive value of whole-body MR imaging for the occurrence of a major adverse cardiac and cerebrovascular event (MACCE) in 65 patients with diabetes. The patients underwent a contrast-enhanced whole-body MR imaging protocol, including brain, cardiac and vascular sequences. Researchers then conducted follow-up inquiries to assess the rate of MACCE in the study group.

Follow-up was completed in 61 patients. After a median of 5.8 years, 14 patients experienced MACCE. Patients who had detectable vascular changes on whole-body MR imaging faced a cumulative MACCE risk rate of 20 percent at three years and 35 percent at six years. None of the patients with a normal whole-body MR imaging went on to experience MACCE.

“The extent of cardiovascular disease as detected with whole-body MR imaging in patients with diabetes mellitus (DM) has strong prognostic implications, independent of other established clinical or laboratory markers,” the authors write.



Whole-body MR images show multiple findings in 74-year-old man with type 2 diabetes for 21 years. (A) Cardiac acquisitions in short-axis (top image) and four-chamber (middle image) views show impaired function with anterolateral hypokinesia (arrows). Late gadolinium-enhanced image (bottom image) shows enhancement of anterolateral myocardium (arrowhead) indicative of MI. (B) Cerebral acquisitions reveal normal cerebral arteries on time-of-flight angiogram (top image), axial T2-weighted brain image (middle image), and coronal fluid-attenuated inversion-recovery image (bottom image). (C) Vascular acquisitions on contrast-enhanced MR angiograms demonstrate 50 percent stenosis of left internal carotid artery (arrowhead) and multisegmental luminal irregularities of abdomen (upper arrow), thighs, and lower leg with severe atherosclerotic disease and vessel occlusion (lower arrow).

Radiology 2013;269:3:730-737 ©RSNA, 2013. All rights reserved. Printed with permission.

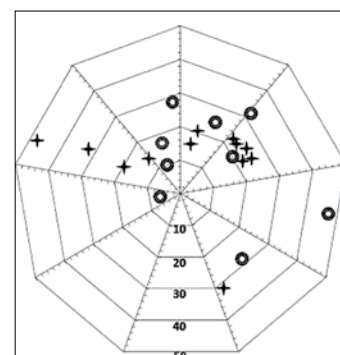
Physician Self-Referral: Frequency of Negative Findings at MR Imaging of the Knee as a Marker of Appropriate Utilization

MR IMAGES of the knee from patients self-referred by clinicians who owned MR equipment are more likely to be negative than those from patients referred by clinicians without financial interest in the MR equipment, new research shows.

Matthew P. Lungren, M.D., of Duke University Medical Center, Durham, N.C., conducted a retrospective review of consecutive diagnostic MR images of the knee interpreted by one radiology practice between January and April 2009. The study comprised patients who had been referred by two separate physician groups serving the same geographic community: one with financial interest (FI) in the MR imaging equipment used and one with no financial interest (NFI) in the MR imaging equipment used.

Of 700 examinations, 205 had negative results (117 of 350 in the FI group and 88 of 350 in the NFI group, $P = .016$), a 33 percent increase in the frequency of studies with negative findings in patients referred by the physician group that owns the MR imaging equipment. Among examinations with positive results, the mean total number of positive abnormality subtypes per image did not significantly differ between groups: 1.52 for the FI group and 1.53 for the NFI group ($P = .96$).

“These findings suggest that there is a different threshold for ordering MR imaging examinations, which may be due to financial incentive,” the authors write.



Scatterplot depicts relative distance (miles) between clinic locations of FI-group (circles) and NFI-group (crosses) referring clinicians.

(Radiology 2013;269:3:810-815) ©RSNA, 2013. All rights reserved. Printed with permission.

The California Breast Density Information Group: A Collaborative Response to the Issues of Breast Density, Breast Cancer Risk, and Breast Density Notification Legislation

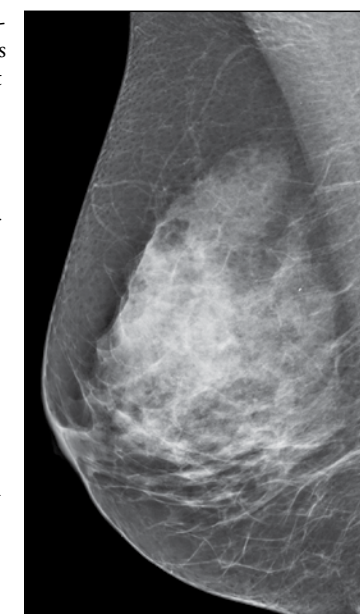
STATEWIDE collaborations like the California Breast Density Information Group (CBDIG) can assist in developing broad-scope guidelines and educational materials to help navigate challenges posed by breast density notification laws, according to a special report.

In California, legislation requiring notification of women with heterogeneously and extremely dense breast tissue took effect April 1, 2013. Elissa R. Price, M.D., of the University of California, San Francisco, and CBDIG colleagues identified key elements and implications of the law, researching scientific evidence needed to develop a robust response. The group developed educational materials for referring physicians and patients and constructed an easily accessible website containing information about breast density, breast cancer risk assessment and supplementary imaging.

In this era of patient-centered care and personalized medicine, breast density notification legislation provides an opportunity for radiologists to engage with referring clinicians and patients, the report states.

“The multi-institutional, multidisciplinary CBDIG approach may be a method for organizations to frame responses to individual state laws as similar legislation is passed across the United States,” the authors write.

See Page 5 for a feature article further examining what new breast density legislation means for radiologists and patients.



Mediolateral oblique mammographic view demonstrates the BI-RADS breast density category, heterogeneously dense, which may obscure detection of small masses. The other BI-RADS breast density categories are almost entirely fatty, scattered fibroglandular density and extremely dense, which lowers the sensitivity of mammography.

(Radiology 2013;269:3:887-892.) ©RSNA, 2013. All rights reserved. Printed with permission.

Media Coverage of RSNA

In September, 833 RSNA-related news stories were tracked in the media. These stories reached an estimated 240 million people.

Coverage included *U.S. News & World Report—Online*, *Yahoo! Health*, *MSN Health*, *Examiner.com*, WABC-TV (New York), KCAL-TV (Los Angeles), WBBM-TV (Chicago), *Science Daily* and *Health.com*.



DECEMBER PUBLIC INFORMATION OUTREACH ACTIVITIES FOCUS ON MR IMAGING

In December, RSNA's 60-Second Checkup radio program focuses on the potential of MR imaging to predict heart attack and stroke risk in people with diabetes.

RadiologyInfo.org Debuts New Screening and Wellness Section

RadiologyInfo.org, the RSNA-ACR public information website, is pleased to announce its new Screening and Wellness section designed to answer patient questions about and provide a better understanding of:

- Screening exams
- Who should consider screening and why?
- How screening is performed
- The benefits and risks of screening
- What happens if something is detected?

Screening topics now available include Lung Cancer, Breast Cancer and Colorectal Cancer. Other topics in the works include cardiac and carotid artery screening.

Journal Highlights

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

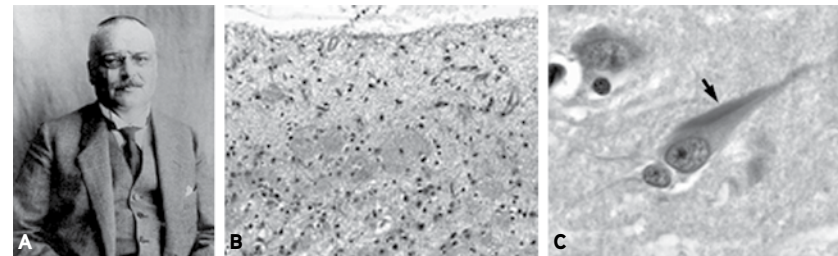
Neuroimaging and the Search for a Cure for Alzheimer Disease

Biomarkers and neuroimaging have great potential to increase the power of clinical trials for Alzheimer disease (AD) through greater effect by matching imaging methodology with therapeutic mechanism.

Radiologists can play a role in biomarker development, treatment monitoring in clinical trials and ultimately, in development of accurate diagnostic tests for patient care, according to a study in the December issue of *Radiology* (RSNA.org/Radiology) led by Jeffrey Petrella, M.D., of Duke University Medical Center, Durham, N.C. Researchers describe the progress made toward developing treatments designed to significantly slow or halt the progression of AD as well as a means of early identification of patients who may be candidates for such interventions. The authors also discuss:

- The multinational Alzheimer's Disease Neuroimaging Initiative (ADNI)
- Biomarkers and clinical trials of AD therapeutics
- Radiologists' role in clinical care and trials

Radiology



The characteristic pathologic features of Alzheimer disease (AD) originally described by (A) Alois Alzheimer; (1864–1915) in 1907, still considered essential for neuropathologic diagnosis; (B) senile plaques and (C) neurofibrillary tangles. (B) Note typical appearance of neocortical plaques with staining (hematoxylin-eosin stain; original magnification, 3200), and increased cellularity around the plaques, which consists primarily of reactive astrocytes. (C) Note typical appearance of a neurofibrillary tangle in a pyramidal neuron of the hippocampus (hematoxylin-eosin stain; original magnification, 3600). The tangle (arrow) appears as a circumscribed inclusion that extends from the cell body into the apical dendrite. (Reprinted, with permission, from reference 101.).

(*Radiology* 2013;269:3:671–691) ©RSNA, 2013. All rights reserved. Printed with permission.

- Beyond clinical care and trials: uncovering the pathophysiology of AD and other dementias
- "In addition to a critical role in trials, structural, molecular, and functional imaging techniques can give us a window on the etiology of AD and other neurodegenerative diseases," the authors write. "This combination of developments has potential to bring diagnostic radiology to the forefront in AD research, therapeutic trials, and patient care."

This article meets the criteria for AMA PRA Category 1 Credit™. SA-CME is available online only.

CT and MR Enterography in Children and Adolescents with Inflammatory Bowel Disease

Although CT enterography and MR enterography have become the imaging modalities of choice for inflammatory bowel disease (IBD), each has advantages and disadvantages in terms of diagnosing pediatric IBD.

In an article in the November-December issue of *RadioGraphics* (RSNA.org/RadioGraphics), Alexander J. Towbin, M.D., of Cincinnati Children's Hospital Medical Center, and colleagues discuss the use of CT enterography and MR enterography in the context of pediatric IBD in terms of advantages and disadvantages, protocol and imaging findings.

Although CT enterography has many advantages over other radiologic and endoscopic modalities, its main disadvantage is its reliance on ionizing radiation. This has limited its use and has helped MR enterography become the primary method of evaluating the pediatric bowel. In addition to being radiation free, MR enterography can help evaluate peristalsis, has high contrast resolution and allows the use of diffusion-weighted imaging.

CT enterography and MR enterography are similar imaging tests, each capable of helping identify IBD in a sensitive and specific manner, according to the authors.



Engorged vasa recta coursing perpendicular to the imaging plane. Axial CT enterographic image in a 16-year-old boy with Crohn disease shows the vasa recta to be increased in size and number, giving the appearance of multiple dots (arrows). Segments of bowel with mucosal hyperenhancement, mural stratification, and bowel wall thickening are also seen.

(*RadioGraphics* 2013;33;7: 1843–1863) ©RSNA, 2013. All rights reserved. Printed with permission.

"We have been able to perform CT enterography and MR enterography reliably in children as young as 2 years of age," the authors write. "Because the findings of pediatric IBD mirror those of adult disease in many ways, radiologists are able to interpret intestinal and extraintestinal findings in a wide range of patients."

This study features an Invited Commentary by Jonathan R. Dillman, M.D., University of Michigan Health System, C.S. Mott Children's Hospital, Ann Arbor.

The Value of Membership

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 is easy.

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.



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Annual Meeting Watch



RSNA RANKED AMONG LARGEST TRADESHOWS

The RSNA annual meeting was ranked the 35th largest tradeshow of 2012 in a list released by the publication *Tradeshow Week*. Tradeshows were ranked by net square feet of exhibit space. RSNA offered 444,900 net square feet at RSNA 2012, making it the second largest healthcare-related tradeshow. The Healthcare Information and Management Systems Society (HIMSS) Annual Conference & Exhibition was the largest healthcare-related tradeshow and 33rd largest tradeshow overall, with 468,500 net square feet of exhibit space.

RSNA 2014 Online Abstract Submission Opens mid-January

The online system to submit abstracts for RSNA 2014 will be activated in mid-January. The submission deadline is 12 noon Central Time on Wednesday, April 9, 2014. Abstracts are required for scientific presentations, education exhibits, applied science, quality storyboards and quantitative imaging reading room showcase.

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

The easy-to-use online system helps the Scientific Program Committee and Education Exhibits Committee evaluate submissions more efficiently. For more information about the abstract submission process, contact the RSNA Program Services Department at 1-877-776-2227 within the U.S. or 1-630-590-7774 outside the U.S.

Other Important Dates for RSNA 2014

- May 7:** Member registration and housing open
- June 4:** General registration and housing opens
- July 9:** Course enrollment opens
- October 24:** International deadline to have full conference badge mailed
- November 7:** Final housing and discounted registration deadline
- November 26:** Deadline to guarantee a seat for all ticketed courses
- Nov 30-Dec 5:** 100th Scientific Assembly & Annual Meeting



RSNA.org

Professionalism Vignettes Spark Discussion of Daily Dilemmas

While most radiologists periodically encounter professional dilemmas in their practice, many aren't sure how to handle these situations—or where to look for guidance and education on the best protocol for addressing such issues.

RSNA members need look no further than the Professionalism Resources page on RSNA.org.

Among the host of tools and information essential to bolstering your professionalism IQ, the portal features vignettes, based on published literature, that provide thought-provoking scenarios in an interactive question-and-answer format.

Developed by the RSNA Professionalism Committee, each vignette illustrates a real-life situation with a professional dilemma, followed by a series of multiple-choice questions that draw attention to important, specific teaching points on professionalism—one of radiology's core competencies.

The Professionalism Committee recently added two new vignettes—"Medical Trainees and Medical Training" and "Suboptimal Utilization of Imaging Studies"—to its diverse roster of topics including, "Sexual Harassment," "Partner Relationships" and "Disclosure of Radiological Error," and will continue to build on its library of content.

Along with sparking discussion on these important issues, the vignettes are intended to raise awareness about the need for radiologists to incorporate professionalism into routine practice and to facilitate discussion of professionalism.

Access the vignettes from the Professionalism homepage at RSNA.org/professionalism.

To submit questions, suggest topics or for more information, contact Professionalism@rsna.org.



COMING NEXT MONTH

Along with featuring highlights of some of the most captivating images of RSNA 2013, we report recent research demonstrating that much of the burn-out experienced by radiology residents is fueled by money worries.



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