

RSNA *News*

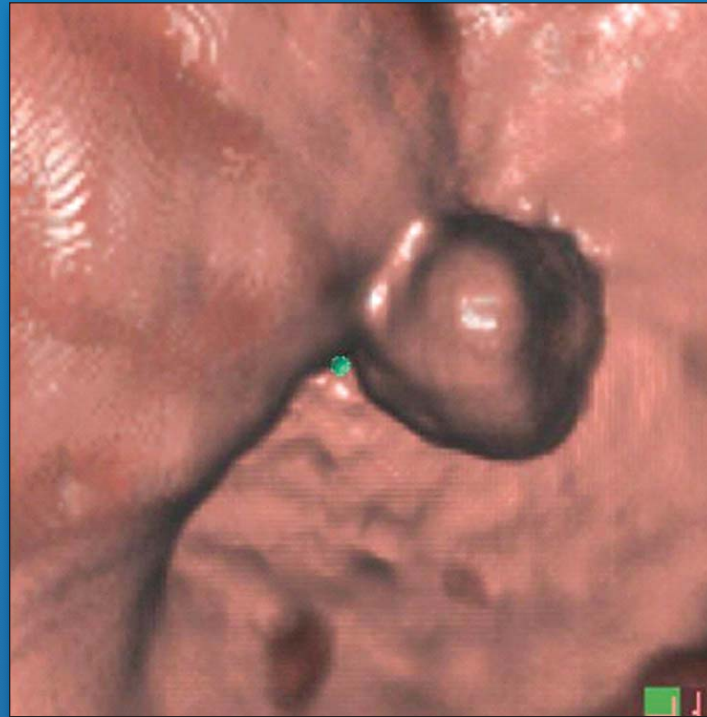


Image courtesy of Stefano G. Barchi, M.D., Ph.D., University of California, Los Angeles

MR Colonography Becomes Option for Patient-Tolerated Colorectal Screening

Also Inside:

- New Studies Further the Debate over CT Lung Screening
- RSNA 2007 Program Spotlights Radiation Oncology, Diagnostic Radiology Bond
- Potential Seen in Nanomagnets to Broaden Range of MR Imaging
- Interesting Work Keeps Radiologists on the Job Longer

Course Enrollment Begins June 18
RSNA2007.RSNA.org

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RSNA News

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Distinguished Honorees and Lecturers

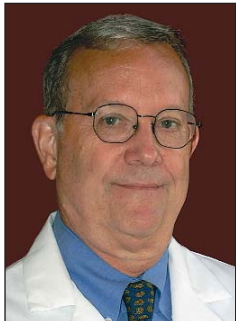

RSNA 2007

CONNECTING RADIOLOGY

 93rd Scientific Assembly
 and Annual Meeting
 November 25-30, 2007
 Chicago

THE RSNA Board of Directors has announced the distinguished honorees and lecturers to whom the Society will pay tribute at the 93rd Scientific Assembly and Annual Meeting. They are:

GOLD MEDALISTS



**R. Nick Bryan, M.D.,
Ph.D.**
Philadelphia

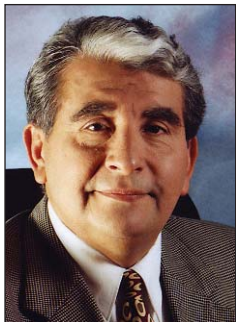


**William R. Hendee,
Ph.D.**
Whitefish Bay, Wis.

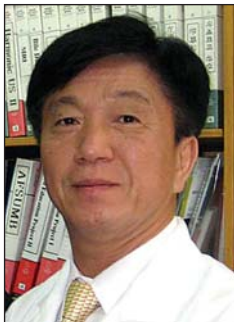


James H. Thrall, M.D.
Boston

HONORARY MEMBERS



**Francisco A.
Arredondo, M.D.**
Guatemala City,
Guatemala



Byung Ihn Choi, M.D.
Seoul, Republic of
Korea



**Christian J. Herold,
M.D.**
Vienna, Austria

■ Detailed information about each of these honorees and presenters will be published in future editions of RSNA News.

ANNUAL ORATION IN DIAGNOSTIC RADIOLOGY

*Breast Imaging:
Yesterday, Today and
Tomorrow*



**Lawrence W. Bassett,
M.D.**
Los Angeles

ANNUAL ORATION IN RADIATION ONCOLOGY

*The Cost of Cancer Care:
Near-Term Strategies and
Long-Term Solutions*



Allen S. Lichter, M.D.
Alexandria, Va.

EUGENE P. PENDERGRASS NEW HORIZONS LECTURE



Elias A. Zerhouni, M.D.
Bethesda, Md.

RSNA Receives More Kudos

Medical Imaging magazine has once again ranked RSNA #1 in its listing of Association/Trade Show/CME Event/Imaging-Related Educational Programs. The American College of Radiology (#2) and American Society of Radiologic Technologists (#3) also kept the same rankings as last year. Rounding out the top 10 were the

American Cancer Society, Radiology Business Management Association, American Healthcare Radiology Administrators, American Society for Therapeutic Radiology and Oncology, SNM, Society for Imaging Informatics in Medicine and Society of Breast Imaging. More information is available at www.medicalimagingmag.com/.

MEDICAL IMAGING COMPANY NEWS

NightHawk Buys Radlinx

■ Teleradiology provider NightHawk Radiology Services, of Coeur d'Alene, Idaho, has acquired Radlinx Group in a \$53 million transaction. NightHawk is the largest teleradiology provider in the U.S., while Radlinx, based in Irving, Texas, was the third largest. NightHawk also just added cardiac 3D imaging capabilities to its service list.

RSNA 2007 Associated Sciences Program

THE Associated Sciences Consortium has announced the topics for its refresher course series at RSNA 2007. Replacing the symposium this year are two additional refresher courses, for a total of 10 courses held Monday, Tuesday and Wednesday.

For more information, go to RSNA2007.RSNA.org and click Registration, Housing & Courses. Course enrollment begins June 18.



MONDAY – NOVEMBER 26

- Radiology's Role: When Disaster Strikes! Part 1: Environmental
- Radiology's Role: When Disaster Strikes! Part 2: Terrorism
- Satisfying Our Diverse Patient Needs: Unique Like Everyone Else
- Optimizing Image Acquisition and Display in Digital Imaging

TUESDAY – NOVEMBER 27

- Fusion Imaging
- The Buck Stopped Here and I Put It in My Pocket: The Link Between Compliance and Good Business
- Pay and Performance: Can Radiology Play Too?
- Radiology Errors

WEDNESDAY – NOVEMBER 28

- Controversies in Screening: Breast, Cardiac, Chest and Virtual Colonoscopy
- The Art and Science of Radiology Planning and Design

The Associated Sciences Consortium comprises the American Healthcare Radiology Administrators (AHRA), American Institute of Architects–Academy on Architecture for Health (AIA-AAH), American Radiological Nurses Association (ARNA), American Society of Radiologic Technologists (ASRT®), Association of Educators in Imaging and Radiologic Sciences, Inc. (AEIRS), Association of Vascular and Interventional Radiographers (AVIR), Canadian Association of Medical Radiation Technologists (CAMRT), Radiology Business Management Association (RBMA), Section for Magnetic Resonance Technologists (SMRT-ISMRT) and the SNM—Technologists Section (SNM-TS).

CARE Bill Introduced in U.S. Senate

The Consistency, Accuracy, Responsibility and Excellence in Medical Imaging and Radiation Therapy Act of 2007 (CARE), introduced into the U.S. House of Representatives on Jan. 19, was introduced into the U.S. Senate on March 29.

The bill would require people performing the technical components of medical imaging and radiation therapy to meet federal education and credentialing standards in order to participate in federal health programs such as Medicare, Medicaid and other programs administered by the U.S. Department of Health and Human Services. Medical imaging examinations and procedures, as well as radiation therapy treatments for patients covered under these programs, would need to be performed by personnel meeting the federal standards in order to be eligible for reimbursement.

NEMA Names MITA

The medical division of the National Electrical Manufacturers Association (NEMA) is now the Medical Imaging & Technology Alliance (MITA). According to NEMA, the new name underscores the role of its medical imaging division as the collective voice of medical imaging equipment manufacturers, innovators and product developers.



MITA will continue to provide leadership for the medical imaging industry on legislative and regulatory issues at the state, federal and international levels. It will also remain the world's primary organization charged with developing standards for the design, production and distribution of imaging products. More information is available at www.medicalimaging.org.

ACR Releases White Paper on Radiation Dose

The American College of Radiology (ACR) has proposed a plan to educate the many stakeholders in medical imaging on the principles of radiation safety and appropriate utilization. The ACR White Paper on Radiation Dose in Medicine also seeks to standardize radiation dose data archived during imaging for the purposes of benchmarking good practice and identifying patients who may have received high levels of radiation from frequent imaging exams and may be candidates for alternative imaging.

A recent report from the National Council on Radiation Protection and Measurements indicated the amount of radiation that the U.S. population receives each year from medical imaging—as opposed to natural sources—has increased five-fold since 1980. The ACR White Paper on Radiation Dose in Medicine is now available online at www.acr.org. It also was published in the May issue of the *Journal of the American College of Radiology*.

AIUM Honors Leaders

THE American Institute of Ultrasound in Medicine (AIUM) presented **William O'Brien Jr., Ph.D.**, with the 2007 William J. Fry Award for his numerous contributions to diagnostic ultrasound. AIUM also honored **Jonathan Rubin, M.D., Ph.D.**, and **Ernest Madsen, Ph.D.**, as pioneers in the subspecialty.

Dr. O'Brien is the Donald Biggar Willet Professor of Engineering, as well as a professor of electrical and computer engineering and

bioengineering, nutritional sciences and speech and hearing science, at the University of Illinois in Urbana-Champaign. He is also a research professor in the Beckman Institute for Advanced Science and Technology and the Coordinated Science Laboratory and director of the Bioacoustics Research Laboratory.

Dr. Rubin, a professor of radiology and director of the



William O'Brien Jr., Ph.D.



Jonathan Rubin, M.D., Ph.D.



Ernest Madsen, Ph.D.

Division of Ultrasound in the Department of Radiology at the University of Michigan in Ann Arbor, received AIUM's clinical pioneer award. A professor emeritus of medical physics

at the University of Wisconsin in Madison, Dr. Madsen received the pioneer award for basic science.

Østensen to Retire

Harald Østensen, M.D., has announced he will retire next month from his position as coordinator for diagnostic imaging and laboratory technology at the World Health Organization (WHO) headquarters in Geneva.

In the position since February 1998, Dr. Østensen has overseen WHO programs to train those responsible for diagnostic imaging in small, remote hospitals in countries with limited resources. Training programs have been conducted in Kenya, Fiji and Cameroon. Under Dr. Østensen's direction, the WHO diagnostic program has also produced practical manuals—focusing on techniques, radiation protection, quality measurements and interpretation of radiographs—and also evaluates digital radiologic equipment suitable for use in remote areas.



Harald Østensen, M.D.

ASNR Awards Gold Medal to Quencer

Robert M. Quencer, M.D., vice-chair of the RSNA Scientific Program Committee, received the gold medal of the American Society of Neuroradiology during its annual meeting this month in Chicago.

Dr. Quencer, chair of the Department of Radiology and The Robert Shapiro M.D. Professor of Radiology at the University of Miami, served as ASNR president in 1995 and editor-in-chief of the *American Journal of Neuroradiology (AJNR)* from 1998 to 2005.



Robert M. Quencer, M.D.

RADIATION SAFETY

Question of the Month

Q I am a fluoroscopist with only one film badge. Where should I wear it?

[Answer on Page 23.]

AFIP Has New Director

Florabel G. Mullick, M.D., S.E.S., is the new director of the Armed Forces Institute of Pathology, effective June 29. The first non-uniformed director in the history of AFIP, Dr. Mullick is a member of the Army Senior Executive Service and is currently AFIP principal deputy director. She has been with AFIP since 1987 and previously served as associate director and director of the Center for Advanced Pathology.

Kricun is Philadelphia's Outstanding Educator

Morrie Kricun, M.D., has received the Mary S. Fisher Outstanding Educator Award from the Philadelphia Roentgen Ray Society. Dr. Kricun is on the faculty of the Department of Radiology at Albert Einstein Medical Center in Philadelphia.

McEnergy Recognized as Imaging Innovator



Kevin McEnergy, M.D., a professor of radiology and associate division head for informatics at the M.D. Anderson Cancer Center in Houston, is among the Top 25 innovators in health imaging and IT for 2007 named by *Health Imaging & IT* magazine. Dr. McEnergy was recognized for seamlessly integrating the picture archiving and communication system (PACS) and electronic medical record (EMR) that he co-developed.

Kevin McEnergy, M.D. Dr. McEnergy, recipient of an RSNA Web-based educational grant in 2000, was also recognized for his part in implementing interpretation prioritization based on patient appointment time.

Meltzer Named Chair at Emory



1996 RSNA Research Scholar **Carolyn Meltzer, M.D.**, has been named chair of the Department of Radiology at the Emory University School of Medicine in Atlanta. A professor of radiology and part-time associate dean for research at Emory, Dr. Meltzer also holds secondary appointments in the Departments of Neurology and Psychiatry & Behavioral Sciences.

Carolyn Meltzer, M.D.

Dr. Meltzer joined Emory in 2005 from the University of Pittsburgh. A biography outlining her research career appeared in the March 2007 issue of *RSNA News*.



Send news about yourself, a colleague or your department to rsnanews@rsna.org, 1-630-571-7837 fax, or *RSNA News*, 820 Jorie Blvd., Oak Brook, IL 60523. Please include your full name and telephone number. You may also include a non-returnable color photo, 3x5 or larger, or electronic photo in high-resolution (300 dpi or higher) TIFF or JPEG format (not embedded in a document). *RSNA News* maintains the right to accept information for print based on membership status, newsworthiness and available print space.

MY TURN

Internet? Internext—Get Ready for the Second Wave of Radiology Informatics

PRESIDING over a recent meeting of RSNA's Radiology Informatics Committee (RIC), I realized how excited RSNA members—and all of radiology—are going to be when the “second wave” of radiologic informatics hits the shore.

The first wave was about the basics. The vast majority of academic and other large medical centers have now embraced picture archiving and communication systems (PACS) and radiology information systems (RIS). In North America, the penetration at all hospitals is expected to reach 80 percent in the next three years. Anyone who hasn't already experienced this first wave will very shortly.

In the second wave, we'll take things to the next level, realizing better integration with other clinical systems, including order-entry, as well as taking

advantage of built-in quality assurance and decision support tools to improve diagnostic accuracy. This new era

My Turn
ONE RADIOLOGIST'S VIEW

will also affect how we learn. Look forward to accessing just-in-time educational “mouthfuls”

relevant to the cases you are looking at and having your own personal space in the RSNA informatics world where you privately archive your own interesting cases and educational material.

RSNA members are lucky to have the RIC to help them navigate these exciting—and admittedly sometimes daunting—developments. Some of the best minds in radiology and medical informatics from around the country collaborate with talented, knowledgeable and energetic RSNA staff. Our



David Avrin, M.D., Ph.D.

recent meeting saw 100 percent attendance, with even an acute dental problem unable to keep one particularly intrepid member away.

When I flew back home from RSNA Headquarters, sipping a drink with a rare empty seat next to me, I had time to contemplate the tremendous satisfaction I've gotten out of helping mem-

bers navigate the first wave of radiology informatics. I have nothing but enthusiasm for what comes next. I know RSNA, always a leader in standard setting and education, will help members ride the second wave with success.

David Avrin, M.D., Ph.D., is a professor of radiology, adjunct professor of biomedical informatics and director of abdominal imaging at the University of Utah. He is the 2007 chair of the RSNA Radiology Informatics Committee.

What's New at RSNA 2007?



New Courses:

- 1-day Quality Improvement Program
- 4-day Bolstering Oncoradiologic and Oncoradiotherapeutic Skills for Tomorrow (BOOST) Program
- ½-day Series Courses in Gastrointestinal, Musculoskeletal and Neuroradiology
- 5-afternoon Interventional Oncology Series
- 1-day Mentored Cardiac CT Case Review
- 1-day Molecular Imaging Program

Featuring:

Categorical Courses:

- Diagnostic Radiology: Clinical PET and PET/CT Imaging
- Diagnostic Radiology Physics: Imaging Technologies in Oncology

Two financial seminars* are offered on Saturday, November 24:

- **New!** Effective Retirement Plans & Distribution Strategies
- Effective Real Estate Investment Strategies

*An additional fee applies



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Radiological Society of North America
93rd Scientific Assembly and Annual Meeting

November 25–30, 2007
McCormick Place, Chicago

MR Colonography Becomes Option for Patient-Tolerated Colorectal Screening

RESearchers evaluating the capability of MR colonography to assess extracolonic organs reported that MR was up to the challenge, further establishing itself alongside CT as a less invasive alternative to conventional colonoscopy.

While conventional colonoscopy is the gold standard for evaluating the entire colon and its pathologies, the procedure is not without its drawbacks. Not all patients want or can undergo colonoscopy due to its invasiveness, and in some types of patients the ability of CT and MR to evaluate the extracolonic findings can be important for further patient management.

A team of researchers led by Waleed Ajaj, M.D., of the Medical Center at the University Hospital Hamburg-Eppendorf in Germany, began a three-year study in 2003 to evaluate dark-lumen MR colonography for the assessment of extracolonic organs. Results were published in the Jan. 24, 2007, issue of *European Radiology*.

Two radiologists evaluated data collected from 375 patients, assessing the large bowel as well as extraintestinal organs from the lung bases to the pelvis for the presence of pathologies. Other diagnostic imaging tests were performed when necessary to further assess findings. Study protocol dictated that all patients undergo a standardized bowel-cleansing procedure prior to MR colonography, with 2,000 ml of a polyethylene glycol solution ingested the night



Stefan G. Ruehm, M.D., Ph.D.
University of California, Los Angeles



Elizabeth G. McFarland, M.D.
Mallinckrodt Institute of Radiology

before and 1,000 ml the morning of the examination.

“We looked at the extracolonic findings and, based on our judgments, we distinguished between clinically relevant findings and non-relevant findings,” said study co-author Stefan G. Ruehm, M.D., Ph.D., an associate professor of radiology at UCLA’s David Geffen School of Medicine. “It was interesting to see what we could get out of MR.”

What researchers got, he said, was solid evidence that

dark-lumen MR colonography can assess the entire colon and evaluate extracolonic organs—in total, 510 extracolonic findings were made in 260 (69 percent) of 375 patients. In those 260 patients, 54 percent had known extracolonic findings and 12 percent

had therapeutically relevant findings.

“This shows that intra- and extracolonic pathologies can be diagnosed within the same examination,” said Dr. Ruehm.

MR Still Faces Obstacles

As optimistic as they are about the potential of MR colonography, researchers are also realistic. Cost could be a deterrent to widespread use, they said, especially in the U.S., where CT is currently winning the cost battle. As a result, said Dr. Ruehm, “Radiologists are still more familiar with reading CT data than with MR.”

CT raises questions about radiation dose, said Dr. Ruehm. While physicians in the U.S. have responded by using low-dose CT, dose concerns have thrust MR center stage in Europe. “The awareness of radiation risks are higher there, so if Europeans have a choice, they prefer the method that is less inva-

If you are able to offer something that is less invasive and also accurate, people have a choice.

Stefan G. Ruehm, M.D., Ph.D.

sive and without radiation,” he said.

Whether the modality is CT or MR, the issue of extracolonic findings is an important one, said Elizabeth G. McFarland, M.D., director of CT colonography at the Center for Diagnostic Imaging and an adjunct professor of radiology at the Mallinckrodt Institute of Radiology at Washington University in St. Louis.

“The issue of proper management of the extracolonic findings is becoming an increasingly important topic,” she said. She warned, however, that for either CT or MR to be cost effective for screening populations, the extracolonic findings must not be excessive.

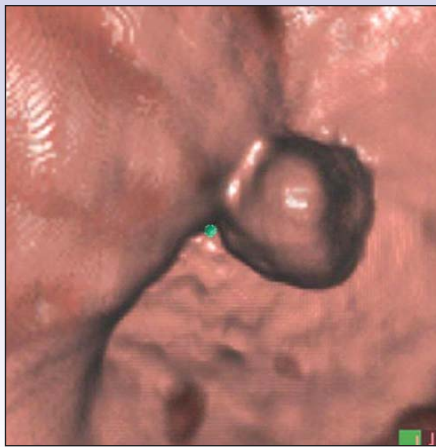
“The more you find is not always better,” Dr. McFarland said. “You need to evaluate very common diagnostic problems, like lesions that likely have little clinical significance, and can lead to unnecessary costs and additional patient distress if not managed correctly.” She pointed out that only 12 percent of subjects in the *European Radiology* study had therapeutically relevant findings.

“To see the extracolonic organs can be a double-edged sword,” she said. “That’s why standards on how to categorize and manage these findings are so important.” The C-RADS reporting structure for CT colonography introduced in the July 2005 issue of *Radiology*, she noted, is one example of how extracolonic findings, in addition to the colonic findings, are categorized from low to high importance.

Larger Goal is More Colorectal Screenings

Beyond the question of MR’s ability to assess extracolonic organs—and the relative value of that ability—Dr. Ruehm and colleagues said they hope their work leads to important changes in preventive screening for colorectal cancer. So many people are afraid of conventional colonoscopy that it makes sense to offer MR alongside CT as another less-invasive option, said Dr. Ruehm.

“In the U.S., we have heard about



ON THE COVER

Virtual endoscopic view of dark lumen MR colonographic data set shows 5mm polyp.

Image courtesy of Stefan G. Ruehm, M.D., Ph.D., University of California, Los Angeles

CT colonography, but not as much about MR colonography,” he said. “I’m trying to raise awareness as I build the program here at UCLA.” He added that while there haven’t been many studies comparing MR and CT in colonography, the results are nearly comparable.

“Many people do not want to undergo colonoscopy,” he said. “If you are able to offer something that is less invasive and also accurate, people have a choice.”

Dr. Ruehm noted that patients undergoing MR colonography must endure the same bowel prep necessary for colonoscopy, but the test itself is much shorter. “The time for data is about 20 seconds, so it’s pretty fast, and without need for sedation,” he said.

MR colonography will likely continue to gain popularity as innovations occur, said Dr. Ruehm. He said research is under way to offer the procedure with a technique called fecal tagging, which eliminates the bowel prep by giving the patient something to add to their daily food intake that tags the residual food or stool.

“MR has many options with a vari-

ety of sequence designs in this area,” said Dr. Ruehm. “You are more flexible with sequence parameters.” He acknowledged, however, an unavoidable reality with CT or MR—if something is detected, the patient may still have to undergo conventional colonoscopy.

Dr. McFarland agreed that the less-invasive nature of MR, like CT, could lead to higher patient compliance with colorectal screening. “The main issues will be cost and accuracy, with the added advantage of no radiation exposure with MR,” she said.

“Studies have shown that CT colonography has been highly acceptable to patients, so I would assume MR would also be favorable. If it leads to more people getting screened, then it’s a good thing.” □

Learn More

More information about the studies cited in this article is available online.

■ “Utility of dark-lumen MR colonography for the assessment of extra-colonic organs” Go to www.springerlink.com/content/100472 and select the June 2007 issue.

■ “CT Colonography Reporting and Data System: A Consensus Proposal” radiology.rsna.org/cgi/content/full/236/1/3

Colonography at RSNA 2007

The gastrointestinal series course at RSNA 2007 will feature a session (VG21) on CT colonography, including technical considerations, colon polyp description and radiographic classification, CT

colonography interpretation and results of the American College of Radiology Imaging Network (ACRIN) colonography trial. Registration for all RSNA 2007 courses begins June 18. More information is available at RSNA2007.RSNA.org.



RSNA 2007
CONNECTING RADIOLOGY

New Studies Further the Debate over CT Lung Screening

Authors of two recently released studies investigating CT screening for lung cancer drew different conclusions from similar data.

Mortality-Focused Study Questions Screening's Promise

CT SCREENING for lung cancer is an unproven technology with potential risks and no demonstrated benefit, said the lead author of a recent study comparing the incidence of lung cancer diagnosis, surgery, advanced cancer and mortality in patients who were screened to the incidence that was statistically predicted without screening.

"We found that we weren't intercepting cancers, that were going to become advanced, when they were early," said Peter B. Bach, M.D., M.A.P.P., a pulmonologist, epidemiologist and an associate attending physician at Memorial Sloan-Kettering Cancer Center in New York. "We saw exactly the same number of advanced cancers and we saw exactly the same number of people die from lung cancer as we were predicting."

Published in the March 7, 2007, issue of *The Journal of the American Medical Association (JAMA)*, the study looked at

3,246 asymptomatic current or former smokers at two academic medical centers in the U.S. and one in Italy. Dr. Bach and colleagues developed statistical models to compare the frequency of lung cancer cases, surgeries, advanced lung

Our study suggests that finding those early cancers may not be beneficial and may in fact be harmful.

Peter B. Bach, M.D., M.A.P.P.

cancer cases and deaths from lung cancer occurring in these patients with what would have occurred in the absence of screening.

Dr. Bach and colleagues found that while CT screening increased the likelihood of a diagnosis threefold and the likelihood of surgery tenfold, there was no decline in the number of diagnoses of advanced lung cancers or deaths due to cancer after an average follow-up of 3.9 years. This apparent lack of benefit, said Dr. Bach, is significant considering the substantial risk associated with the kind of surgery prompted by CT screening.

"We saw a tenfold increase in surgery—a very significant increase in a procedure that has a 4 or 5 percent mortality rate and a 20 to 40 percent major complication rate," he

said. "CT screening is not something we should be doing if it's not that efficient."

He added that when weighing the risks, his team didn't factor in the harm from CT-associated radiation, which can be hard to quantify. "But with mass screening every year of tens of millions of people, there would probably be some measurable harm from the radiation," he said.

The fact that CT screening finds a lot of early cancers is not in dispute, said Dr. Bach. "The question is, Do patients benefit from finding early cancers?" he asked. "Our study suggests that finding those early cancers may not be beneficial and may in fact be harmful."

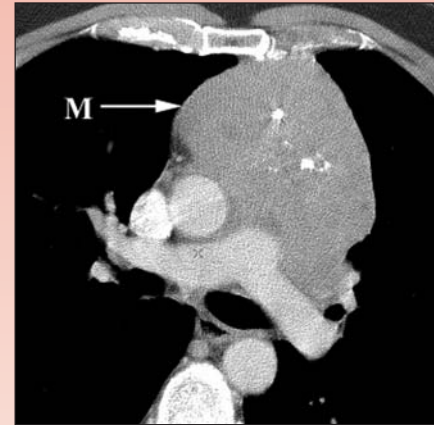
He added that the findings are reminiscent of those resulting from multiple randomized trials of chest X-ray screening, which compared the lung cancer mortality rates of patients who were screened and those who were not. "When you screen with chest X-ray you find small nodules—you

Continued on Page 15



Peter B. Bach, M.D., M.A.P.P.
Memorial Sloan-Kettering
Cancer Center

CT Screening for Lung Cancer



(above) Baseline low-dose transverse CT scan in a 61-year-old man shows a mass (M) with calcifications in the anterior mediastinum. Diagnosis based on biopsy of the mass showed thymic carcinoma.

(top right) Baseline low-dose transverse CT scan in a 60-year-old man shows an ovoid thymic mass (M) with a width of 20 mm. (bottom right) On annual repeat screening low-dose CT scan one year later, the width of the mass (M) is decreased to 10 mm.

Reprinted with permission from Henschke, et. al. "CT Screening for Lung Cancer: Prevalence and Incidence of Mediastinal Masses." *Radiology* 2006;239:586-590. © RSNA, 2006. All rights reserved.

Lung Cancer at RSNA 2007

"Update on Lung Cancer: Screening and Staging" is one of several RSNA 2007 refresher courses addressing lung cancer

detection and treatment. Registration for all RSNA 2007 courses begins June 18. More information is available at RSNA2007.RSNA.org.



Study of Protocol Deems Proper Diagnostic Work-up as Key

ANNUAL CT screening for lung cancer identifies a high proportion of patients with early-stage lung disease and a carefully designed work-up will prevent unnecessary invasive procedures and associated complications and costs, say authors of a study published in the April 2007 issue of *Radiology*.

“The diagnostic work-up is critical,” said lead author Claudia I. Henschke, Ph.D., M.D., a professor of radiology at Weill Cornell Medical College and chief of the division of chest imaging at New York-Presbyterian Hospital/Weill Cornell Medical Center in New York. Referring to the work-up she and her colleagues used, she said, “This is how you work up something without doing too many unnecessary procedures and yet still find a high percentage—85 percent—of cancers in Stage I.”

The *Radiology* study reports results from the New York Early Lung Cancer Action Project (NY-ELCAP) and supplements the findings of the International Early Lung Cancer Action Project (I-ELCAP). The focus of the study, said Dr. Henschke, was “how the regimen of screening determines how early the cancer is diagnosed. This is critical, as it provides the opportunity for earlier treatment, which can be curative.”

Investigators at 12 medical centers in New York State provided baseline CT screenings to 6,295 people with no cancer symptoms and 6,014 repeat screenings one year after the initial test. The study participants were 60 years or older with a history of smoking, but no prior cancers and no chest

CT scans in the last three years.

Of 124 people who were diagnosed with lung cancer—101 at baseline screening, 20 at annual repeat screening and three prompted by symptoms before the first annual screening—91 percent were in clinical Stage I, said Dr. Henschke.

By following the recommended protocol, unnecessary biopsies were kept to a minimum, said Dr. Henschke. Of the 134 recommended biopsies, 125 (93.3 percent) resulted in a diagnosis of lung cancer or other malignancy, while none of the 24 biopsies performed outside of the recommendations resulted in a diagnosis of lung cancer. No lobectomies were performed in patients with benign disease and no deaths resulted from surgery, Dr. Henschke added.

“This study shows that the unnecessary tests can be kept reasonably low, just about the same as you find in mammography screening,” she said. “Just like with mammography screening, it’s very important that patients go to an imaging center that has experience in the screening, does long-term followup and has a multidisciplinary team of physicians.”

She and her colleagues examined the question of treatment and long-term follow-up in a separate study. That study, reported in the October 26, 2006, issue of *The New England Journal of Medicine*, showed that patients diagnosed in Stage I as a result of annual CT screening who underwent prompt resection had a curability rate of 92 percent, said Dr. Henschke.

She said her study, ongoing at multiple institutions worldwide since 1993, has shown that CT screening can find lung cancer early and that early treatment yields a very high percentage of cures.

“I think it is reasonable for a smoker or former smoker to consider screening,” she said. “They should be told the risks

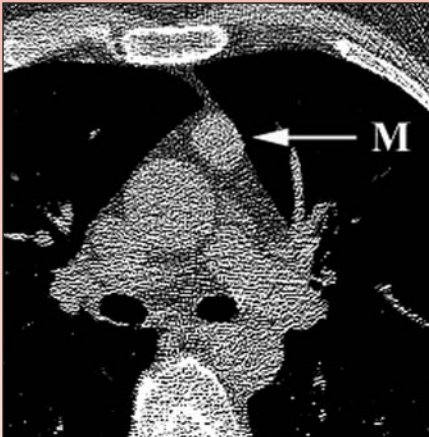
and the benefits of the screening and that it’s very reasonable for them to go ahead and get a screening at a center with experience in this area.”

Rejecting randomized screening trials as impractical

Continued on Page 13



Claudia I. Henschke, Ph.D., M.D.
New York-Presbyterian Hospital/
Weill Cornell Medical Center



Learn More

More information about the studies cited in this article is available online.

■ “Computed Tomography Screening and Lung Cancer Outcomes” jama.ama-assn.org/content/vol297/issue9/index.dtl

■ “CT Screening for Lung Cancer: Diagnoses Resulting from the New York Early Lung Cancer Action Project” radiology.rsna.org/content/abstract/243/1/239

■ “Survival of Patients with Stage I Lung Cancer Detected on CT Screening” content.nejm.org/cgi/content/abstract/355/17/1763

RSNA 2007 Program Spotlights Radiation Oncology, Diagnostic Radiology Bond

RADIATION ONCOLOGISTS are invited to learn how to forge new partnerships with diagnostic radiologists in a new RSNA 2007 program featuring top experts in a number of subspecialties.

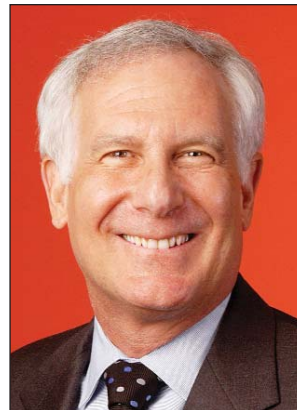
The idea behind the new Bolstering Oncoradiologic and Oncoradiotherapeutic Skills for Tomorrow (BOOST) program is to offer a one-of-a-kind opportunity not available at any other meeting, said Sarah S. Donaldson, M.D., RSNA Board Liaison for Publications and Communications and board representative to the RSNA Oncologic Imaging and Therapies Task Force that created the program.

“The practice of radiation oncology today requires precision in knowing where the cancer is located,” said Dr. Donaldson, associate chair of the Department of Radiation Oncology, deputy clinic chief and residency program director for radiation oncology at Stanford University Medical Center in Stanford, Calif., as well as the Catharine and Howard Avery Professor of Radiation Oncology at Stanford University School of Medicine.

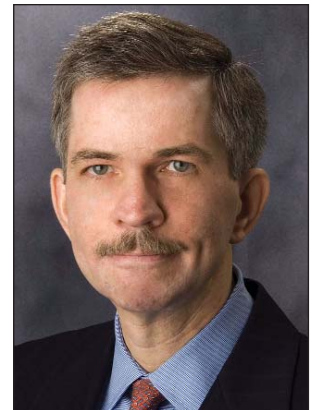
“Radiation oncologists today have to work closely with diagnostic radiologists because if we know where the cancer is located, we know better where to treat,” Dr. Donaldson continued. “This new synergy of precision imaging for use in precision therapy



Sarah S. Donaldson, M.D.



Steven Leibel, M.D.



David Panicek, M.D.

has just unfolded. It’s a wonderful way to get both disciplines working hand in hand.”

To create a four-day program of BOOST courses (see sidebar), Dr. Donaldson worked with task force co-chairs Steven Leibel, M.D., medical director of the Stanford Cancer Center and professor of radiation oncology at Stanford University, and David Panicek, M.D., vice-chair for clinical affairs and director of educational programs in radiology at Memorial Sloan-Kettering Cancer Center

and professor of radiology at Cornell University Medical College in New York. The daylong courses are organized so that one type of cancer—head and neck, prostate, lung or gastrointestinal—is addressed each day. Featuring experts in radiation oncology, diagnostic radiology, biology and physics, BOOST courses will encourage spe-

cialists to learn from each other via audience participation exercises and question-and-answer periods.

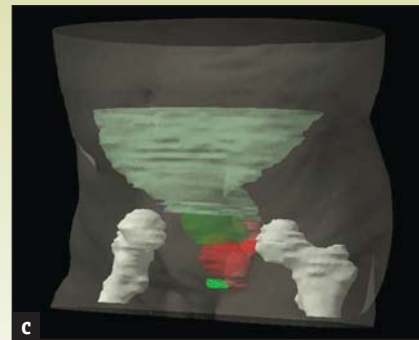
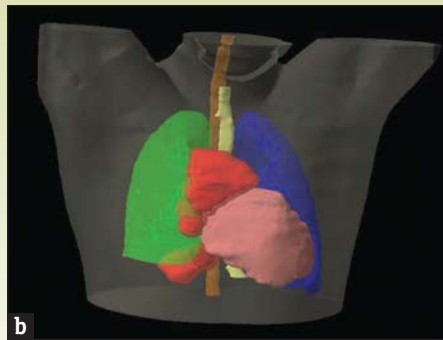
Covering one disease site per day allows physicians with limited time at the annual meeting to hone in on their specific areas of interest, said Drs. Leibel and Panicek. The first part of each day will function like a refresher course, focusing on the oncologic principles of the disease site, the biology and pathophysiology and the anatomy using state-of-the-art imaging.

Another part of each BOOST day, with presentations of scientific papers and case-based reviews, will look at the latest developments. “We’ll see what’s new out there, what the different imaging approaches are and what’s on the horizon for radiation oncologists and diagnostic radiologists to use in a specific disease site to improve diagnosis and treatment,” said Dr. Leibel.

Toward the end of the day, courses will turn to the practical aspects of radiation oncology or contouring—identifying the area to be treated as defined by the experts in radiation

Radiation oncologists today must work closely with diagnostic radiologists, because if we know where the cancer is located, we know better where to treat.

Sarah S. Donaldson, M.D.



Images courtesy of Peter Maxim, Ph.D., Stanford University.

Three-dimensional color-encoded reconstructions of tumor and normal tissue contours for cancers of the head and neck (a), lung (b) and prostate (c).

oncology and diagnostic imaging. “We’re looking at radiation target volumes, the proper volume to treat, and the best imaging modality to identify what to treat,” Dr. Leibel said.

Drs. Leibel and Panicek reiterated that taking attendees through all aspects of one disease site per day sets BOOST apart from other educational programs, where papers, panel discussions and other information relevant to a particular type of cancer might be spread over several days and program tracks. “We really want to focus on a disease site and emphasize all the issues around its imaging and treatment, but also present papers and special lectures on radiation biology and the role of interventional

radiology and offer some panel discussions,” said Dr. Leibel. “I think we have everything anyone could want.”

BOOST’s collaborative and concentrated design is what RSNA attendees have been asking for, he added. “The real impact is to have diagnostic radiology onsite, with multimodality presentations,” Dr. Leibel said. “For example, the radiologists are going to tell us, ‘Here’s how it spreads, this is how we image it, this is the role of PET imaging.’ It’s a unique way to allow the two disciplines to play off each other.”

While attracting experienced physicians, BOOST planners also hope to provide educational opportunities for younger practitioners. “Residents and

fellows will find this particularly beneficial because they have to learn not just radiation oncology, but how to interpret radiologic studies,” said Dr. Panicek. “I would think a substantial part of the audience will consist of trainees.”

He added that diagnostic radiologists and radiation oncologists recruited to present at BOOST are eager to participate. “There is an explosion in the amount of information people need and this brings it together all in one spot,” he said. □

BOOST Schedule

EACH DAY of the Bolstering Oncologic and Oncoradiotherapeutic Skills for Tomorrow (BOOST) program focuses on a different type of cancer. Sessions run 8:30 a.m. – 10:00 a.m., 10:30 a.m. – 12:00 p.m., 3:00 p.m. – 4:30 p.m. and 4:30 p.m. – 6:00 p.m.

Registration for all RSNA 2007 courses begins June 18. More information is available at RSNA2007.RSNA.org.



RSNA 2007
CONNECTING RADIOLOGY
93rd Scientific Assembly and Annual Meeting
November 25–30, 2007
Chicago

Monday, November 26— Head and Neck

Anatomy and Oncology (RO21)
Integrated Science and Practice Session* (RO22)
Case-based Review of Radiation, Medical and Surgical Oncology (RO23)
Contouring (RO24)

Tuesday, November 27— Gastrointestinal

Anatomy and Oncology (RO31)
Integrated Science and Practice Session* (RO32)
Case-based Review of Radiation Oncology (RO33)
Contouring (RO34)

Wednesday, November 28—Thoracic

Anatomy and Oncology (RO41)
Integrated Science and Practice Session* (RO42)
Case-based Review of Radiation Oncology (RO43)
Contouring (RO44)

Thursday, November 29—Prostate

Anatomy and Oncology (RO51)
Integrated Science and Practice Session* (RO52)
Case-based Review of Radiation Oncology (RO53)
Contouring (RO54)

*A combination of education and science. Scientific abstracts will follow an invited lecturer.

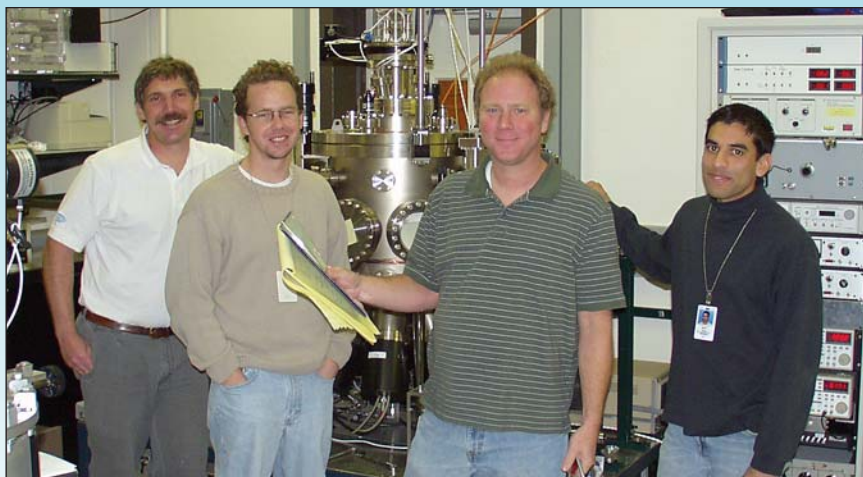
Potential Seen in Nanomagnets to Broaden Range of MR Imaging

IRON-BASED molecular nanomagnets could greatly expand and improve MR imaging contrast, though research and development are still in their very early stages, according to a recent study by the Electromagnetics Division of the National Institute of Standards and Technology (NIST) in Boulder, Colo.

The study, to be published in an upcoming issue of *Polyhedron* and available online, was led by NIST guest researcher Brant Cage, Ph.D., now a research and development scientist with General Electric Global Healthcare in Chalfont St. Giles, U.K. Dr. Cage and coauthors set out to determine the potential effectiveness and practicality of single-molecule magnets (SMM) as MR imaging contrast agents when compared to paramagnetic gadolinium chelates, specifically Magnevist®. Magnevist is manufactured by Bayer HealthCare Pharmaceuticals.

“We decided to pursue the single-molecule magnets because they have very high spins and homogenous chemical structures that bridge the gap between molecules and large clusters/particles,” said Dr. Cage, adding that SMM “represent a new class of contrast agents and thus, perhaps, new properties.” Coauthor Stephen E. Russek, Ph.D., an NIST research scientist, described this new class of magnetic structures as having well-defined bonding geometry and clusters of magnetic atoms, typically iron or manganese, with their spins aligned.

The materials themselves date back about a decade, Dr. Russek added, but



Stephen E. Russek, Ph.D. (left), and Brant Cage, Ph.D. (third from left), published an article in *Polyhedron* detailing their study that tested the potential of single-molecule magnets, or nanomagnets, as MR imaging contrast agents. Also pictured are Bill Rippard, Ph.D. (second from left), and Shehzaad Kaka, Ph.D. (far right), their colleagues at the National Institute of Standards and Technology (NIST) in Boulder, Colo.

the interest in them as MR imaging contrast agents has come about only in the past year or so. Though it wasn't a factor in the NIST study, the search is on for alternatives to gadolinium-based contrast agents for some patients. Last year it was revealed some of these agents can cause nephrogenic systemic

fibrosis (NSF), a rare, life-threatening skin condition, when administered to patients with moderate- to end-stage kidney disease.

The NIST study was initially spurred by the seemingly conflicting results of recent studies comparing SMM Fe₈, an iron molecule, to Magnevist. A 2005 study led by Elisenda Rodriguez, M.A., of the University of Mons-Hainaut in Belgium, and published in the August 2005 issue of *NMR Biomed*, had found the relaxi-

ties of Fe₈ similar, if not superior, to Magnevist at higher resonance frequencies. However, a concurrent study, led by Steven Isaacman, M.S., of New York University and published in the November 17, 2005, issue of *Polyhedron*, found Fe₈ to be a much less efficient contrast agent than Magnevist.

In addition to resolving the discrepancies and comparing Fe₈ to other gadolinium chelates currently in use, Drs. Cage and Russek also compared their results to those obtained using superparamagnetic iron oxides as contrast agents, in hopes of bridging the gap between the two types of contrast agents.

In the end, the new study found that discrepancies in results from studies comparing Fe₈ and Magnevist stemmed from using different concentration ranges. But more importantly, Dr. Cage's report suggested that SMMs do have a future potential use as MR imaging contrast agents.

Explaining the advantage of using

We need to look for a nanomagnet that is stable longer in the body and maintains its magnetic property the whole time.

Stephen E. Russek, Ph.D.

molecular nanomagnets, Dr. Russek noted they “offer a certain new functionality that you can’t get with the existing contrast agents. In particular, you get a larger moment but still get the reproducibility of the picture.”

Gadolinium chelates also have a long moment, he said, but their magnetic properties cannot be controlled, Dr. Russek said. On the other hand, magnetic atom particles, such as iron oxide, iron or cobalt, that are sometimes used as contrast agents “are not identical, and so you have a harder time trying to bond them. However, they have a much bigger magnetic moment.”

Molecular nanomagnets, said Dr. Russek, are “sort of right in between.” They have a well-defined molecular cluster of magnetic atoms, which give researchers—and potentially radiologists—control over the ligand bonding, similar to what can be done with gadolinium chelates. But an SMM like Fe_8 also has a much larger moment, comparable to that found in magnetic atom particles.

The uniformity of molecular nanomagnets also makes their bonding geometry “well defined and reproducible,” said Dr. Russek. Unlike chelates or magnetic materials, he said, “the molecular nanomagnets allow you to manipulate the magnetic properties by adjusting the bonding configuration. That’s unique.” It is this ability to “tune” the magnetic properties of SMMs that makes them “a better start-

ing point to make a smart contrast agent,” said Dr. Russek. “It gets you a new class of contrast agents where you can actually have the contrast properties being stipulated.”

The future, however, is not yet here and now. The Fe_8 iron molecules that Drs. Cage and Russek and colleagues studied were developed for other applications and, as a result, are not stable enough for use as mass-scale MR imaging contrast agents. “We’ve shown that Fe_8 is a good start,” said Dr. Russek. “But it goes into the body and then degrades into smaller clusters.”

The next step, he said, is to engineer a magnetic cluster that is better suited for MR imaging contrast. “We need to look for a nanomagnet that is stable longer in the body and maintains its magnetic property the whole time.” The goal would be to engineer a magnetic cluster specifically for MR imaging contrast but researcher engineers are not quite at that stage yet.

Dr. Cage agreed, noting that Fe_8 and other SMMs are in the academic domain. “I think the hope is that they will show promise as smart contrast

agents that ‘turn on’ when in the vicinity of a biological target,” he said. “The largest challenge is the stability of these compounds in biological medium.”

Moving forward, said Dr. Russek, researchers are examining different types of molecular nanomagnets in order to understand how to modify their contrast mechanisms. He pointed out they are also looking at ways of measuring the contrast activity as a function of the magnetic structure, in order to develop a detailed understanding of how the contrast mechanisms can be controlled by manipulating the magnetic structure. □

Learn More

More information about the studies cited in this article is available online.

■ “The utility of the single-molecule magnet Fe_8 as a magnetic resonance imaging contrast agent over a broad range of concentration” Go to dx.doi.org and type doi:10.1016/j.poly.2006.12.009 in the box.

■ “In vitro characterization of an Fe_8 cluster as potential MRI contrast agent” www3.interscience.wiley.com/cgi-bin/abstract/110501928/ABSTRACT

■ “Critical examination of Fe_8 as a contrast agent for magnetic resonance imaging” Go to dx.doi.org and type doi:10.1016/j.poly.2005.03.138 in the box.

MR Contrast at RSNA 2007

THE RISK posed by some gadolinium-based contrast agents used for MR imaging will be the subject of a special focus session, “Gadolinium Toxicity: Nephrogenic Systemic Fibrosis/Nephrogenic Fibrosing Dermopathy—A Lethal Threat to Patients with Renal Insufficiency,” at RSNA 2007. The session will be moderated by Emanuel Kanal, M.D. More information will be available at RSNA2007.RSNA.org.



Study of Protocol Deems Proper Diagnostic Work-up as Key

Continued from Page 9

and prone to give misleading results—amply illustrated, she said, by prior screening trials for breast and lung cancer—Dr. Henschke said she and her colleagues have provided a new approach to CT screening for lung cancer. “Randomized trials are too expensive, require too long a period of time to provide a meaningful result and lead to an all-or-none conclusion—either there is a benefit or there is insufficient

evidence for a benefit,” she said. “We suggest doing a smaller study, as illustrated by ELCAP in 1999, to provide evidence of a benefit, and then proceed to quantify the magnitude of the benefit while providing the screening to a much larger group and accumulating the long-term evidence, as illustrated by the I-ELCAP results.”

Continued debate on the two approaches is very important, she said. “Some 160,000 people die each year of

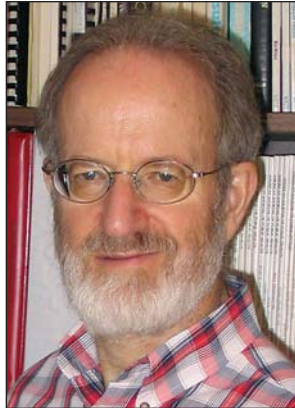
lung cancer in the U.S. alone,” she said. “The discussions now are really between the traditional approach and our approach. This scientific battle cannot be underestimated, as it affects evaluation of any diagnostic test which will be used for screening purposes. There should be a lot of discussion and debate and eventually, the best way will emerge.” □

Interesting Work Keeps Radiologists on the Job Longer

RADIOLOGISTS remain active in their profession longer than the typical American worker. Enjoyment in their work—not economic concern—appears to be a major reason why many radiologists continue working later in life.

“Radiologists stay active in their jobs quite long, with about half of those over 65 still active in radiology—and that’s because radiology must be quite interesting,” said Jonathan H. Sunshine, Ph.D., senior director of the Research Department at the American College of Radiology. Dr. Sunshine is one of the authors of a study of radiologists and retirement published in the December 2006 issue of the *American Journal of Roentgenology (AJR)*.

“The objective was to look at radiologists’ recent retirement plans and patterns to assess whether there were any changes in their patterns over the last decade and, if there were some changes, whether those changes explain the recent easing of



Jonathan H. Sunshine, Ph.D.
American College of Radiology



Cristian Meghea, Ph.D.
Michigan State University



Michael A. Sullivan, M.D.
1997 RSNA President

the radiologist shortage,” said coauthor Cristian Meghea, Ph.D., of the Institute for Health Care Studies at Michigan State University in East Lansing.

The researchers compared data from a survey done in 2003 with information from a previous survey conducted in 1995.

“If you remember, the stock market took a big dive in the year 2000, and had not come back,” Dr. Sunshine said, refer-

ring to the 2003 survey period. “Many people had the notion that because the assets of physicians had declined a good deal in value, physicians were retiring later and that’s why the radiologist shortage, which was so acute back around 2000 to 2001, had eased a lot over the next couple of years.”

The authors found that radiologists retire, on average, at the age of 64—two years later than the average U.S. worker. Forty-two percent of

retired radiologists had worked part-time before full retirement and 28 percent of retired radiologists aged 60 to 64 said they would consider returning to radiology part-time.

“What we found was that there was no change in the pattern of gradually moving into retirement over the period from 1995 to 2003, and that a delay in retirement is not an explanation of the recent easing of the radiologist shortage,” Dr. Meghea said.

The researchers asked, What would explain the let up in the shortage, if it wasn’t a delay in retirement? Focusing on that question in a separate research paper published in the November issue of *AJR*, Drs. Meghea and Sunshine studied a number of factors that might play a role.

“Working longer hours and retiring later were two possibilities,” Dr. Sunshine said. “A third possibility was that radiologists weren’t taking fellowships, so they were getting out there in the workforce a year earlier. Another one was that a lot of work was being shipped overseas. Another possibility was that non-radiologists were grabbing more and more of the imaging work.”

Retirement Patterns: Post-training Radiologists

Completely Retired from Radiology

Average age at retirement	64
Worked part-time before retirement (%)	42
Average years worked part-time	4
Would consider returning part-time to radiology (%)	18
Current economy influenced full retirement (%)	15

Professional Active Radiologists

Keep working full-time in radiology, never retire (%)	13
Change careers (%)	4
If change careers, at what age? (average)	55
Work part-time before retiring (%)	57
If work part-time before retiring, at what age? (average)	59
Fully retire (%)	39
If fully retire, at what age? (average)	63
Current economy affecting future work plans (%)	42
Been retired and returned to full-time or part-time work (%)	7

AJR 2006; 187:1405-1411. Reprinted with permission from the *American Journal of Roentgenology*.

But what the researchers found was that higher productivity seemed to be the biggest reason the shortage had eased, and that the other factors played a small role, if any.

“The main finding is that radiologists are getting a greater amount of work done per hour worked than they used to,” Dr. Sunshine said. “There’s been a quite remarkable increase in amount of work done per work hour.”

1997 RSNA President Michael A. Sullivan, M.D., concurred, saying picture archiving and communication systems (PACS) are a big reason for the increase in radiologists’ efficiency. “I can read more films now than I could

five years ago because of the efficiency of getting the images to me,” Dr. Sullivan said.

Radiology Lucrative and Interesting

While noting that radiologists stay active in the workforce longer than the typical American worker, the authors pointed out in their study that radiology is both more lucrative than the average job and more interesting than many occupations in the U.S.

“I think it’s enjoyable and interesting work, which is not true of a good many jobs in America, and physically people can handle it at later ages,” Dr. Sunshine said.

Dr. Sullivan, who practices at the Ochsner Clinic in New Orleans, was not surprised by the most recent findings on radiologists’ retirement patterns.

“I think the field of radiology is so much fun, and it’s not a physically difficult specialty, unless you’re doing vascular interventional, so we can keep working a long time,” said Dr. Sullivan. He said he is still working full-time at the age of 67 and

while he will probably reduce his workload, he does not plan to retire completely any time soon.

“I love my work every day. I enjoy it,” Dr. Sullivan said. “I don’t think I’ll work forever, but as long as I’m capable, I think I’ll work a while longer. I may go down to 75 percent in the beginning of next year, and then just see where I’ll go from there.”

Dr. Sunshine suggested the attractiveness of the profession would keep many radiologists on the job even if they no longer needed to work.

“It would be sort of interesting to go around to radiologists and say, ‘If you had enough stashed away so that you could retire today and keep up your income, would you do so?’ And I think you’d find a fair number who would say, ‘No, I want to stay involved.’” □

Retirement Planning at RSNA 2007

“Effective Retirement Plans and Distribution Strategies” is one of two comprehensive financial seminars available on Saturday, November 24, at McCormick Place in Chicago just prior to the RSNA annual meeting. The retirement session costs \$129

and a companion session, “Effective Real Estate Investment Strategies,” costs \$159. Save almost \$20 by registering for both courses for \$269. Textbooks written specifically for each course are included. Register for the courses by going to RSNA2007.RSNA.org. These seminars do not qualify for *AMA PRA Category 1 Credit*™.



Learn More

More information about the studies cited in this article is available online.

- “Retirement Patterns and Plans of Radiologists” www.ajronline.org/cgi/content/abstract/187/6/1405
- “How Could the Radiologist Shortage Have Eased?” www.ajronline.org/cgi/content/abstract/187/5/1160

Mortality-Focused Study Questions Screening’s Promise

Continued from Page 8

find more than when you don’t screen,” he said. “You do more surgery than if you don’t screen, but you don’t save anyone’s life.” The extent of excess diagnosis and excess surgery is far greater with CT than with chest X-ray, he added.

The results of his study, said Dr. Bach, underscore the necessity of randomized trials to provide further data. The National Lung Screening Trial (NLST) in the U.S. is expected to have preliminary results as early as next year, while data are also anticipated from other studies worldwide, including a Dutch-Belgian randomized lung cancer screening trial (Nederlands Leu-

vens Longkanker Screenings Onderzoek, or NELSON).

Right now, the message to patients is that CT screening still has not been proven beneficial, said Dr. Bach. “We’re saying we don’t know if this will benefit you or not, but we see pretty compelling evidence that it may harm you,” he said. “We may discover things that look like cancer but pose very little threat, however, the result of finding those things will be to trigger a chain of medical procedures that could lead to major thoracic surgery and removal of a part of the lung—a procedure that carries substantial risk.

“Until we figure out whether going through that chain of events is some-

thing that is helpful or harmful, it probably makes more sense not to be screened,” Dr. Bach continued. Stopping smoking, managing body weight, exercising and wearing a seat belt are among more important steps people can undertake to improve their health, he said.

“Signing up for a test with radiation, and risking finding false-positives that cause anxiety and potential harm and incur costs, is not one of those health protective behaviors,” he said. “Until we know that this is beneficial, we shouldn’t be running out to get screened.” □



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Journal Highlights

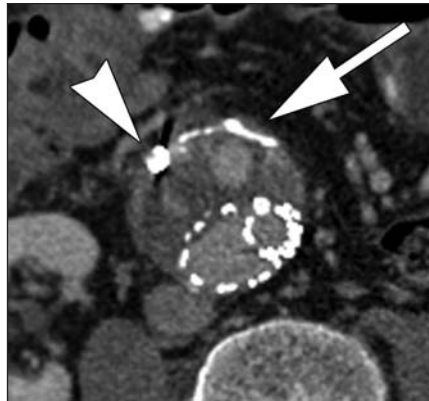
The following are highlights from the current issues of RSNA's two peer-reviewed journals.

Imaging Techniques for Detection and Management of Endoleaks after Endovascular Aortic Aneurysm Repair

ENDOVASCULAR aortic aneurysm repair (EVAR) is a viable alternative to open surgical repair for many patients with abdominal and thoracic aortic aneurysms but, unlike open repair, EVAR requires lifelong imaging surveillance to determine the long-term performance of the stent-graft and detect possible complications such as endoleak formation.

In a review article in the June issue of *Radiology* (RSNA.org/radiologyjnl), S. William Stavropoulos, M.D., and Sridhar R. Charagundla, M.D., Ph.D., detail the techniques and challenges of imaging surveillance in post-EVAR patients, as well as options for endoleak management.

Radiology



Specifically Drs. Stavropoulos and Charagundla, of the Division of Interventional Radiology in the Department of Radiology at the Hospital of the University of Pennsylvania, address:

- Endoleak classification
- Stent-graft composition and effect on imaging
- Surveillance imaging techniques including CT, MR, ultrasound and nuclear medicine
- Important aspects of surveillance

Persistent endoleak after embolization.

Transverse CT angiogram during delayed phases shows embolization coils (*arrowhead*) causing streak artifact and endoleak (*arrow*) in anterior aspect of aneurysm sac. Streak artifact from embolization coils may degrade portions of the images but are often of diagnostic quality, according to the study author.

(*Radiology* 2007;243:641-655) © RSNA, 2007. All rights reserved. Printed with permission.

image interpretation

- Endoleak angiography
- Endoleak detection after endoleak embolization

“Endoleak detection requires rigorous follow-up with high-quality imaging,” Drs. Stavropoulos and Charagundla conclude. “Continued outcomes-based investigations will help further define when and how patients with endoleaks are optimally imaged and treated after EVAR.”

Advances in Digital Radiography: Physical Principles and System Overview

DIGITAL radiography has supplanted screen-film radiography in many radiology departments over the last two decades. While the most obvious advantage of digital detectors is how they enable implementation of a fully digital picture archiving and communication system, other advantages include higher patient throughput, increased dose efficiency and possible reduction of radiation exposure to the patient.

In an article in the May-June issue

Continued on Page 19

RadioGraphics



Image postprocessing.

The image on the far left represents the initially acquired raw data without any processing. The other three images have been digitally processed in different ways to illustrate the influence of various software tools on image appearance. Contrast enhancement (*second image from left*) makes anatomic structures more visible and distinguishable, contrast reduction (*second image from right*) results in smoothing of the structures and edge enhancement (*image on far right*) provides sharper delineation of the fine structures of bones.

(*RadioGraphics* 2007; 27:675-686) © RSNA, 2007. All rights reserved. Printed with permission.

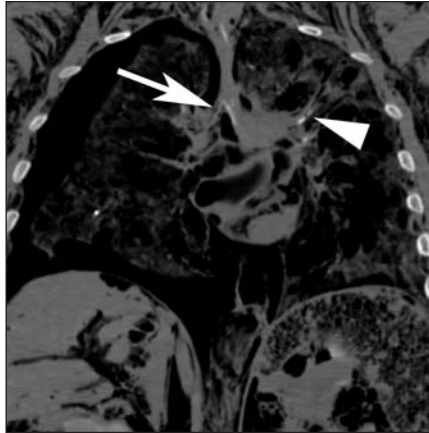
Radiology in Public Focus

Press releases have been sent to the medical news media for the following articles appearing in the June issue of *Radiology* (RSNA.org/radiologyjnl):

Virtual Autopsy: 2D and 3D MDCT Findings in Drowning with Autopsy Comparison

WHOLE-BODY multidetector CT (MDCT) autopsy—virtual autopsy—can potentially establish or exclude drowning as a cause of death and may be useful as a pre-autopsy triage tool in mass casualty scenarios, researchers have determined.

Angela D. Levy, M.D., of the Department of Radiologic Pathology at the Armed Forces Institute of Pathology in Washington, and colleagues compared virtual autopsy images with traditional autopsy findings in 28 drowning subjects and 12 sudden cardiac death subjects. The researchers found all drowning and control subjects had fluid in the paranasal sinuses and mastoid air cells and ground glass opacity in the lungs. Control subjects, however, did not have frothy airway fluid or high attenuation sediment in the airways, findings the researchers



Findings in a drowning subject with severe decomposition. Coronal multidetector CT image of the chest shows high-attenuation sediment at the carina and in the main bronchi (arrow) and branches of the left upper lobe bronchus (arrowhead). Cystic spaces within the lungs and gas in the vasculature and soft tissues represent advanced decomposition.

(*Radiology* 2007; 243:862-868) © RSNA, 2007. All rights reserved. Printed with permission.

concluded are highly suggestive of drowning.

The accurate diagnosis of drowning is of utmost importance in the forensic investigation of a body that is found in water when there is suspicion that the body may have been placed in water after death from another cause, the researchers note.

“In the absence of frothy fluid or sediment, MDCT is nonspecific but may provide anatomic findings that

support the diagnosis of drowning in the appropriate scenario when all other causes of death have been excluded,” they conclude. “Furthermore, MDCT ... may add additional anatomic information to a cause of death rendered by external examination or limited autopsy.”

Correlation of MRI Findings with Neurological Outcome in Patients with Acute Cervical Traumatic Spinal Cord Injury: A Prospective Study in 100 Consecutive Patients

RESearchers have demonstrated the capability of MR imaging to predict a patient’s potential for neurological recovery after a spinal cord injury.

Firoz Miyajni, M.D., and colleagues studied three quantitative (maximum spinal cord compression [MSCC], maximum canal compromise [MCC] and length of lesion) and six qualitative (canal stenosis, intramedullary hemorrhage, edema, cord swelling, soft tissue injury and disc herniation) MR imaging parameters in 100 patients with trau-

matic spinal cord injuries, to evaluate whether the findings correlated with patient neurological status and were predictors of outcome.

Researchers determined that the severity of MSCC and the extent of intramedullary hemorrhage and cord swelling were key predictors of neurological recovery; however, only intramedullary hemorrhage and cord swelling were significantly correlated with recovery after controlling for baseline neurological status.

“In addition to validating the existing literature, our study also suggests that the extent of direct MSCC is more reliable in predicting the neurological outcome of patients than is presence of canal stenosis,” the researchers conclude.

(*Radiology* 2007;243:820–827) © RSNA, 2007. All rights reserved. Printed with permission.

MRI-guided Focused Ultrasound Surgery of Uterine Leiomyomas: Results of Different Treatment Guideline Protocols

PERFORMING MR-guided focused ultrasound surgery (MRgFUS) with a less restrictive protocol that allows therapeutic sonications to be delivered to as large an area as possible results in greater clinical effectiveness and fewer adverse events, researchers have found.

Fiona M. Fennessy, M.D., Ph.D., of the Department of Radiology at Harvard Medical School and Brigham and Women's Hospital in Boston, and colleagues studied the outcomes of 96 patients treated with MRgFUS using an original protocol and 64 patients treated

using the FDA-approved, less restrictive guidelines.

Symptom severity scores were obtained from patients at baseline and three, six and 12 months post-treatment. Adverse events were also recorded. Dr. Fennessy and colleagues found that MRgFUS resulted in substantial symptomatic improvement up to 12 months after treatment in both groups, with the modified protocol yielding an even greater early symptom decrease and a decrease in patients seeking alternative treatment.

“Our study also demonstrates that there is a significant correlation between the percentage of non-perfused fibroid volume at treatment and the fibroid-related symptom score change from baseline to six months post-therapy,” the researchers note. “While this correlation is moderate and the time period of follow up is relatively short, it is likely that there is an association between treatment effectiveness and devascularization.”

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Media Coverage of Radiology

In April, media outlets carried 284 news stories related to articles appearing in *Radiology*. These stories reached an estimated 146 million people.

News releases promoted findings from studies on CT screening for lung cancer (*Radiology* 2007;243:239-249), radiofrequency ablation of lung tumors (*Radiology* 2007; 243:268-275) and stem cell therapy to speed liver tissue regeneration (*Radiology* 2007;243:171-179).



Coverage included print placements in the *Pittsburgh Post-Gazette*, *Asbury Park Press*, *Des Moines Register*, *Daily Mail* (London), *The Daily Telegraph* (London), *Internal Medicine News*, *Family Practice News* and *Pediatric News*. Among the broadcast placements were National Public Radio and several

regional television affiliates. Prominent Web placements included Yahoo! News, WebMD, MSN Health, *discovery.com* and *healthcentral.com*.

Interventional Radiology the Focus of June Outreach Activities

RSNA's 60-Second Checkup radio program focuses this month on interventional radiology, including the role of the interventional radiologist, uterine fibroid embolization, pelvic congestion syndrome treatment, chemoembolization and radioembolization of liver cancer and tumor ablation for painful bone metastases.

Advances in Digital Radiography: Physical Principles and System Overview

Continued from Page 17

of *RadioGraphics* (RSNA.org/radiographics), Markus Körner, M.D., of the Department of Clinical Radiology at University Hospital Munich in Germany, and colleagues provide an overview of the digital radiography systems currently available for general radiography. First describing the physical principles of digital radiography, Dr. Körner and colleagues also illus-

trate the current systems in terms of:

- Detectors
- Image processing
- Image quality criteria
- Radiation exposure issues

Dr. Körner and colleagues also discuss future technologies and perspectives in digital radiography. “The future of radiography will be digital,” they conclude. “The advantages of digital radiography with respect to various

imaging systems have been extensively discussed in the literature. The large number of scientific papers dealing with digital radiography that have been published over the last 25 years also indicates the importance of this topic to the radiologist.”

Working For You

New Educational Offerings Available on InteractED®

The RSNA Education Center has announced several new online programs that are available free to RSNA members for *AMA PRA Category 1 Credit™*.

Refresher Courses

- Thyroid Nodules and Cancer: Role of CT and MR in Evaluating Thyroid Cancer
- Thyroid Nodules and Cancer: Indications for Ultrasound and Fine Needle Aspiration
- Thyroid Nodules and Cancer: Clinical Evaluation of Nodules
- Angiomatous Lesions: From Head to Toe



Self-Assessment Modules (SAMs)

- SAM Practical Statistics: Covariation—Correlation & Regression
- SAM Practical Statistics: Overview of Statistical Methods for Clinical Radiology
- SAM Practical Statistics: Technology Assessment in Clinical Radiology
- SAM Practical Statistics: Descriptive Statistics
- SAM Practical Statistics: Statistical Inference – Parameter Estimation
- SAM Practical Statistics: Statistical Inference – Sample Size Estimation
- SAM Practical Statistics: Hypothesis Testing

- SAM for Radiologists: Mammography—Dosimetry & Digital Technology
- SAM for Radiologists: CT Image Quality & Pediatric Clinical Considerations
- SAM for Radiologic Physicists: Mammography—Dosimetry & Digital Technology
- SAM for Radiologic Physicists: CT Imaging Quality

To view these new programs, go to RSNA.org/education. For additional information, contact the RSNA Education Center at 1-800-381-6660 x3753.

RSNA Committees *RSNA News* continues its series highlighting the work of RSNA's volunteer committees with a look at the Associated Sciences Committee.

Associated Sciences Committee

MANY disciplines function within the radiology department, and it's the job of the RSNA Associated Sciences Committee to support productive relationships with them by recommending policies and programs to the Board of Directors and implementing activities approved by the Board. The committee works with the Associated Sciences Consortium, made up of associations representing various disciplines—including radiology administrators, architects, educators, nurses and technologists from various disciplines such as MR, interventional radiology and nuclear medicine—to create the 2½-day Associated Sciences program for the RSNA annual meeting. The RSNA 2007 Associated Sciences program appears on Page 2, along with a listing of consortium members.

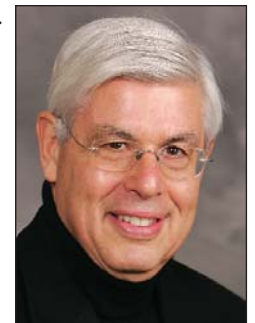
The Associated Sciences Committee is also responsible for updating the *Radiation Biology for Diagnostic and Interventional Radiologists* syllabus.

The committee also oversees the Student Radiographer Theater held during the annual meeting. The theater is an opportunity for students from radiography programs from throughout the Midwest to learn about the latest technologi-

cal advances and career opportunities. New this year is a physics program on reducing patient dose and a presentation on the American Registry of Radiologic Technologists® ethics process. Almost 1,300 students attended the theater at RSNA 2006.

Working for you COMMITTEE PROFILE

Committee Chair
Edward I. Bluth,
M.D., of New



Edward I. Bluth, M.D.

Orleans, praised the collaborative relationship of the various disciplines that produce the associated sciences courses. "RSNA is the perfect venue for bringing all the elements of radiology together to share and discuss the science and business components of radiology," he said, adding, "This is probably is the only venue where such educational diversity and interrelationships are possible and available." The associated sciences program will be particularly interesting this year, he said, owing to a special two-part refresher course focusing on radiology's role in responding to natural and manmade disasters.

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

Program and Grant Announcements

RSNA Advanced Course in Grant Writing

Application Deadline – July 1

This course helps junior faculty members prepare and submit a National Institutes of Health, National Science Foundation or equivalent grant application. The course will consist of four two-day sessions at RSNA Headquarters in Oak Brook, Ill., over a nine-month period beginning in September 2007.



Forms for these programs are available at RSNA.org/research/educational_courses.cfm. For more information, contact Fiona Miller at fmiller@rsna.org or 1-630-590-7741.

RSNA/AUR/ARRS Introduction to Research Program

Nomination Deadline – July 15

Sponsored by RSNA, the American Roentgen Ray Society (ARRS) and Association of University Radiologists (AUR), this program encourages young radiologists to pursue careers in academic radiology. Eighty residents will be selected to participate in a seminar held during either RSNA 2007 or the ARRS annual meeting in 2008. Radiology departments are invited to nominate

a current first-year resident.

RSNA Derek Harwood-Nash International Fellowship

Application Deadline – 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 form for this program is available at RSNA.org/international/CIRE/dhnash.cfm. For more information, contact Fiona Miller at fmiller@rsna.org or 1-630-590-7741.



Tools for Success in the Practice of Radiology

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

Space still available

This customized, interactive seminar, featuring sessions on leadership, planning, staff development and quality and safety, will help participants confidently lead their practice through day-to-day issues on the job. Claire E. Bender, M.D., of the Mayo Clinic College of Medicine in Rochester, Minn., is directing the course. More information is available at RSNA.org/education/RSNA_shortcourses.cfm or by calling the RSNA Education Center at 1-800-381-6660 x7772. A feature article further describing the course appears in the May 2007 issue of *RSNA News*.



Academy of Molecular Imaging (AMI)/RSNA/SNM/Society for Molecular Imaging (SMI) Pre-Conference Symposium: Imaging in Molecular Medicine 2007

September 7–8 • Providence, R.I.

Registration is now open for this symposium immediately preceding the AMI/SMI Joint Molecular Imaging Conference.

The symposium comprises two clinical tracks:

- Molecular Imaging Fundamentals in Medicine—introduction and overview of molecular imaging
- Clinical PET/CT Imaging—essentials of clinical PET/CT

More information is available at www.molecularimaging.org or by contacting Fiona Miller at fmiller@rsna.org or 1-630-590-7741.

NIH Director's New Innovator Award

This new award aims to stimulate highly innovative research and support promising new investigators. Recognizing that new investigators may have exceptionally innovative research ideas—but not the required preliminary data to fare well in the traditional peer-review system—NIH has created the NIH Director's New Innovator Award to support investigators proposing highly innovative approaches with potential to produce an unusually high impact. NIH anticipates making at least 14 awards of up to \$1.5 million each over a five-year period. More information is available at grants.nih.gov/grants/new_investigators/innovator_award/.

News about RSNA 2007

Course Enrollment Opens June 18

COURSE enrollment information for RSNA 2007 will be mailed in mid-June and will also be available online. Go to RSNA2007.RSNA.org and click on Registration, Housing & Courses. Enrollment is required for various components of the meeting, including refresher, multisession and investment courses, informatics workshops and RSNA tours and events. The Digital Mammography Training and Self Assessment Workshops also require advance registration.

CME Update: Each physician can earn up to 85.75 AMA PRA Category 1 CME Credits™ at RSNA 2007



More than 300 refresher courses will be offered at RSNA 2007, covering traditional and cutting-edge topics in numerous subspecialty areas.

How to Register

RSNA 2007 registration for all categories is now open.

There are four ways to register:

1 Internet

Go to RSNA.org/register

Use your member ID number from **Fastest way to register!**

the *RSNA News* label or meeting flyer sent to you. If you have questions, send an e-mail to rsna@experient-inc.com.

2 Fax (24 hours)

1-800-521-6017

1-847-940-2386

3 Telephone

(Monday–Friday,
8:00 a.m.–5:00 p.m. CT)

1-800-650-7018

1-847-940-2155

4 Mail

Experient/RSNA 2007

108 Wilmot Rd.,

Suite 400

Deerfield, IL 60015-5124

USA



RSNA 2007

CONNECTING RADIOLOGY

93rd Scientific Assembly
and Annual Meeting
November 25–30, 2007
Chicago

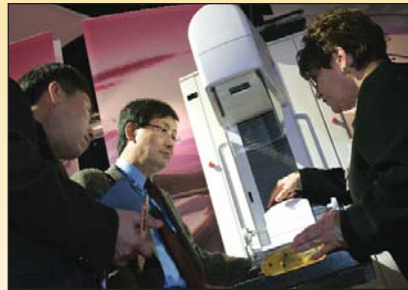
For more information about registering for RSNA 2007, visit RSNA2007.RSNA.org, e-mail reginfo@rsna.org or call 1-800-381-6660 x7862.

Registration Fees

BY 11/5	ONSITE	
\$0	\$100	RSNA Member, AAPM Member
\$0	\$0	Member Presenter
\$0	\$0	RSNA Member-in-Training, RSNA Student Member and Non-Member Student
\$0	\$0	Non-Member Presenter
\$130	\$230	Non-Member Resident/Trainee
\$130	\$230	Radiology Support Personnel
\$620	\$720	Non-Member Radiologist, Physicist or Physician
\$620	\$720	Hospital or Facility Executive, Commercial Research and Development Personnel, Healthcare Consultant, Industry Personnel
\$300	\$300	One-day registration to view only the Technical Exhibits area

Important Dates for RSNA 2007

June 18	Course enrollment opens
Nov. 5	Final advance registration, housing and course enrollment deadline
Nov. 25–30	RSNA 93rd Scientific Assembly and Annual Meeting



Educational opportunities at RSNA 2007 range from sharing experiences one-on-one to viewing the world's largest exhibition of medical imaging equipment and services.



International Visitors

Personalized invitation letters are available at RSNA2007.RSNA.org. Click International Visitors. This section of the annual meeting Web site also includes important information about visa applications.

Request a Printed Copy of the RSNA Meeting Program

BEGINNING in mid-June, RSNA members can request a printed copy of the *RSNA Scientific Assembly and Annual Meeting Program*. The *RSNA Meeting Program* is a benefit of membership.



To request a printed copy, go to RSNA2007.RSNA.org and click Meeting Program. Members may also call RSNA Membership and Subscription Services at 1-877-RSNA-MEM [776-2636] (U.S. and Canada) or 1-630-571-7873.

Members can choose to have the printed copy mailed to them, or they can pick up the program at the annual meeting, along with their official meeting bag.

The deadline to request a printed copy of the *RSNA Meeting Program* is September 14. Programs will not be mailed to members who do not request them. *RSNA Meeting Program* content will be available online before, during and after the meeting.

RADIATION SAFETY

Answer

[Question on Page 3.]

A Presuming that you always wear lead when you are near radiation, the badge should be consistently worn on the left collar outside the lead. The reading can be used to estimate both whole-body and eye doses.

Q&A courtesy of AAPM.

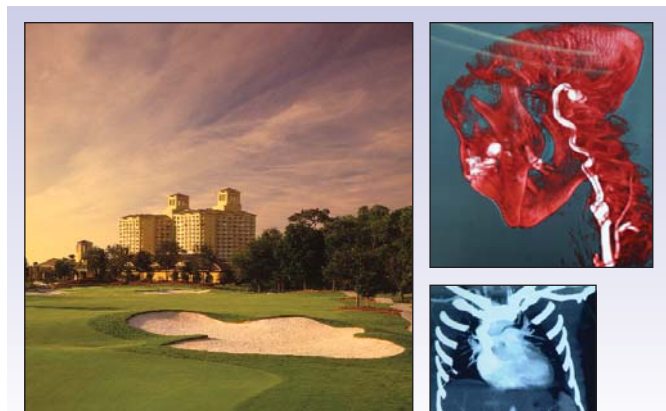
News about RSNA Highlights™ 2008

Advance Registration Opens September 4

RSNA Highlights™ 2008 will be held Feb. 18–20 at the Ritz-Carlton/JW Marriott Orlando, Grande Lakes in Florida. Course topics include cardiac imaging, head and neck imaging, thoracic imaging and breast imaging.

RSNA Highlights is designed for people who can't attend the annual meeting, or those who attend but find they can't get to every lecture they want. RSNA Highlights 2008 attendees will also be able to access select electronic education exhibits from RSNA 2007.

More information will be announced in future issues of *RSNA News* and on the Web at RSNA.org/highlights.



Product News

NEW PRODUCT

PET/CT Workstation Software

MERGE HEALTHCARE (www.merge.com) has released its PET/CT Workstation™ software. Designed as vendor-neutral, the Merge PET/CT can be used as a standalone workstation or integrated into a DICOM-compliant picture archiving and communication system (PACS), freeing physicians from having to read studies directly on PET/CT consoles.

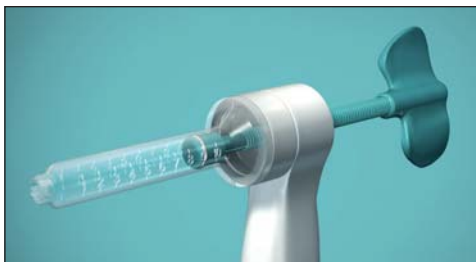
For clinical effectiveness, Merge PET/CT incorporates reading tools such as 3D volume rendering and hot-spot scout along with reporting tools such as standard uptake value calculations and configurable colormaps. Workflow is enhanced by layouts that mimic PACS layouts split across dual monitors in panoramic mode, allowing simultaneous review of CT, PET corrected, PET uncorrected, PET/CT fused and maximum intensity projection images.



NEW PRODUCT

Vertebral Augmentation System

Cardinal Health (www.cardinal.com) has introduced the AVAmax™ Advanced Vertebral Augmentation System, developed with guidance from interventional radiologists. Among the unique components of the AVAmax system is a coaxial cement tube that extends through the access cannula as a liner. This leaves the cannulas clear of cement material, allowing the physician greater control and options throughout the procedure. The system also features the AVAflex™, a curved injection needle made from nitinol that allows maneuverability and targeted cement placement.



FDA CLEARANCE

MR Injector System

E-Z-EM, Inc. (www.ezem.com) has received FDA clearance for its EmpowerMR™ injector system, the company's first product for the MR imaging market. Designed to have the same easy-to-use interface and safety features as the company's Empower family of CT injector systems, EmpowerMR also incorporates a patent-pending hydraulic control system to minimize image distortion and artifacts. The system has no shielded iron core motors, piezoelectric motors or electrically active motor control circuitry adjacent to the scanner, significantly minimizing the prospect of electrical interference with the scanner's magnetic field. EmpowerMR can be used in MR field strengths up to 7 Tesla and links to its electrical supply via a single pass-through cable that does not require special shielding. The hydraulic control also enables the system to deliver consistent flow rates, volumetric and pressure performance on demand, features which may help improve MR suite productivity.

NEW PRODUCT

Sterile Cover for Vascular Procedures

CIVCO Medical Solutions (www.civco.com) has introduced the new iVAS™ transducer cover to reduce the risks of cross-contamination during vascular procedures. Latex-free iVAS covers are 58" in length to provide additional sterile protection in procedures such as placing peripherally inserted central catheters and central venous catheters. The telescopic-fold of the iVAS allows for easy application of gel, as well as easy application of the cover onto the transducer. Procedure kits include an iVAS transducer cover, sterile gel packet and colored elastic bands.

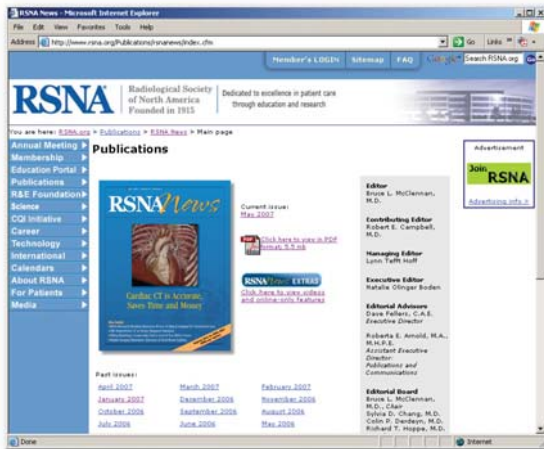


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2 When you select an issue from the list, the PDF opens.

3 Advance to the second page of the PDF to see the Table of Contents for that issue.

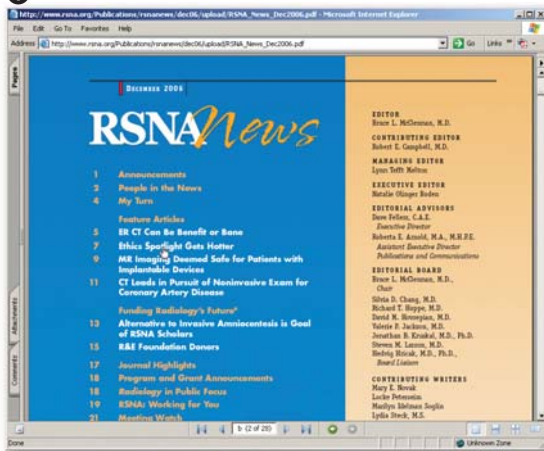
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Medical Meetings

July – September 2007

JUNE 28–JULY 1

Canadian Association of Radiologists (CAR), Annual Meeting, St. John's, Newfoundland • www.car.ca

JUNE 29–30

RSNA, Tools for Success in the Practice of Radiology, RSNA Headquarters, Oak Brook, Ill.

• RSNA.org/education/RSNA_shortcourses.cfm

JULY 8–12

American Healthcare Radiology Administrators (AHRA), Annual Meeting and Exposition, Gaylord Palms Hotel, Orlando, Fla.

• www.ahraonline.org

JULY 13–14

American Institute of Ultrasound in Medicine (AIUM), Hands-on Musculoskeletal Ultrasound: Diagnostic and Interventional Techniques, Mayo Clinic and Kahler Grand Hotel, Rochester, Minn.

• www.aium.org

JULY 20–21

American Brachytherapy Society (ABS), GYN School, Knickerbocker Hotel, Chicago • www.americanbrachytherapy.org

JULY 22–26

American Association of Physicists in Medicine (AAPM), 49th Annual Meeting, Minneapolis Convention Center

• www.aapm.org/meetings/07AM

JULY 27–29

AAPM, Shielding Methods for Medical Facilities: Diagnostic Imaging, PET and Radiation Therapy, St. John's University, Collegeville, Minn. • www.aapm.org/meetings/07SS/

AUGUST 5–9

Society of Computed Body Tomography and Magnetic Resonance (SCBTMR), Summer Practicum, Banff, Alberta, Canada

• www.scbtmr.org

SEPTEMBER 2–6

International Association for the Study of Lung Cancer (IASLC), 12th World Conference on Lung Cancer, COEX Convention Center, Seoul, Republic of Korea • www.2007worldlungcancer.org

SEPTEMBER 7–8

American Society of Clinical Oncology (ASCO), American Society for Therapeutic Radiology and Oncology (ASTRO), American Society of Breast Disease, American Society of Breast Surgeons and Society of Surgical Oncology, 2007 Breast Cancer Symposium, San Francisco Marriott • www.asco.org

SEPTEMBER 7–8

ASTRO/SNM/Radiation Therapy Oncology Group (RTOG), Translational Research in Radiation Oncology and Radiology, San Francisco • www.astro.org

SEPTEMBER 7–8

Academy of Molecular Imaging (AMI)/RSNA/SNM/Society for Molecular Imaging (SMI) Pre-Conference Symposium: Imaging in Molecular Medicine 2007, Rhode Island Convention Center, Providence

• www.molecularimaging.org/2007jointconf/PreConference.php

SEPTEMBER 8–11

AMI and SMI, Joint Molecular Imaging Conference, Rhode Island Convention Center, Providence

• www.molecularimaging.org/2007jointconf/

SEPTEMBER 8–12

Cardiovascular and Interventional Radiological Society of Europe (CIRSE), Annual Meeting and Postgraduate Course, Megaron Centre, Athens, Greece • www.cirse.org

SEPTEMBER 12–16

Society for Pediatric Radiology (SPR), 5th Symposium on Pediatric Cardiovascular MR, Cincinnati Children's Hospital Medical Center • www.pedrad.org

SEPTEMBER 13–16

Australasian Society for Ultrasound in Medicine (ASUM), 37th Annual Scientific Meeting, Cairns Convention Centre, Australia

• www.asum.com/au

NOVEMBER 25–30

RSNA 2007, 93rd Scientific Assembly and Annual Meeting, McCormick Place, Chicago • RSNA2007.RSNA.org

FEBRUARY 18–20, 2008

RSNA Highlights™, Ritz-Carlton/JW Marriott Orlando, Grande Lakes, Florida • RSNA.org/Highlights

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