

RSNA® *News*



Simulation Faces Technological, Regulatory Obstacles on Way to Mainstream

Also Inside:

- Obesity and Heart Disease Link Spurs Structured Reporting Ideas
- Debate Sparked Over Risk of CT-based CAC Screening
- Radiologists Experience Deepening Levels of Stress, Burnout
- Radiology Salaries Inch Up Slightly

RSNA 2009
November 29 – December 4

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RSNA to Create Imaging Sharing Network with NIBIB Grant

RSNA has been awarded a \$4.7 million grant from the National Institute of Biomedical Imaging and Bioengineering (NIBIB) to design and launch an Internet-based network for patient-controlled sharing of medical images. The network will facilitate access to imaging exams for patients and physicians, potentially reducing redundant examinations, minimizing patient radiation exposure and enabling better informed medical decisions.

In the first year of the two-year pilot, participating medical research centers around the country will be:

- Mayo Clinic – Rochester, Minn.
- Mount Sinai Medical Center – New York
- University of California – San Francisco
- University of Chicago
- University of Maryland – Baltimore

The initial goal is to establish image sharing in the clinical domain, according to principal investigator David S. Mendelson, M.D., an associate professor of radiology at the Mount

Sinai School of Medicine and co-chair of Integrating the Healthcare Enterprise (IHE®). Eight more research centers will be added in the second year, along with a number of smaller community satellite sites. At that time, the sites with patient consent will be able to share medical images and reports for clinical and research purposes.

The network will be based on Cross-enterprise Document Sharing for Imaging (XDS-I), an integration profile developed under the IHE initiative launched about a decade ago by RSNA and the Healthcare Information and Management Systems Society. XDS-I is part of a family of profiles developed by IHE to enable sharing of a variety of medical documents and data across a group of affiliated enterprises. These profiles have been embraced by national electronic health record (EHR) programs worldwide including the U.S. Office of the National Coordinator for Health

Information Technology and Canada Health Infoway. The pilot will highlight the role medical imaging should play in any comprehensive EHR program.

Participating sites will also educate patients on personal health records (PHR) including establishing PHR accounts with selected providers that will enable patients to retrieve, view, archive and share medical images, reports and other medical documents, creating a detailed medical history accessible through any secure Internet connection.

The goal of the project is to provide patients with the interoperability necessary for easy, secure access to medical data and control of medical information. The network will also help improve longitudinal health records, reduce the number of redundant examinations by providing an exam history and reduce radiation exposure to the individual and the population at large.



House Hears Proposal to Promote Mo-99 Production in U.S.

Proposed legislation promoting the U.S. production of the molybdenum-99 radioisotope (Mo-99) for medical use was heard by the U.S. House Subcommittee on Energy and Environment in September. Three witnesses testified in support of the legislation that addresses the ongoing, worldwide shortage of medical isotopes.

The American Medical Isotopes Production Act of 2009 (H.R. 3276) dedicates \$163 million for the support of domestic production of Mo-99 without the use of highly-enriched uranium, a concern in light of terrorism. The decay of Mo-99 is used to produce technetium-99m, the most widely used isotope in nuclear medicine. The measure would also amend the Atomic Energy Act to prohibit the issuance of export licenses for highly enriched uranium for medical isotope production seven to 10 years after the date of enactment.

Those who testified included Steven M. Larson, M.D., chief of Nuclear Medicine Service in the Department of Radiology at Memorial Sloan-Kettering Cancer Center in New York and vice-chair of the Committee on Medical Isotope Production Without Highly Enriched Uranium at the National Academy of Sciences.

More information on the act and testimony from the hearing is available at energycommerce.house.gov/index.php.



RSNA Photographer Takes First Place in "Art of the Show" Competition

RSNA's official annual meeting photographer and video contractor, Oscar Einzig Photography, has captured first place in the International Association of Exhibitions and Events "Art of the Show" competition. The winning photograph, depicting RSNA 2008 exhibit attendees from a "technology's-eye" view, was praised by the association for capturing the essence of the annual meeting.

Image Gently Launches Practice Quality Improvement Module

THE Image Gently campaign Web site, imagegently.org, now features a performance quality improvement (PQI) module that captures how institutions perform CT scans in children and allows for comparison with safe practice guidelines established in the literature and by the American College of Radiology.

A survey tool enables institutions to compare their practices to those of others who have completed the module. Practice interventions and tools suggested in the module are intended to be tailored to an individual institution's needs.

The Image Gently campaign is an initiative of the Alliance for Radiation



Safety in Pediatric Imaging created to change practice by increasing awareness of the opportunities to lower radiation dose in the imaging of children. The new program is approved by the American Board of Radiology for PQI Maintenance of Certification Part IV.

RSNA Announces International Visiting Professor Teams

The RSNA Board of Directors has announced the teams of International Visiting Professors (IVP) for 2010. The professors and their destinations are:

Brazil

Donna G. Blankenbaker, M.D.
University of Wisconsin Medical School, Madison

Robert W. Hurst, M.D.
Hospital of the University of Pennsylvania, Philadelphia

Erik K. Paulson, M.D.
Duke University Medical Center, Durham, N.C.

Mexico

(In cooperation with the Sociedad Mexicana de Radiología E Imagen A.C.)

U. Joseph Schoepf, M.D.
Medical University of South Carolina, Charleston

Murali Sundaram, M.D.
Cleveland Clinic Foundation, Ohio

Philippines

Alexander M. Norbash, M.D.
Boston Medical Center

Thomas (Tommy) L. Pope Jr., M.D.
Medical University of South Carolina, Charleston

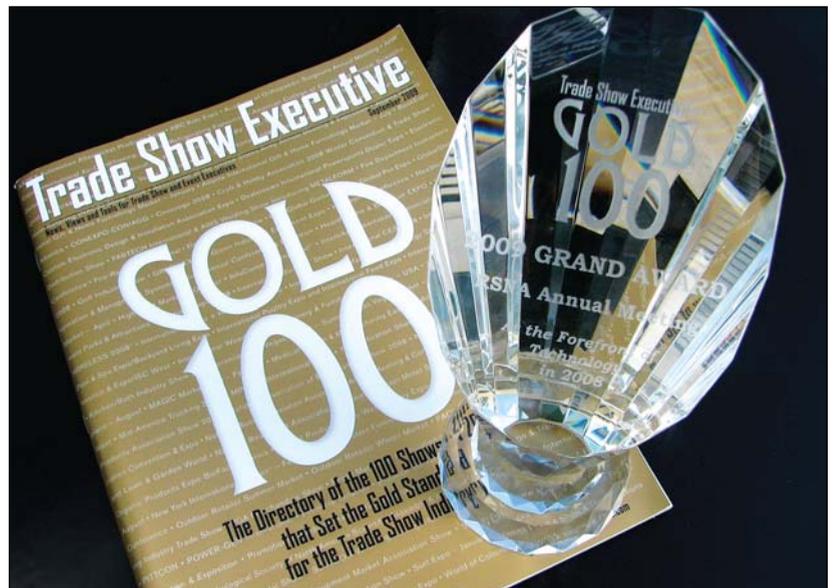
Marilyn J. Siegel, M.D.
Mallinckrodt Institute of Radiology, St. Louis

Thailand

Teresita L. Angtuaco, M.D.
University of Arkansas for Medical Sciences, Little Rock

J. Bayne Selby Jr., M.D.
Medical University of South Carolina, Charleston

For more information about the IVP Program, go to RSNA.org/International/CIRE/ivpp.cfm. An article about the IVP team that traveled to Estonia in 2009 will appear in the February 2010 issue of *RSNA News*.



RSNA 2008 Named among Trade Show Executive's Gold 100

Last year's RSNA annual meeting ranked 35th among "the 100 shows in 2008 that set the gold standard for the trade show industry," according to the "September Gold 100" issue of *Trade Show Executive* magazine. The publication noted RSNA's record-breaking annual meeting attendance in recent years and cited increasing international abstract submissions and a large number of first-time exhibitors. Also noted was RSNA's radiofrequency identification system that tracked the average number of hours attendees spent in exhibit halls, total number of exhibit visitors, average technical exhibit length and total number of visitors per square foot in each exhibit hall.

FLUOROSCOPY

Question of the Day

Q Where should the operator stand to minimize radiation exposure when operating a C-arm fluoroscopy unit in the lateral position?

[Answer on page 22.]

AAPM Announces Awards

THE American Association of Physicists in Medicine (AAPM) recently presented awards at its annual meeting in Anaheim, Calif.

Willi A. Kalender, Ph.D., received the William D. Coolidge Award, the association's highest honor. Credited with inventing and developing spiral CT, Dr. Kalender is a professor and director of the Institute of Medical Physics at the Friedrich-Alexander-University Erlangen in Nuremberg, Germany.

The Award for Achievement in Medical Physics was presented to **James A. Deye, Ph.D.**, **Lawrence E. Reinstein, Ph.D.**, and **Raymond L. Tanner, Ph.D.** Dr. Deye is program director of radiation research programs at the National Cancer Institute in Bethesda, Md., and Dr. Reinstein is chief medical physicist at St. Peter's Hospital in Albany, N.Y. A former AAPM president and former RSNA vice-president, Dr. Tanner is professor emeritus of the University of Tennessee Health Science Center in Memphis and previously taught physics at Memphis State University.

Honorary membership was presented to RSNA Board Liaison for Education and 2010 Chair **George S. Bisset III, M.D.**, vice-chair of the Department of Radiology at Duke University Medical Center in Durham, N.C. Dr. Bisset also serves on the boards of directors of the American Board of Radiology and the Society for Pediatric Radiology.



Willi A. Kalender, Ph.D.



James A. Deye, Ph.D.



Lawrence E. Reinstein, Ph.D.



Raymond L. Tanner, Ph.D.



George S. Bisset III, M.D.

Curran Named Executive Director of Emory Winship Cancer Institute

Walter J. Curran Jr., M.D., has been named executive director of the Emory Winship Cancer Institute and associate vice-president for cancer of the Woodruff Health Sciences Center, both in Atlanta. Dr. Curran, who serves as group chair for the American College of Radiology's Radiation Therapy Oncology Group (RTOG), is the only radiation oncologist in the country to serve as director of a National Cancer Institute-designated cancer center.



Walter J. Curran Jr., M.D.

A Georgia Cancer Coalition Distinguished Scholar, Dr. Curran is chair of Emory's Department of Radiation Oncology and medical director of the Emory Winship Cancer Institute. He joined Emory in 2007 from Jefferson Medical College at Thomas Jefferson University in Philadelphia, where he served as professor and chair of the Department of Radiation Oncology and clinical director for the Kimmel Cancer Center.

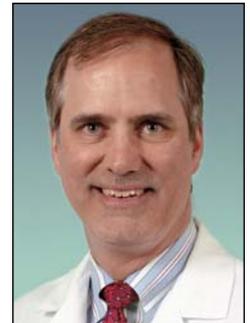
Dr. Curran has been group chair and principal investigator of RTOG since 1997.

Michalski Named Vice-Chair of Radiation Oncology

Jeff M. Michalski, M.D., a professor of radiation oncology, has been named vice-chair and director of clinical programs of the Department of Radiation Oncology at Washington University School of Medicine in St. Louis.

Dr. Michalski will oversee the department's clinical division which includes clinical operations at all treatment facilities, clinical and translational research, and physician resident, fellow and medical student training and education. He will also oversee the Brachytherapy Center, Proton Therapy Center, Gamma Knife Center and community and off-campus programs.

He currently serves as vice-chair of the Radiation Therapy Oncology Group of the American College of Radiology and leads its advanced technology integration committee.



Jeff M. Michalski, M.D.

Hill Recognized by Radiation Research Society

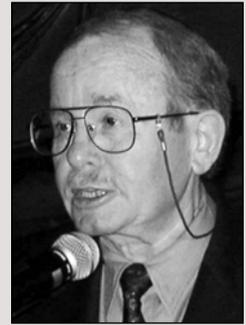
Richard Hill, Ph.D., has been awarded the 2009 Failla Award and Lectureship from the Radiation Research Society for his scientific contributions to radiation research. Dr. Hill is a senior scientist at the Ontario Cancer Institute/Princess Margaret Hospital in Canada and a professor in the Medical Biophysics and Radiation Oncology Departments at the University of Toronto in Canada. Dr. Hill is joint editor-in-chief of the *International Journal of Radiation Biology*.

Gamsu Receives Posthumous STR Gold Medal

The Society of Thoracic Radiology (STR) will bestow its gold medal posthumously to world-renowned thoracic radiologist and former STR president **Gordon Gamsu, M.D.**, at the second World Congress of Thoracic Imaging in Valencia, Spain, this month.

Dr. Gamsu, who passed away earlier this year, served as chief of chest radiology at the University of California, San Francisco, from

1973 to 1995, leaving in 1996 to become a professor and vice-chair of the Department of Radiology at Weill Cornell Medical Center in New York. From 1999 until he retired in 2007, Dr. Gamsu served as director of outpatient radiology at New York Hospital. Dr. Gamsu received STR's Lifetime Achievement Award in 2009.



Gordon Gamsu, M.D.

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

Changes Necessary to Maintain Salary Levels

IT'S NO SURPRISE that radiologists again finish near the top of the annual American Medical Group Association (AMGA) Medical Compensation and Financial Survey. A diagnostic radiologist's median income is over \$438K! It's a fool's errand to try to defend or attack our salaries, what with myriad examples of underpaid and overpaid radiologists, physicians and non-medical people. Rare is the individual who believes he or she is paid too much. However, in the midst of healthcare reform, I wonder how long this situation will last.

Neither the healthcare "market," because it is not truly competitive, nor providence has bestowed upon us our financial good fortune—it's simply an outcome of a system that rewards almost everyone for doing more, even fixing our own complications. When a clinician pays no incremental cost in self-referral, or even garners a profit, the obvious ensues. The incentive realignment promised by reform must wait another decade or more while

other experiments with payment incentives occur. From a purely pecuniary short-term point of view, radiologists benefit from every day of delay.

How do we maintain our economic status quo? In most re-formulated reimbursement models, an accountable care organization or similar proxy assumes financial responsibility for patient care, with real economic incentives to provide higher efficiency and quality. Radiologists adeptly manage processes and choose proper imaging algorithms. Clinicians practicing defensive medicine rely on imaging; radiologists cannot do more than recommend appropriate use. "Preventing" an inappropriate study is never compensated, while interpreting even the most loosely indicated study is. The results are all too predictable. Before we can redefine our role and deliver only high-quality imaging, malpractice and tort reform are needed, as is a revamped



Howard P. Forman, M.D., M.B.A.

healthcare delivery model.

Short-term prospects for radiologists are excellent but the future is a serious question, especially if our training programs don't teach the skills necessary for us to remain integral parts of the healthcare system of the future. I have confidence that our leadership knows this and

efforts by major societies to promote and expand maintenance of certification give me great hope. More than just leadership, however, is necessary to continue coming out on top.

Howard P. Forman, M.D., M.B.A., is a professor of diagnostic radiology, economics and public health at Yale University and Director of the Yale MBA for Executives: Leadership in Healthcare. He is also director of the MD/MBA Program at Yale. He is also a manuscript reviewer for Radiology and formerly served as chair of the Health Services Policy & Research subcommittee of the RSNA Scientific Program Committee.

■ The feature article "Radiology Salaries Inch Up Slightly," appears on Page 10.

My Turn
ONE RADIOLOGIST'S VIEW

RSNA Board of Directors Report

AT ITS September meeting, the RSNA Board of Directors formed a new committee to focus on the RSNA centennial and approved appointments to existing RSNA committees for the coming year.

New Committee to Address 100th Anniversary

The new **RSNA Centennial Committee** is co-chaired by **Ronald L. Arenson, M.D.**, RSNA Board Liaison for the Annual Meeting and Technology, and **N. Reed Dunnick, M.D.**, RSNA Board Liaison for Science. RSNA will observe its centennial year beginning with RSNA 2014 and ending with RSNA 2015. The committee will identify appropriate themes and programs to mark the anniversary throughout the year.

The Board has agreed to form a joint task force with the American College of Radiology to address **resident training in professionalism**. The RSNA co-chair of the task force will be **Leonard Berlin, M.D.**, whose term as chair of the RSNA Professionalism Committee concludes at RSNA 2009.

Appointments to RSNA's many existing committees were also approved by the Board, in consultation with the committee chairs. The Board thanks the hundreds of **exceptional and dedicated volunteers** who make it possible for RSNA to meet its mission.

R&E Officers, Trustees Named for 2010

2008 RSNA President **Theresa C. McLoud, M.D.**, is chair-elect of the RSNA Research & Education Foundation Board of Trustees. Dr. McLoud will become chair at the end of 2010, following the two-year term of **Jack E. Price**. Other officers named were **E. Russell Ritenour, Ph.D.**, as secre-

tary, and **R. Gilbert Jost, M.D.**, as treasurer. New trustees were also appointed: **Sarah M. Donaldson, M.D.**, **Richard L. Ehman, M.D.**, and **Valerie P. Jackson, M.D.**

International Focus Boosts Individuals, Specialty

RSNA has named **Temitope Bello, M.B.B.S.**, of Nigeria, and **Raed Al-Saad, Ph.D.**, of Iraq, as the 2009-10 Derek Harwood-Nash International Fellows. This fellowship, named for late RSNA Board member **Derek Harwood-Nash, M.B.Ch.B., D.Sc.**, allows an academic radiologist to study for a six- to 12-week period at a North American host institution and is targeted to radiologists three to 10 years beyond training.

RSNA will convene a meeting of international radiology leaders at RSNA 2009 to discuss trends and perspectives on training, certification and practice in **hybrid imaging** around the world. Watch the January 2010 issue of *RSNA News* for coverage of this session.

In a domestic collaboration, RSNA will work with the National Institute of Biomedical Imaging and Bioengineering to convene a methodology workshop on **Comparative Effectiveness Research (CER) in Imaging**. RSNA foresees playing a critical role in developing methodology for CER—defined as generating and synthesizing comparisons of the benefits and harms of various methods to prevent, diagnose, treat and monitor conditions—by setting an agenda for CER in imaging, developing a cadre of researchers and bringing CER to a wider imaging audience.

Outstanding Researcher, Educator Named

RSNA has selected **Elliot K. Fish-**



Burton P. Drayer, M.D.
Chairman, 2009 RSNA Board of Directors

man, M.D., as the 2009 Outstanding Educator and **Sanjiv Sam Gambhir, Ph.D., M.D.**, as the 2009 Outstanding Researcher. Read more about Drs. Fishman and Gambhir, who will be recognized during the RSNA 2009 opening session, on Page 18.

The RSNA 2009 opening session is just around the corner. I look forward to seeing all of you at this year's annual meeting.

BURTON P. DRAYER, M.D.

CHAIRMAN, 2009 RSNA BOARD OF DIRECTORS

■ Note: In our continuing efforts to keep RSNA members informed, the chairman of the RSNA Board of Directors will provide a brief report in *RSNA News* following each board meeting. The next RSNA Board Meeting will be at RSNA 2009.

Simulation Faces Technological, Regulatory Obstacles on Way to Mainstream

DESPITE OBVIOUS advantages for trainees and veteran practitioners, the future of medical simulation as a widely integrated part of curricula is still contingent on factors including technological breakthroughs, training standards and the simulators themselves.

“Simulation will be a major player in training and accreditation, but my guess is it won’t be for another 10 or 15 years,” said Craig B. Glaiberman, M.D., an interventional radiologist and assistant professor of radiology at the University of California Davis (UC Davis) Medical Center in Sacramento.

Variety of Simulation Products Offer Different Advantages

Dr. Glaiberman has had experience with a number of simulators at the Mallinckrodt Institute of Radiology in St. Louis as well as UC Davis, which is home to the Center for Virtual Care. The center features two lifelike training mannequins that blink, speak and breathe and also have a heartbeat, pulse points, dilating pupils and other realistic anatomical features that allow students to practice intravenous drug delivery, CPR, catheterizations, basic obstetrics and airway management and respiratory therapy for adult and pediatric patients.

The center also utilizes Medical Simulation Corp.’s SimSuite™ virtual training system that allows students and residents to practice renal and iliac interventions and carotid artery stenting on the Simantha™ endovascular simulator.

In addition to the mechanics of a procedure, SimSuite simulates hemodynamic and physiologic responses, said

Dr. Glaiberman.

“There are code scenarios that demonstrate airway management, interactions with medications, responses to anesthesia or just basic histories for hemodynamics, so you can actually watch the physiologic response to the medication and the dose.”

What his experiences have taught him, said Dr. Glaiberman, is that commercial simulators have different advantages. While SimSuite focuses heavily on clinical scenarios and interpersonal interactions among the clinical team, the Mentice VIST™ system has excellent haptics and tool simulation for procedures and “gives very good tactile feedback,” he said.

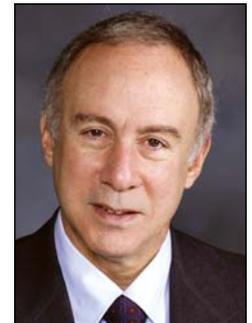
“An Israeli company called Symbionix has shown great promise for patient anatomy, patient history, haptics and the ability to use specific tools,” he said.

Along with allowing trainees to practice without risk to real patients, simulation also affords the opportunity to perform procedures not otherwise encountered in significant volume, Dr. Glaiberman said. “Residents need to be involved with a certain number of carotid, iliac and renal interventions and may not be exposed to that many procedures during their training. With simulation we’re hoping to bridge some of those gaps.”

Simulation can also close gaps for physicians with advanced skills, said Ronald L. Arenson, M.D., chair and Alexander R. Margulis Distinguished Professor of Radiology at the Uni-



Craig B. Glaiberman, M.D.
University of California Davis



Ronald L. Arenson, M.D.
University of California, San Francisco



Amrita Kumar, M.D., M.Sc.
Arrow Park Hospital and Mersey Deanery



Steven Dawson, M.D.
Massachusetts General Hospital, Harvard Medical School

versity of California, San Francisco (UCSF) and RSNA Liaison for the Annual Meeting and Technology. “SimSuite can create random simulated complications such as changes in hemostasis among other complications interventional radiologists don’t often encounter,” said Dr. Arenson.

Future of Simulation Tied to Standards Consensus

Currently the Joint Commission is moving toward more specific standards for maintenance of certification



The UC Davis Center for Virtual Care features two lifelike training mannequins that blink, speak and breathe and also have a heartbeat, pulse points, dilating pupils and other realistic anatomical features. The simulators can be injected, intubated and catheterized for patient care training. Image courtesy of UC Regents.

(MOC), which could involve simulation, Dr. Arenson said. “The commission might decide that clinicians would have to do, say, 100 of a certain procedure per year to remain certified. Simulation will be the vehicle by which they can maintain their certification.”

The future of simulation, however, still awaits a consensus on standards for credentialing and MOC in terms of both the procedures trainees must perform and the type of simulator used to perform those procedures.

“In today’s commercial market there are no fully validated simulators,” said Amrita Kumar, M.D., M.Sc., a radiology registrar at Arrowe Park Hospital and Mersey Deanery in Merseyside, Great Britain, whose research is part of the U.K.-based Collaborators in Radiological and Interventional Virtual Environments (CRaIVE), a consortium of clinicians, physicists, computer scientists, clinical engineers and psychologists, which includes RSNA members.

“Even though there have been no broadly accepted guidelines for the validation of simulators in the past, investigators in the U.S. and Europe are currently working to establish guidelines,” said Dr. Kumar.

CRaIVE’s chair, Derek A. Gould,

M.D., is a member of the Society of Interventional Radiology (SIR) and serves on RSNA’s Joint Medical Simulation Task Force along with RSNA President Gary J. Becker, M.D., and Steven Dawson, M.D. Earlier this year, Dr. Dawson presented at an RSNA/SIR-sponsored session focusing particularly on guidelines for interventional radiology.

“We culled SIR experts representing different subspecialties, community practices, academic practices and large private practices, as well as an educational psychologist,” said Dr. Dawson, an interventional radiologist and program lead in medical simulation at Massachusetts General Hospital and an associate professor at Harvard Medical School in Boston.

“We assigned values based on clinical relevance to each step in a very long list of individual steps for interventional procedures.”

Metrics developed by non-radiologists are not able to distinguish the critical steps that should be scored more heavily during a simulation exercise than steps of lesser clinical consequence, Dr. Dawson said.

“The goal is to develop a scoring system that can be integrated into the

software that the machines are already running. If we present a mathematical basis for measuring the performance, then we can imbue the machines with a whole new level of relevance to practice.”

Procedural simulation technology is far more complex than technology based on visual simulation, such as video games, said Dr. Dawson.

CRaIVE Projects Aim to Advance Simulation

There are two ongoing CRaIVE simulation projects for interventional procedures, said Dr. Kumar. One, the Imaging Guided Interventional Needle Simulation, or ImaGINE-S, uses a PC, monitor and graphic user interface, stereoscopic goggles and two Sens-Able Technologies Phantom® Omni haptic devices with different resistance levels—one for the needle, that can penetrate tissue, and one for the ultrasound probe, that cannot—to deliver the “feel” of the procedure.

Haptics, a technology that interfaces with the user via the sense of touch through force, vibrations and/or motion, is still emerging, he said.

“Haptic devices can give force feedback for inserting a needle in a straight motion,” Dr. Dawson said, “but for angiographic procedures that involve more than a straight needle stick, I think the challenge is going to

Continued on Page 11

Simulation will be a major player in training and accreditation, but my guess is it won't be for another 10 or 15 years.

Craig B. Glaiberman, M.D.

Debate Sparked over Risks of CT-based CAC Screening

A RECENT STUDY suggesting that CT-based coronary artery calcification (CAC) screening puts patients at an increased risk of developing cancer over time has raised questions about the need for screening protocols and whether equipment and screening recommendations referenced in the study are in fact commonly utilized.

Based on computer modeling of radiation risk, the study suggests that widespread screening for the buildup of calcium in the arteries using CT would lead to an estimated 42 additional radiation-induced cancer cases per 100,000 men and 62 cases per 100,000 women. The study appeared in the July 13, 2009, issue of the *Archives of Internal Medicine (AIM)*.

Due to differences in scanner models and techniques, the radiation dose from a CT scan to detect CAC varied more than tenfold, researchers discovered.

“For the vast majority of patients undergoing CT and all radiology procedures utilizing ionizing radiation, the benefits outweigh the risks,” said study author Andrew J. Einstein, M.D., Ph.D., director of cardiac CT research at Columbia University Medical Center in New York. “However there is a small subset of patients for whom potential risks outweigh the benefits.”

An editorial appearing in the same issue of *AIM* points out the controversy surrounding the value of CAC screening and stresses the need for a standardized protocol for CAC quantification. Some cardiac imagers are also taking issue with the study, asserting that the authors’ findings are not adequately supported by the research.

“I don’t think it’s a robust finding for CT practice in 2009,” said Geof-

frey Rubin, M.D., a professor of radiology at Stanford University in California. “While the results highlight the importance of responsible imaging to avoid unnecessary radiation exposure, the combination of older CT protocols and highly aggressive CAC screening recommendations should substantially overestimate the risk to the population under current practice standards.”

Variation in Radiation Dose Surprises Researchers

To reach their conclusions, authors found that an effective dose range measured 0.8-10.5 mSv. They extrapolated data from that measurement and utilized SHAPE (Screening for Heart Attack Prevention and Education) recommendations of screening every five years for men ages 45 to 75 and women ages 55 to 75. A median dose of 2.3 mSv was used in the study calculation.

The wide variation in radiation dose detected by the team was unexpected, said Dr. Einstein.

“It really surprised me,” he said. “I didn’t think we were going to find such outliers with high doses for calcium scoring. At the same time, we thought it was worth investigating.

“I was most surprised that one of the sites had an effective dose of calcium scoring over 10 mSv,” continued



Andrew J. Einstein, M.D., Ph.D.
Columbia University Medical Center



Geoffrey Rubin, M.D.
Stanford University

Dr. Einstein. “I suspect that scanner, which is older technology, is no longer being used, but it taught us a lesson that we must be careful about the technology being used.”

Variation in radiation doses from such screening is one of the key take-home points from this research. CT protocols can be optimized to minimize the dose and, therefore, risks, said Dr.

For the vast majority of patients undergoing CT and all radiology procedures utilizing ionizing radiation, the benefits outweigh the risks.

Andrew J. Einstein, M.D., Ph.D.

Einstein.

“We observed a more than tenfold variation in radiation doses from CAC screening with multidetector CT depending on the protocol and, therefore, a wide variation in the estimated radiation-induced cancer risk,”

said the study’s lead author, Kwang Pyo Kim, Ph.D., then of the National Cancer Institute in Bethesda, Md., and now an assistant professor in the Department of Nuclear Engineering at Kyung Hee University in Gyeonggi-do in South Korea. “This means a patient may receive radiation doses 10 times higher or lower

depending on the hospital he visits.”

Screening Guidelines Fuel Debate

Dr. Rubin takes issue with researchers basing their data on SHAPE recommendation of screening every five years.

“The goals of the SHAPE task force are laudable, however their recommendations for atherosclerosis screening are among the most aggressive paradigms proposed to date,” he said. “None of the major medical societies advocates this approach and I am not aware of any populations for whom this screening is being applied. At this time, this approach is purely theoretical.”

In the *AIM* editorial, authors Raymond J. Gibbons, M.D., and Thomas C. Gerber, M.D., Ph.D., both of the Mayo Clinic in Rochester, Minn., point out that, “The U.S. Preventive Services Task Force recommends against routine CAC screening with CT. The American Heart Association (AHA) has indicated that CAC scanning may be reasonable in selected, intermediate-risk patients but does not recommend it in low or high-risk patients.”

Dr. Kim rebutted, saying, “The point is that it depends on comparison between benefits and risks. If benefits from the screening apparently exceed the risks, the guideline is not too aggressive. If not, we need to think about that more carefully. Therefore, it is necessary to perform such a study to compare the benefits and risks.”

Dr. Rubin said he does not believe the study represented state-of-the-art methodologies.

“Of the 20 CT acquisition protocols considered, 15 came from published studies where the protocols were 7-9 years old and used equipment that was among the earliest generation of multi-detector-row CT,” he said. “The other

protocols were collected from hospitals that apparently were selected without justification as to why they would be representative of current practice. Protocols derived from a formalized survey of current practice that would legitimately represent the spectrum of CT scan protocols used for CAC screening in 2009 would have been preferable.”

CAC Screening Standard Urged

Ultimately professional organizations are responsible for advocating for standardization of CAC imaging with CT, stressed Drs. Gibbons and Gerber in their editorial. “In the meantime, every effort should be made to reduce patient dose while balancing image noise and quality sufficient for confident interpretation,” they write.

They also advise physicians utilizing CAC imaging with CT to carefully review the American College of Cardiology and AHA clinical practice guidelines as well as the newest guidelines due to be published in late 2009 or early 2010.

The findings discussed in the study raise valid points for consumers considering cardiac imaging, said Dr. Einstein.

“I don’t think the general public should take away an alarmist message,” he said. “At the same time, it’s of interest that there is a more than tenfold variation in the amount of radiation

they could receive from the same study between different types of scanners. It’s important to choose a radiology or imaging center that has state-of-the-art equipment and performs tests in a low dose manner.”

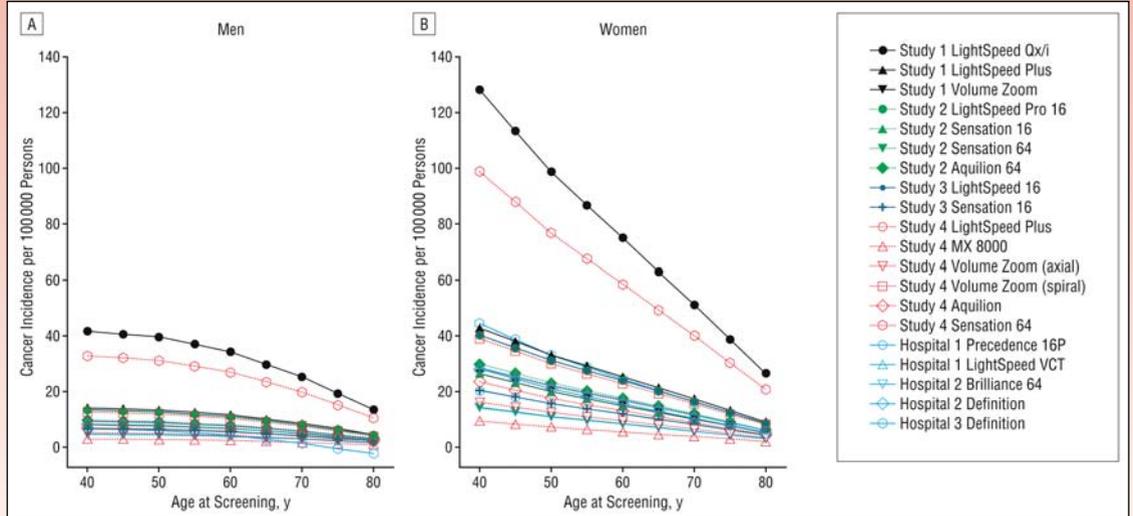
Learn More

- To view an abstract of the study, “Coronary Artery Calcification Screening: Estimated Radiation Dose and Cancer Risk,” published in the July 13 issue of the *Archives of Internal Medicine*, go to archinte.ama-assn.org/cgi/content/abstract/169/13/1188.
- To view an extract of the editorial, “Calcium Scoring with Computed Tomography,” from the same issue, go to archinte.ama-assn.org/cgi/content/extract/169/13/1185.

Radiation Dose at RSNA 2009

The Associated Sciences Course, “Radiation Dose: Are We at Crisis?” will be moderated by Karen J. Finnegan, M.S., R.T. (R)(CV) at RSNA 2009. The session includes courses on “Radiation Risk in Interventional Radiology,” presented by John F. Angle, M.D., and “Low-Dose CT: Practical Applications,” presented by Narinder S. Paul, M.D.

Registration for all RSNA 2009 courses is under way at RSNA2009.RSNA.org.



A recent study published in the *Archives of Internal Medicine* suggests that CT-based coronary artery calcification (CAC) screening puts patients at an increased risk of developing cancer over time. Above: The estimated lifetime risk of radiation-induced cancer per 100,000 persons from a single CT scan to assess CAC by age at screening.

Archives of Internal Medicine 2009;169:1191 © 2009 American Medical Association

Radiology Salaries Inch Up Slightly

ALTHOUGH experts had predicted numbers would hold steady or even drop for physicians in 2008, revenue and compensation increased slightly for radiologists last year, keeping in line with most specialties, according to an annual salary survey.

These findings are part of the American Medical Group Association (AMGA) 2009 Medical Compensation and Financial Survey sent to 2,700 medical groups in February 2009. Survey administrator RSM McGladrey received responses from 231 medical groups representing 44,200 providers.

According to the survey, salaries for interventional radiologists increased by 3.19 percent in 2008—down from the 5.28 percent increase that specialty posted in 2007. The median salary for an interventional radiologist was \$478,000, once again the second highest among 30 specialties included in the AMGA survey.

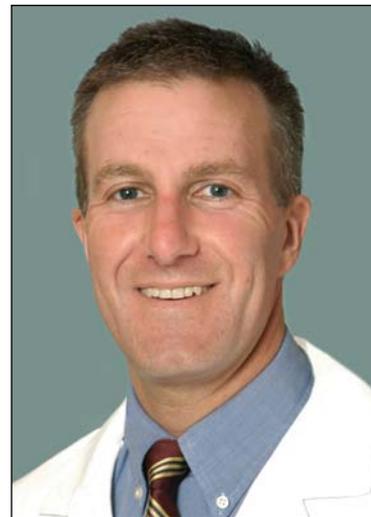
With a median salary of \$438,115, diagnostic radiologists' compensation increased by 4.10 percent in 2008, jumping from the 1.44 percent increase in 2007. Diagnostic radiologists scored the fifth highest annual compensation among the specialties surveyed.

Cardiac/thoracic surgeons were the highest paid specialty, with a median salary of \$507,143, for a 1.98 percent increase. Specialties with the highest compensation increases from 2007 to 2008 were ophthalmology at 6.58 percent, otolaryngology at 8.63 percent, pathology at 11.02 percent and urgent care at 7.33 percent, according to the survey.

"We had projected that revenue numbers would be flat or even decrease due to the changes in reimbursement from the Centers for Medicare and



Brad Vaudrey, M.B.A., C.P.A.
RSM McGladrey, Inc.



Richard Duszak Jr., M.D.
Mid-South Imaging & Therapeutics

Medicaid Services," according to Brad Vaudrey, M.B.A., C.P.A., a director with RSM McGladrey's Health Care Consulting Group. "But in terms of the physician compensation increase, there was an average increase of approximately 3.6 percent across all specialties."

Radiology "Cools" Off

Although radiology has been "hot" in recent years due to high profits and increasing demand, Vaudrey said, the changing market is having a cooling effect on the specialty.

"The demand for radiology is still there but the market has begun to catch up," he said. "This is having a flattening effect on compensation and on the relative value unit (RVU) side as well."

RVUs are the primary measure of a physician's productivity at the majority of participating medical groups, according to AMGA. The average increase in

work RVUs from 2007 to 2008 was 1.6 percent for all specialties surveyed.

For interventional radiologists, the AMGA analysis shows a 6.28 percent decrease in median work RVUs last year, dropping from 8,671 in 2007 to 8,127 in 2008. Diagnostic radiologists registered a 4.70 percent increase in RVUs from 7,610 in 2007 to 7,968 last year.

In 2007, CMS adjusted RVUs to funnel more money into primary care, a strategy that was reflected in the survey, Vaudrey said.

Previously flat for several years, primary care saw an increase in 2008 and is now starting to show an overall uptake, while technical services are

seeing less reimbursement and could be starting to flatten out, Vaudrey said. "That's what we expected to see and what CMS intended with their changes."

Despite the redistribution of pay-

The demand for radiology is still there but the market has begun to catch up. This is having a flattening effect on compensation and on the RVU side as well.

Brad Vaudrey, M.B.A.

ment under CMS, compensation for physicians, including radiologists, increased overall.

“Radiologist salaries stayed intact with everybody else,” said Richard Duszak Jr., M.D., an interventional radiologist with Mid-South Imaging & Therapeutics in Memphis and a member of the American Medical Association’s Current Procedural Technology Editorial Panel.

There appears to be an increasing demand for physician services across the board because of the aging population, he said. Consequently, patient volume is increasing and compensation is growing marginally.

Diagnostic Radiologists Bolster Workload, Not Paycheck

Pointing out that the salary increase for diagnostic radiologists did not keep pace with the RVU increase in the AMGA survey, Dr. Duszak said he believes that “diagnostic radiologists are working harder to earn the same amount we did before.”

He attributes the discrepancy to a “hostile payer community,” including CMS which he said is issuing an increasing number of nonpayment edicts.

“Patient and referrer demand is driving volume, but payments are basically maintaining parity,” said Dr. Duszak. “This same principle applies to a number of other medical specialties as well.

Top Physician Compensation

SPECIALTY	2008	2007	2007-2008 PERCENTAGE CHANGE	2006
Cardiac/Thoracic Surgery	\$507,143	\$497,307	1.98	\$460,000
Diagnostic Radiology (Interventional)	\$478,000	\$463,219	3.19	\$440,004
Orthopedic Surgery	\$476,083	\$450,000	5.80	\$436,481
Cardiology – Cath Lab	\$471,746	\$456,048	3.44	\$435,000
Diagnostic Radiology (Non-interventional)	\$438,115	\$420,858	4.10	\$414,875

Source: American Medical Group Association (AMGA) 2008 Medical Group Compensation and Financial Survey.

“Interestingly, interventional radiologists are not getting paid more on a per unit basis, so what I think we are seeing is the consequence of an increase in wider specialty encroachment upon interventional radiology,” he continued.

Turf battles between specialties may also be impacting compensation, said Dr. Duszak.

“For instance, the amount of peripheral vascular disease I treat daily has gone way down, but the amount I have to cover on call has gone up,” he said. “Because people are cherry picking the turf, it is difficult for interventionalists to generate the same amount of revenue for their practices as they did in the past.”

At the practice level, dollars are shifting from diagnostic radiology toward the subsidization of interventional radiologists, he said.

“This is one way a contracted radiology group can cover its entire book of radiology services,” said Dr. Duszak. “The group knows some services will be more lucrative than others and must find

a way to adjust to keep the business.”

The willingness of hospitals to help radiology groups subsidize the salaries of interventional radiologists will also contribute to the stabilization of interventional radiology coverage, he said.

Salaries Could Be Tied to Quality Outcomes

Looking ahead, looming changes on the healthcare horizon will have a considerable impact on physicians’ salaries, said Vaudrey.

“With healthcare reform, a lot of the focus is on quality initiatives,” he said. “When our firm does compensation planning clients are not looking at how to get more dollars from revenue increases, but how to enhance revenue based on quality outcomes. We are seeing more focus on quality and more dollars tied to quality outcomes.” □

Learn More

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

Simulation Faces Technological, Regulatory Obstacles on Way to Mainstream

Continued from Page 7

be greater.”

The second CRAIVE project will attempt to address that challenge with a physics-based virtual environment for guidewire and catheter insertion. “For ultimate fidelity, we will determine and localize the forces experienced by an operator using miniature sensors, enabling the ‘feel’ to be accurately reproduced,” said Dr. Kumar. “This will allow us to simulate needle puncture and introduce a guidewire and catheter into a blood vessel with realistic behavior of tissue and vessels.”

Simulation remains a very small part of the curriculum at most institutions and establishing its clinical relevance for certification and MOC standards may be slower than once predicted, radiologists agreed.

“Eventually simulation will come into the mainstream, and we will be better off, but I don’t think we’re ready,” said Dr. Dawson. “We still need to make sure the simulators we’re developing will really transform how we think or transform how we use our hands and eyes.” □

Simulation at RSNA 2009

COURSES, scientific sessions and digital presentations on simulation technology offered at RSNA 2009 will focus on topics including robotics for minimally invasive techniques, calculating dose reduction methods, algorithms for measuring and improving performance and the feasibility of electronic health records. The digital presentation, “The Role of Simulation in Medical Training and Assessment” (LL-VI6082), presented by Amrita Kumar, M.D., M.Sc., will discuss current uses of simulation, its advantages and limitations and future potential.



Obesity and Heart Disease Link Spurs Structured Reporting Ideas

A STUDY ON THE correlation between obesity and cardiovascular disease gave RSNA Research & Education (R&E) Grant recipient Marta Heilbrun, M.D., a better understanding of what imaging can convey beyond the original hypothesis and led her to a structured reporting initiative to track and quantify such outcomes.

Dr. Heilbrun used a 2005 RSNA Presidents Circle Research Resident Grant to fund her study, “A Nonhuman Primate Model for Quantitative CT Volumetric Measures of Obesity and Cardiovascular Disease Risk Factors,” which demonstrated the feasibility and ease of performing high-volume CT imaging of the entire body in a relatively large number of non-human primates. The study was the first to show a significant correlation between CT-measured hepatic steatosis and

atherosclerotic plaque at histology in any species. The research, which has not yet been published, was completed at Wake Forest University in Winston-Salem, N.C.

Dr. Heilbrun examined volumetric measures of abdominal fat compartments using whole-body multidetector CT scans of cynomolgus monkeys taken from a larger trial investigating the link between depression and cardiovascular disease risk. Results of Dr. Heilbrun’s research showed the monkeys had almost no CT demonstrable plaque.

“Yet at histology, there was quantifiable plaque,” said Dr. Heilbrun, now a professor in the Department of Radiol-

ogy at the University of Utah in Salt Lake City. “We found that they had varying amounts of visceral fat, subcutaneous fat, cardio fat and even liver fat.

“We identified factors that we hadn’t even thought about that were part of the cardiovascular disease risk profile,” she said. “This was an incredible opportunity to understand much more about the spectrum of disease and what an image might tell us, separate from the original hypothesis of the experiment.

“It was valuable to realize that a multitude of questions can be asked and answered each time an image is obtained—especially in non-human primates when environmental exposure is tightly controlled. This eliminates some of the problems with human epidemiologic studies,” she added. “Our exposures are so heterogeneous that it’s very hard to sort the signal from the noise.”

Future studies will be able to use CT to measure intermediate endpoints instead of sacrificing part of the study population or study animals, Dr. Heilbrun said.

More Standardized Data Sought

Her experience using monkey scans from a separate, larger study led Dr. Heilbrun to an initiative to identify more standardized information to be



Marta Heilbrun, M.D.

taken from images and reported for use by researchers. She became a member of the RSNA Structured Reporting Committee established to create clear and consistent report templates that contain reusable structured data.

“If I can get quantifiable and reliable data out of the reports we generate, we will be

much more likely to be able to actually track and measure outcomes and determine what happens with patients when they interact with imaging.

“There was a lot more information there, once I started actually looking at the images and measuring,” Dr. Heilbrun said. “Right now we generate reports in clinical practice and there is a lot of information about the state of health in America that we don’t know how to measure. Maybe a structured report is a way to start capturing that.”

Along with her cost-effective analysis and outcomes-based research, Dr. Heilbrun’s work on structured reporting is especially significant to radiology—and research in general, said Kathryn A. Morton, M.D., a professor of radiology at the University of Utah and a long-time mentor to Dr. Heilbrun.

“Structured reporting is critical because it allows for combining or comparing radiology data from multiple institutions,” said Dr. Morton. “This is critical for our profession, yet few people have the expertise necessary to accomplish this. Dr. Heilbrun has that expertise, acquired through her graduate program and a long-standing interest in medical informatics dealing

This was an incredible opportunity to understand much more about the spectrum of disease and what an image might tell us separate from the original hypothesis of the experiment.

Marta Heilbrun, M.D.

with outcomes-based research.”

Evaluating Image-Guided Biopsy in Renal Cell Carcinoma

Since arriving in Utah in 2007, Dr. Heilbrun has been working on a paradigm to systematically evaluate the impact of imaging-based technologies on patient outcomes—an inquiry that she said has prompted her to investigate what is really on patients’ minds.

The first step was learning to use statistical modeling, decision analysis and cost-effectiveness tools to evaluate the role of image-guided percutaneous biopsy on outcomes in renal cell carcinoma. The research is funded through a GE-Association of University Radiologists Radiology Research Academic Fellowship that provides \$70,000 for each of two years.

The work is based on the hypothesis that adding percutaneous biopsy to the diagnostic workup of renal masses that meet the imaging criteria of a T1a tumor—four centimeters or smaller and limited to the kidney without spread to lymph nodes or distant organs—will be cost-effective by preventing patients from undergoing unnecessary treat-

ment, said Dr. Heilbrun.

“The current standard of care is not to do a biopsy except in certain indications, such as when a procedure is not going to yield a final whole specimen or there is significant risk involved with surgery,” said Dr. Heilbrun. “I am trying to understand if we should expand the biopsy to more patients and how to demonstrate whether it would be beneficial if we did so in terms of this disease.”

The project hinges on understanding a patient’s perspective once diagnosed with a particular disease, she said.

“A lot of it comes down to the willingness of the patient and caregiver to accept some uncertainty,” said Dr. Heilbrun. “If the patient is willing to accept the possibility of a non-diagnostic or inconclusive test and there is a high risk associated with surgery, then the biopsy is probably a good choice. If the patient is unwilling to accept uncertainty, then neither watchful waiting nor doing a biopsy is a particularly good choice.

“If we develop a new imaging test, I want to understand how good would it have to be and what kind of addi-

tional information would be necessary to glean in order to really change the outcome of patients with this disease,” she said. “That is why we are trying to quantify uncertainty about patient behaviors in order to inform the development of new tests.

“Because we really don’t understand the natural history of this disease, it is difficult to counsel patients effectively about their options.”

One limitation to her research lies with the patients themselves. Dr. Heilbrun said it could be difficult to find patients willing to undergo a new imaging test since someone with a renal mass may want it removed whether or not it is cancerous.

“If patients want this mass out of their body, then there is no reason to develop a new MR imaging technique that can differentiate whether it is cancer or not,” she said. “That is what is driving my next question. I really need to start asking patients and real people how they would deal with this information.” □

NAME:

Marta Heilbrun, M.D.

GRANT RECEIVED:

2005 RSNA Presidents Circle Research Resident Grant, \$30,000

STUDY:

“A Nonhuman Primate Model for Quantitative CT Volumetric Measures of Obesity and Cardiovascular Disease Risk Factors.”

CAREER IMPACT:

The RSNA grant launched a pathway of intense academic growth in understanding and effectively conducting clinical research. The grant was followed by the GE-Association of University Radiologists Radiology Research Academic Fellowship and a Master of Science in clinical investigation. The desire to harness large amounts of data in order to understand human disease led to involvement with RSNA’s structured reporting initiative.

CLINICAL IMPLICATIONS:

Dr. Heilbrun’s research on the link between obesity and cardiovascular disease demonstrated a significant correlation between CT measured hepatic steatosis—which was mediated by dyslipidemia—and increased subclinical atherosclerosis. Research on different imaging techniques and medical interventions in primates has practical applications for human trials.



Grants in Action

For more information on all Foundation grant programs, go to RSNA.org/Foundation or contact Scott Walter, M.S., assistant director, grant administration at 1-630-571-7816 or swalter@rsna.org.

Radiologists Face Deepening Levels of Stress, Burnout

A RECENT REVIEW article describing the shocking behavior of a senior radiologist who “had a meltdown” when a sedated child woke up during an abdominal CT reveals an equally unsettling reason for his behavior: anxiety and trouble sleeping and concentrating.

Radiologists facing heavier workloads with decreasing financial rewards, the fear of litigation, exhaustion and the constant struggle of juggling work and family issues are becoming increasingly stressed, burnt out and depressed.

Anxiety and trouble sleeping or concentrating are among symptoms of these conditions that may cause disruptive behaviors in the workplace and lead to conduct commonly seen in drug or alcohol addiction, according to the review published in the July 2009 issue of the *Journal of the American College of Radiology (JACR)*.

“Physicians are in stressful work conditions,” said one of the authors, Stephen D. Brown, M.D., an assistant professor of radiology at Children’s Hospital of Boston and Harvard Medical School. “We need to learn to understand behaviors associated with poor responses to stress and how to manage those behaviors.”

A fictional account based on a real event,

the case of the radiologist treating the sedated child is a classic example of a physician unable to manage a stressful situation in an acceptable manner. In the scenario, after the child woke up and the radiologist realized the exam had been rendered nondiagnostic, he



Stephen D. Brown, M.D.
Children’s Hospital of Boston
and Harvard Medical School



Carol M. Rumack, M.D.
University of Colorado’s
Denver School of Medicine



Dania Tamimi, B.D.S., D.M.Sc.

denounced the nurse, fellow and technician in front of the patient and family, threw down the chart and stormed out of the room, according to the review.

Disruptive behavior related to any cause is now understood to adversely affect physician performance and compromise patient safety, according to Dr. Brown’s review.

However, little is known about behavioral problems related to depression, burnout and stress in radiology and whether they may become more

frequent or acute as workloads increase and reimbursements decline, he said.

The review addresses a variety of causes of stress, with one of the most common being workflow and volume.

“When the worker does not have control of the flow of work—that causes stress,” said Dr. Brown, a member of RSNA’s Professionalism Committee who will present this material at RSNA 2009 with co-authors Marilyn

J. Goske, M.D. and Craig M. Johnson, D.O. (see sidebar).

RSNA 2009 Yoga Course Offers Solution

Stress is the body’s response to a real or perceived threat, according to Dania Tamimi, B.D.S., D.M.Sc., who will present, “Yoga for the Stressed Radiologist,” at RSNA 2009 (see sidebar), and who regularly speaks and writes on topics related to radiology and yoga. She defined burnout as the constant depletion of mental, physical and emotional energy. “Burnout is a normal response to putting in too much effort without taking in what you need to balance and restore yourself,” she said.

Dr. Tamimi, an oral radiologist, registered yoga trainer and an American Council on Exercise-certified instructor, said some repetitive physical and mental activities can offset stress.

“Often, a person who is burnt out does not realize it or is in denial so as not to appear weak to himself or others,” she said. “Recognizing that you are stressed or burnt out is the first and most important step to healing yourself. One of the first signs of burnout is a

Recognizing that you are stressed or burnt out is the first and most important step to healing yourself.

Dania Tamimi, B.D.S., D.M.Sc.

lack of interest in things previously found enjoyable, which may apply to work as well.”

Some problems that could deepen stress for radiologists are poor posture, excessive glare from viewing monitors, a cluttered workstation, the inability to create time for themselves, overeating, consumption of stimulants like caffeine and the abuse of alcohol and narcotics, Dr. Tamimi said.

Stress management techniques and exercise may offer greater relief, and yoga is one effective way to reduce stress, according to Dr. Tamimi.

“Yoga massages the musculoskeletal system as the muscles and tendons are stretched,” she said. “The steady, even, diaphragmatic breathing performed in yoga reduces stress by activating the relaxation response.”

Stress Impacts Radiologists of all Ages

Radiologists face stress at every stage of their career, experts said. Financial issues related to the faltering economy can increase stress in older physicians who realize they may not be able to retire when scheduled, while a radiologist who is ill or is caring for a sick family member can also experience increased stress levels.

For radiologists in training, sitting for board exams can lead to toxic levels of stress, according to Carol M. Rumack, M.D., a professor of radiology and pediatrics and associate dean for Graduate Medical Education at the University of Colorado’s Denver School of Medicine who developed the presentation, “The Physician with Behavior Problems,” with Alan C. Hartford, M.D., Ph.D., who will make the presentation at RSNA 2009.

Board exams are so stressful that the university has created a program to reduce the tension, said Dr. Rumack.

“Each week, an attending physician meets with about 50 residents to discuss a case,” she said. “About a quarter of the residents are called on so they get used to the idea of talking in front of people. After four years of doing

this, residents find the boards much less traumatic.”

Dr. Rumack, president of the American College of Radiology, said something as simple as eating before the exams is effective for alleviating stress.

“Learn how to deal with stress so that it helps you perform,” she said. “When I was a resident, I had no breakfast before my first oral exam in pediatrics. During the one-on-one meeting with the examiner, he offered me an apple when he saw how pale I was. If you don’t think your stomach can take any food, try some ginger ale.”

Finding a work environment that fits your comfort level is another way to reduce stress. If the emergency department is too stressful, stay away from it, cautioned Dr. Rumack.

Working around a stressed, burnt-out or depressed radiologist may cause stress in a fellow colleague hesitant to report the physician’s actions for fear of retribution or destroying a career.

In Colorado, part of the licensing fee goes toward the Colorado Physician’s Health Program, a nonprofit, independent organization that provides peer assistance services for licensed physicians and physician assistants of Colorado, said Dr. Rumack.

About one-third of those doctors in the program enter voluntarily, while others are sent when a program director or chair becomes aware of behavior issues, she said.

After the physician goes through the intake process, assessment and lab testing, the program notifies the department chair that the physician is fit for practice but does not reveal other details, said Dr. Rumack.

More Radiology-focused Research Needed

Dr. Brown said he would like to see future research on how stress, burnout, depression and associated workplace risk factors such as patient volume and disruption in workflow affect the quality of care, patient safety and the incidence of medical errors in radiology.

Specifically, Dr. Brown wants to

see radiology-focused research similar to the study published in the February 2008 issue of the *British Medical Journal*, “Rates of Medication Errors Among Depressed and Burnt Out Residents: Prospective Cohort Study,” demonstrating that depressed physicians were significantly more likely to make medication errors.

In addition, Dr. Brown sees a need for training programs that educate radiologists, especially those at the managerial level, on warning signs that a physician’s behavior is beginning to cross the line. “We need mechanisms that recognize, report and correct behaviors,” he said. □

Learn More

- To view an abstract of the study, “Beyond Substance Abuse: Stress, Burnout and Depression as Causes of Physician Impairment and Disruptive Behavior,” published in the July 2009 issue of the *Journal of the American College of Radiology (JACR)*, go to www.jacr.org/article/PIIS1546144008005942.
- To view an abstract of the study, “Rates of Medication Errors Among Depressed and Burnt Out Residents: Prospective Cohort Study,” published in the *British Medical Journal*, go to www.bmj.com/cgi/content/abstract/336/7642/488.

Stress Management at RSNA 2009

THE refresher course (RC316), “When the Doctor is the Problem: Dealing with the Disruptive or Impaired Physicians,” will include the sessions:

- “The Physician with Behavior Problems,” presented by Alan C. Hartford, M.D., Ph.D., will focus on how disruptive behavior disables a healthcare team and detail the process for handling such behavior.
- “The Physician with a Mental or Physical Illness,” presented by Stephen Brown, M.D., Marilyn J. Goske, M.D., and Craig M. Johnson, D.O., will explore the impact illness has on a physician’s personal life, practice and patients and provides examples of interventions to help solve these issues.

Dania Tamimi, D.M.Sc., will present the refresher course (RC724), “Yoga for the Stressed Radiologist” demonstrating how radiologists can incorporate exercise and relaxation techniques at their workstations.

Registration for all RSNA 2009 courses is under way at RSNA2009.RSNA.org.



RSNA 2009 Lecture/Oration Preview

RSNA 2009 will feature honored lectures by these esteemed medical leaders: **Graeme M. Bydder, M.B.Ch.B., of San Diego, Daniel C. Sullivan, M.D., of Durham, N.C., and Bruce G. Haffty, M.D., of New Brunswick, N.J.**

Eugene P. Pendergrass New Horizons Lecture

While most clinical MR images are interpreted in qualitative terms using the concept of weighting, MR physics is mainly understood in quantitative terms, noted the presenter of the RSNA 2009 New Horizons Lecture.

"Nowhere is this dichotomy more apparent than in the concept of weighting," said **Graeme M. Bydder, M.B.Ch.B.**, who will deliver "Qualitative and Quantitative Ways of Understanding Clinical MR Images" on



Graeme M. Bydder, M.B.Ch.B.

Monday, Nov. 30. "Weighting is the most commonly used technical term in clinical MR and relates image contrast to differences in tissue properties and hence to pathology, but the term is used as little more than a label in the MR physics literature. The lack of a quantitative definition is a barrier to the understanding and implementation of quantitative studies on signal and contrast."

By defining weighting as a partial derivative, Dr. Bydder continued, it is possible to replace the qualitative definition with a concept which resolves many of the inconsistencies associated with qualitative use and provides new insights into the behavior of pulse sequences.

"Qualitative approaches can greatly inform quantitative approaches and vice-versa," said Dr. Bydder. "There are many opportunities to improve our understanding of clinical MR images through exploiting this synergy."

A pioneer and an expert on MR techniques, clinical applications and image interpretation, Dr. Bydder currently serves as a professor of radiology at the University of California, San Diego (UCSD). His 40 years in medicine have

found him on the leading edge of many of the specialty's new technologies, including initial clinical research into the use of the cryomagnets-based whole-body MR system.

Dr. Bydder's extensive research also includes creation of the FLAIR and STIR inversion recovery pulse sequences. Currently he is developing ultrashort echo time pulse sequences and body imaging techniques and remains interested in general issues about image contrast and weighting.

Dr. Bydder joined UCSD in 2003 after more than 20 years with the Department of Diagnostic Radiology in the Royal Postgraduate Medical School at Hammersmith Hospital at the University of London. He and his work have been recognized with such honors as the gold medals of the International Society for Magnetic Resonance in Medicine and the U.K. Royal College of Radiologists. He is also an honorary member of the American and British societies of neuroradiology.

Annual Oration in Diagnostic Radiology

Diagnostic information must be expressed quantitatively in order to lead to predictable and reproducible outcomes, according to the presenter of the RSNA 2009 Annual Oration in Diagnostic Radiology.

"We must focus on methods to extract quantitative data about whatever anatomical or biochemical properties our imaging systems signify are present," said **Daniel C. Sullivan, M.D.**, who will deliver "Radiology in the Era of Molecular Medicine: Can We Measure Up?" on Tuesday, Dec. 1.

"As imaging becomes more central to clinical decision-making, any observed change on a clinical imaging study should reflect biology and not random instrumentation differences or subjective differences due to interpreting physician variability."

Although there are factors limiting incorporation of quantitative results into radiologic interpretation, imaging seems ideally suited to flourish as a quantitative science, said Dr. Sullivan.

"All clinical images are really n-dimensional datasets and therefore inherently quantitative," said Dr. Sullivan. "Every pixel or voxel has a number associated with it."

One of the country's leading authorities on molecular imaging, Dr. Sullivan is currently a professor of radiology at Duke University Medical Center, coordinator of imaging facilities for the Duke Comprehensive Care Center and director of the Imaging Core of the Duke Clinical and Translational Science Aware Program, all in Durham, N.C. His work includes improving and increasing the use of imaging as a biomarker in clinical trials and facilitating translational research involving new and established imaging methods.

As RSNA's Science Advisor, Dr. Sullivan coordinates integration of a wide range of national and international activities related to evaluating and validating imaging methods as biomarkers in clinical research. Dr. Sullivan also heads RSNA's Quantitative Imaging Biomarkers Alliance (QIBA), dedicated to transforming radiology from a qualitative to a more quantitative science.



Daniel C. Sullivan, M.D.

That shift is necessary in order for radiology to remain relevant in the evolving world of quantifiable evidence-based and molecular medicine, he said.

"As we move into the next few decades of increasingly scientific medical practice, it will be prudent for radiologists to be 'as quantitative as reasonably achievable,' in order for radiology to remain relevant in the evolving world of quantifiable evidence-based and molecular medicine," according to Dr. Sullivan.

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Annual Oration in Radiation Oncology

The past 20 years have seen dramatic advances in our understanding of human genetics and their potential for understanding and treating malignancy. The manifestations of genetic factors—and the application of genetics to medicine—have shown particular prominence in breast cancer research.

“While the identification in the mid-1990s of the breast cancer susceptibility genes BRCA1 and BRCA2 has had a major impact on breast cancer management, only 5 to 10 percent of breast cancers are clearly linked to deleterious mutations in these highly penetrant but relatively low frequency genes,” noted **Bruce G. Haffty, M.D.**, who will deliver “Genetic Factors in the Diagnostic Imaging and Radiotherapeutic Management of Breast Cancer,” on Wednesday, Dec. 2. “There are also a large number of identified low-penetrance candidate genes or



Bruce G. Haffty, M.D.

single nucleotide polymorphisms which can have a significant impact on epidemiology, screening, imaging and treatment of breast cancer. Although these single nucleotide polymorphisms are less penetrant, they can be much more common, and may directly impact normal biological processes as well as the development and natural history of malignancy.”

As with most complex systems, it is likely that combinations and interactions of multiple genetic variants interacting with environmental and other biological factors, rather than any single genetic variant, ultimately contribute to the phenotypic expression of the disease, Dr. Haffty said. The lecture will review the impact of BRCA1 and BRCA2, as well as selected more frequent low-penetrance polymorphisms in candidate genes, on the diagnostic imaging and radiotherapeutic management of breast cancer.

Dr. Haffty is professor and chair of the Department of Radiation Oncology at the University of Medicine and Dentistry of New Jersey’s Robert Wood Johnson Medical School and New Jersey Medical School in Newark. He is also associate director of clinical sciences at the Cancer Institute of New Jersey in New Brunswick.

Internationally recognized for his expertise in breast cancer and head and neck cancer, Dr. Haffty is currently researching the p53 binding protein 53bp1 in the local and regional management of breast cancer. He serves as co-chair of RSNA’s Bolstering Oncoradiologic and Oncoradiotherapeutic Skills for Tomorrow (BOOST) program, which is forging ties between radiology and radiation oncology.



2009 Outstanding Researcher, Educator Announced

RSNA will honor two individuals at RSNA 2009 for their contributions to research and education. **Sanjiv Sam Gambhir, M.D., Ph.D.**, is the Outstanding Researcher. **Elliot K. Fishman, M.D.**, is the Outstanding Educator.

An internationally recognized leader in molecular imaging, **Dr. Gambhir** is the Virginia and D.K. Ludwig Professor of Radiology and Bioengineering at Stanford University in Palo Alto, Calif., and was recently appointed head of Stanford's new Canary Center for Cancer Early Detection.

Dr. Gambhir has received over \$50 million in federal grant funding and currently is the principal investigator for several National Institutes of Health R01s and program projects from the National Cancer Institute



Sanjiv Sam Gambhir, M.D., Ph.D.

(NCI), including a Center for Cancer Nanotechnology Excellence and the In Vivo Cellular and Molecular Imaging Centers. Previously the director of the Crump Institute for Molecular Imaging at the University of California, Los Angeles, Dr. Gambhir moved to Stanford in 2003 to direct the molecular imaging program and lead nuclear medicine.

Dr. Gambhir pioneered the novel Raman nanomolecular imaging strategies that are being clinically translated for endoscopic imaging and is currently working to advance the merger of in vitro and in vivo diagnostics using novel nanotechnology for earlier disease detection and individualized patient management.

Dr. Gambhir has more than 20 patents pending or granted and is the author of over 325 peer-reviewed journal articles in publica-

tions including *Radiology*, *Nature Medicine*, *Nature Biotechnology*, *Nature Methods* and *Science*. He co-edited the best-selling book, "Nuclear Medicine in Clinical Diagnosis and Treatment."

The recipient of numerous awards including the Hounsfield Medal from Imperial College, Dr. Gambhir is the former president of the Academy of Molecular Imaging and is current chair of RSNA's Molecular Imaging Committee.

"Sanjiv Sam Gambhir is an innovative thinker, prolific writer, much sought-after speaker, mentor and thought leader," said Peter L. Choyke, M.D., chief of NCI's Molecular Imaging Program. "He is an excellent example of a physician scientist and has become a model for what young research-oriented radiologists can aspire."

Recognized for his innovative and inspirational teaching style, **Dr. Fishman** is a professor of radiology and oncology at Johns Hopkins University School of Medicine and director of Diagnostic Imaging and Body CT at Johns Hopkins Hospital, both in Baltimore.

From his earliest manuscripts on educating the practicing radiologist on body CT and the value of 3D imaging to his later articles on the science of radiology education, Dr. Fishman has always approached radiology from the standpoint of an educator. A majority of the more than 1,000 journal articles authored by Dr. Fishman include a student or trainee as first author or co-author, which is a testament to his ongoing role as mentor to generations of residents, fellows and junior faculty.

Dr. Fishman has developed 25 audiovisual and Web-based programs devoted to dissemi-

nating radiologic educational materials including *CTisus.com*, a Web site used by more than 60,000 radiologists and technologists in more than 120 countries worldwide.

In the last 20 years, Dr. Fishman has coordinated more than 100 CME courses for the Johns Hopkins School of Medicine and currently organizes eight to 10 CME courses



Elliot K. Fishman, M.D.

annually across the country, recently adding an international CME meeting. His honors include being named among "America's Top Doctors for Cancer" from 2005 to 2007 and "America's Top Doctors" from 2001 to 2007 by Castle Connolly Medical Ltd. and "Top Radiologist in the Nation 2007" by *Medical Imaging Magazine*.

He is an active member of more than half a dozen professional radiology organizations and regularly contributes education exhibits, scientific posters and papers, plenary sessions and refresher courses to RSNA annual meetings.

"Elliot Fishman has been at the forefront of every new technical development in the field of body CT and has surely educated more radiologists around the world about CT than anyone," said Michael P. Federle, M.D., a professor and associate chair for education in the Department of Radiology at Stanford University Medical Center. "I am proud to know him as a career-long colleague and friend."

More About RSNA 2009

Toward Quantitative Imaging: Reading Room of the Future

Located in the Lakeside Learning Center, the Reading Room of the Future showcases products that integrate quantitative analysis into the image interpretation process. Representing academia and industry, Reading Room participants will demonstrate products and applications addressing workflow, quality improvement processing functions, mark-up decision support and clinical applications in oncology, cardiology, osteoarthritis and other diseases.

Attendees can learn about these applications through hands-on exhibits featuring informational posters, computer-based demonstrations and "Meet the Experts" presentations scheduled throughout the week. The exhibits are educational in nature and not designed for product promotion. The showcase will also feature information on the status and accomplishments of the Quantitative Imaging Biomarkers Alliance (QIBA) technical committees.



Toward
Quantitative
Imaging

Reading Room
of the Future

Session Highlights Best of United Kingdom Research

"U.K. Presents," an Integrated Science and Practice session offered in conjunction with the Royal College of Radiologists (RCR), will feature the latest and best in radiology research from the United Kingdom.

"The session is particularly appropriate in view of the very close link between British and American radiology," said session moderator and RCR



President Andy Adam, M.B.B.S. "There are many similarities in our specialty on both sides of the Atlantic—but in science and life, there are also sufficient differences that we have a few things to teach each other."

"U.K. Presents," scheduled for Monday, November 30, from 10:30 a.m. to 12:00 p.m., will cover high-resolution CT of the lungs, MR fluoroscopy and emergency radiology.

"The first two lectures will explore state of the art in the imaging techniques and outline



their increasingly useful clinical applications," said Dr. Adam. "The third lecture will focus on the role of interventional radiology in major trauma and on the importance of accurate imaging in guiding vascular embolization, as well as other interventional techniques."

The United Kingdom's role in the history of radiology is significant considering that Britons invented or co-invented ultrasound, CT and MR imaging and have played a major role in the clinical development of modern diagnostic and interventional radiology, said Dr. Adam. They also founded the oldest national radiological society in the world, he said.

There have also been a few missteps along the way, Dr. Adam pointed out.

"I wish that Lord Kelvin, who had served as president of the Royal Society and was one of the most eminent scientists in Britain, had not said that 'X-rays are a hoax,'" said Dr. Adam. "It seems increasingly unlikely that he was correct. However, we have worked to make up for this misjudgment."

Meet the Editors

Stop by the publications kiosk in the RSNA Services area at RSNA 2009 to meet the editors of RSNA's two peer-reviewed journals. *Radiology* Editor Herbert Y. Kressel, M.D., and *RadioGraphics* Editor William W. Olmsted, M.D., will be on hand to answer questions and discuss these prestigious medical journals with attendees. Dr. Kressel will be available from 10:00 a.m. - 10:30 a.m., Tuesday, Dec. 1 and Wednesday, Dec. 2. Dr. Olmsted will be available from 10:30 a.m. - 11:15 a.m., Tuesday, Dec. 1.



Herbert Y. Kressel, M.D.



William W. Olmsted, M.D.

Continued on next page

More About RSNA 2009

Continued from previous page

Benefits of Annual Breast Ultrasound and MR Imaging, Childhood Lead Exposure among RSNA 2009 Press Conference Topics

Watch the news for coverage of RSNA 2009. More than 170 members of the news media typically attend the annual meeting, generating thousands of stories appearing in print and electronic media in the U.S. and around the world. Among press conferences to be presented are:

- Annual Screening with Breast Ultrasound or MR Imaging Could Benefit Some Women
- Overweight Children May Develop Back Pain and Spinal Abnormalities
- Childhood Lead Exposure Causes Permanent Brain Damage
- Smart Phones Allow Quick Diagnosis of Acute Appendicitis
- Elastography Reduces Unnecessary Breast Biopsies
- Beverage Can Stay-Tabs Pose Swallowing Risk
- Unindicated CT Series Result in Unnecessary Radiation Exposure for Patients
- Mammography May Increase Breast Cancer Risk in Some Women
- Outpatient Disc Treatment Gives Long-Term Back Pain Relief
- Targeted Breast Ultrasound Can Reduce Biopsies for Women Under Forty
- MR Imaging Helps Detect Life-Threatening Pregnancy Complication
- Special Ultrasound Accurately Identifies Skin Cancer
- Severe Asymptomatic Heart Disease May Accompany Narrowing in Leg Arteries
- Too Much Physical Activity May Lead to Arthritis



Tweet Your RSNA 2009 Experience

Access Twitter to follow live feeds about RSNA 2009 and contribute Tweets of your own. RSNA staff members will be  Tweeting live buzz and information at @RSNA and want you to join in the discussion. Tweet about your experience and interact with others using the hashtag #RSNA09.

Join myRSNA® Demonstrations, Courses and Workshops

Demonstrations of myRSNA®, the personalized radiology workspace at myRSNA.org, will be offered at the RSNA Services kiosk during the annual meeting. 

In the hands-on workshops, RSNA staff will demonstrate how to create a customized homepage, bookmark and share links, access files anywhere and more. Along with collecting user feedback, myRSNA user group meetings at RSNA 2009 will cover advanced techniques like sharing files with a group, tagging files for easy searching and making files publicly searchable.

Informatics Courses Using myRSNA: Hands-on Workshops

Monday, November 30, 12:30 p.m. – 2:00 p.m.
Thursday, December 3, 10:30 a.m. – 12:00 p.m.

myRSNA User Group Meetings

Monday, November 30, 4:30 p.m. – 6:00 p.m.
Thursday, December 3, 12:30 p.m. – 2:00 p.m.

Win a \$500 Shopping Spree, Reap Sales Tax Discount

Many Chicago retailers are offering an exclusive 10.25 percent “no sales tax” discount to RSNA 2009 attendees. In addition, attendees, presenters and family members can enter an online sweepstakes for a chance to win a \$500 gift certificate valid at Michigan Avenue shops including Water Tower Place, The 900 Shops and Shops at North Bridge.

A list of retailers offering discounts and a downloadable coupon—along with a chance to enter the sweepstakes—are available through the Chicago Convention & Tourism Bureau at ChooseChicago.com/ShopChicago.

Up to 90.75 AMA PRA Category 1 Credits™ Available

Take advantage of the many refresher courses, scientific sessions, honored lectures and education exhibits at RSNA 2009 to earn *AMA PRA Category 1 Credit™*. Each physician has the opportunity to earn up to 90.75 credits.

Register Onsite for Investment Seminars

RSNA will offer two investment seminars at McCormick Place during RSNA 2009.

- Saturday, November 28**
 1:00 p.m. – 5:00 p.m.
 Effective Real Estate Investment Strategies, presented by J. Michael Moody, M.B.A.
- Monday, November 30**
 1:30 p.m. – 5:30 p.m.
 Asset Protection and Retirement Planning in the New (Stimulus?) Era, presented by Barry Rubenstein, B.S., J.D., L.L.M.

Register for these seminars onsite at McCormick Place Room E253AB. You must be registered for the annual meeting in order to enroll in these seminars. These seminars do not qualify for *AMA PRA Category 1 Credit™*. For more information, contact the RSNA Education Center at 1-800-381-6660, x7772 or e-mail ed-ctr@rsna.org.

SAMs Available at RSNA 2009

More than 30 American Board of Radiology-qualified self-assessment modules (SAMs) in more than 15 subspecialty categories are being offered during RSNA 2009 to assist participants in fulfilling maintenance of certification (MOC) requirements. SAMs are available to U.S.-licensed physicians for select courses and are a benefit of membership (non-members are charged a fee). Look for the SAM icon when registering for RSNA 2009. For more information, contact the RSNA Education Center at 1-800-381-6660, x3733.

RSNA Education Store

Visitors to the RSNA Education Store at the annual meeting can purchase Education Center products including:

- Refresher courses on CD-ROM
- *RadioGraphics* special issues
- 2009 *RSNA Meeting Programs*
- Syllabi
- Categorical course supplements on CD-ROM

Web-based physics teaching modules developed by RSNA and AAPM will be introduced in the Education Store's demonstration area. RSNA staff will guide attendees through education-related sections of the RSNA Web site and answer questions. For information on courses or products, contact the RSNA Education Center at 1-800-381-6660, x3753 or 1-800-272-2920 in the U.S. and Canada.

Get the Spa Treatment at McCormick Place

Take a break from the whirlwind of activity at RSNA 2009 to visit McCormick Mi Bon Spa, with mini-spas located in the South Building, Level 2.5 Grand Concourse and Lakeside Center, Level 2. Spas offer a streamlined array of services including massages, mini-facials and manicures, catering to clients with a limited amount of time. For more information, visit mibonspamccormick.com.

Important Registration Information

Registration Materials Mailed

RSNA 2009 registration materials were mailed to North Americans who registered by November 6 and international attendees who registered by October 23. If your registration materials do not arrive in time, please plan to visit one of the Help Centers onsite, located in the Grand Concourse and Lakeside Center, to have the contents reprinted. RSNA encourages attendees to do this on Saturday, November 29, to avoid long lines later in the week.

For those who registered after these dates, documents will be available for pickup onsite at Professional Registration, located in the Lakeside Center Ballroom.

Name Badge Required

You must wear your name badge at McCormick Place to attend RSNA courses and events or to enter the exhibit halls. RSNA will use radiofrequency identification (RFID) badge scanning technology within the Technical Exhibit halls. No personal information is stored in the RFID badge, only an ID number. Should you wish to "opt out" of this program, please visit either Help Center onsite located in the Grand Concourse or Lakeside Center.



Meeting Program, Lanyard and Official Meeting Bag

One complimentary copy of the *RSNA Meeting Program*, official meeting bag and lanyard are available with the presentation of a voucher at the distribution counters located in the South Building and Lakeside Center.



Onsite Registration

Those who need to register onsite should proceed to Professional Registration in the Lakeside Center Ballroom.

Onsite Registration Hours

Saturday, November 28
12:00 p.m. – 6:00 p.m.

Sunday, November 29 – Thursday, December 3
7:30 a.m. – 5:00 p.m.

Friday, December 4
7:30 a.m. – 12:00 p.m.

Onsite Registration Fees

After November 6

- \$100 RSNA/AAPM Member
- \$0 RSNA/AAPM Member Presenter
- \$0 RSNA Member-in-Training, RSNA Student Member and Non-Member Student
- \$0 Non-Member Presenter
- \$250 Non-Member Resident/Trainee
- \$250 Radiology Support Personnel
- \$780 Non-Member Radiologist, Physician or Physician
- \$780 Hospital or Facility Executive, Commercial Research and Development Personnel, Healthcare Consultant and Industry Personnel
- \$300 One-day registration to view only the Technical Exhibits

For more information about registration at RSNA 2009, visit RSNA.org/register, e-mail reginfo@rsna.org, or call 1-800-381-6660 x7862.

RSNA 2009 Technical Exhibition

Technical Exhibition to Span Three Halls

The RSNA Technical Exhibition, featuring the world's largest assembly of healthcare imaging products and solutions, will be located in Hall A (South Building), Hall B (North Building) and Hall D (Lakeside Center). More than 650 companies are scheduled to participate within a half a million square feet in the three halls. More information about the layout, along with maps and information about all exhibiting companies, will be published in the *RSNA Meeting Guide* available at McCormick Place.

Plan Your Visit

A searchable database of the RSNA technical exhibitors is available online at RSNA.org/showcase. This list includes complete information about the participating companies, including booth numbers, contact information, company description, product listings and interactive floor plan. During the meeting, the database can be accessed at Internet Zones throughout McCormick Place.

Technical Exhibition Hours

Sunday, November 29 – Wednesday, December 2
10:00 a.m. – 5:00 p.m.

Thursday, December 3
10:00 a.m. – 2:00 p.m.

Attendees can also find exhibitors via the Company Locators at the entrance to each exhibit hall and You Are Here kiosks placed throughout the Technical Exhibition.

New Products and Services Spot-lighted in *Daily Bulletin*

Many exhibiting companies use the New Product & Services section of the *RSNA Daily Bulletin* to promote products and services released within the last 12 months. Published Sunday through Thursday, the *Daily Bulletin* is the official daily newspaper of the annual meeting and provides overnight coverage of meeting news. Each edition of the *Daily Bulletin* features a unique New Products & Services section. The *Daily Bulletin* is available at McCormick Place and also online at RSNA.org/bulletin.

FLUOROSCOPY

Answer

[Question on page 2.]

A The operator receives less radiation exposure standing on the image receptor side.

(Reference: National Institutes of Health Publication No. 05-5286, March, 2005, "Interventional Fluoroscopy - Reducing Radiation Risks for Patients and Staff")

Q&A courtesy of AAPM.



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THE Board of Trustees of the RSNA Research & Education Foundation and its recipients of research and education grant support gratefully acknowledge the contributions made to the Foundation August 15 – September 18, 2009.

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Lizabeth & Samuel Hissong
Rhonda Hoag
In memory of Frances B. Toomey, M.D.
Esther & Juerg Hodler, M.D.

Continued on Page 25

Journal Highlights

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

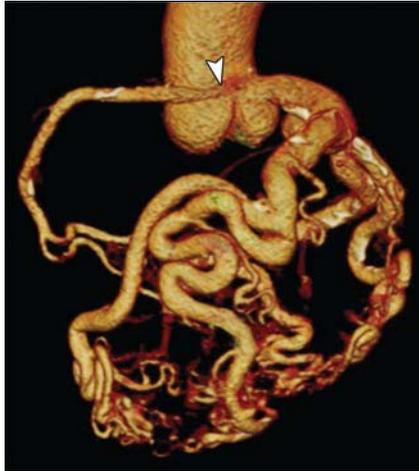
CT of Coronary Artery Disease

THE RAPID RISE of coronary CT angiography from a research application to a robust, widely embraced clinical tool has very few parallels in medicine. Currently, a convergence of factors has the potential to make coronary CT angiography a pivotal cornerstone in cardiovascular disease management.

Radiology

In a review article in the November issue of *Radiology*, (RSNA.org/radiology), Gorka Bastarrika, M.D., Ph.D., of the Medical University of South Carolina in Charleston, and colleagues, review each of these factors as they relate to the current and future role of coronary CT angiography. Specifically, authors discuss:

- The scope and importance of cardiovascular disease
- Rapidly evolving technology
- Widening use of coronary CT angiog-



A 70-year old woman with continuous systolic murmur and anterior wall motion abnormality at stress nuclear myocardial perfusion imaging. Contrast-enhanced retrospectively ECG-gated coronary CT angiogram displayed as 3D volume rendering from a left anterior oblique perspective shows the extent of fistulas of the left coronary system and reveals anomalous origin of the right coronary artery (*arrowhead*) from the left coronary artery cusp.

(*Radiology* 2009;253:317-338) © RSNA, 2009. All rights reserved. Printed with permission.

- raphy for established indications
 - Emerging applications
 - Fundamental changes in clinical cardiovascular disease management
 - Increased emphasis on cost-effectiveness in healthcare
- “Current technical limitations, especially the association of coronary CT angiography with relatively high

levels of radiation, will be increasingly addressed by ongoing refinements in technology,” the authors conclude. “Along with an increasing evidence base, guidelines for appropriate indication are in place and are evolving to ensure appropriate use, curb over-utilization, and ensure cost-effectiveness.”

Thoracic Manifestations of Primary Humoral Immunodeficiency: A Comprehensive Review

PULMONARY abnormalities are present in as many as 60 percent of patients with primary immunodeficiency and chronic changes and recurrent infections in the respiratory tract are the main causes of morbidity and mortality among those patients.

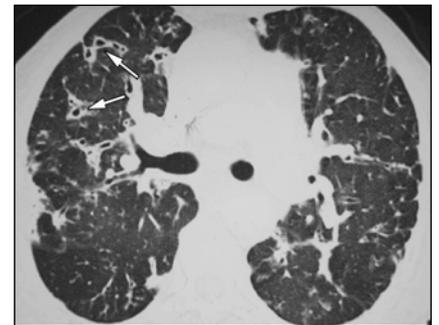
RadioGraphics

In a review article in the November-December issue of *RadioGraphics* (RSNA.org/radiographics), Guillaume Bierry, M.D., Ph.D., of the University Hospital of Strasbourg in France, and colleagues describe the thoracic abnormalities most often observed at imaging in patients with various primary humoral immunodeficiencies, emphasizing key findings to narrowing the

differential diagnosis and determining the prognosis. Authors detail the manifestations of:

- Noninfectious airway disorders
- Infections
- Chronic lung disease
- Chronic inflammatory conditions
- Benign lymphoproliferative disorders
- Malignancies

“Imaging plays a crucial role in the management of patients with primary humoral immunodeficiencies by allowing the detection and characterization of thoracic abnormalities,” the authors conclude. “Thoracic CT should be included in the imaging evaluation of patients in whom the presence of a primary humoral immunodeficiency is suspected.”



Bronchiectasis and bronchial wall thickening in a 17-year-old patient with X-linked agammaglobulinemia. CT image shows the diffuse distribution of abnormalities (*arrows*).

(*RadioGraphics* 2009;29:1909-1920) © RSNA, 2009. All rights reserved. Printed with permission.

This article meets the criteria for 1.0 AMA PRA Category 1 Credit.

Radiology in Public Focus

Media Coverage of Radiology

IN September, media outlets carried 222 news stories generated by articles appearing in the print and online editions of *Radiology*. These stories reached an estimated 106 million people.

September coverage included WJXX-TV (Jacksonville, Fla.), WTVF-TV (Nashville), WOIO-TV (Cleveland), KXXV-TV (Waco, Texas), WREX-TV (Rockford, Ill.), KLKN-TV (Lincoln, Neb.), WSFA-TV (Montgomery, Ala.), WTNZ-TV (Knoxville, Tenn.) WATE-TV (Knoxville, Tenn.), WAFF-TV (Huntsville, Ala.), WBBH-TV (El Paso), WXIX-TV (Cincinnati), KHNL-TV (Honolulu), WTOL-TV (Toledo), KTNV-TV (Las Vegas), WBAY-TV (Green Bay, Wis.), KOTV-TV (Tulsa, Okla.), KTIV-TV (Sioux City, Iowa), KVOA-TV (Tucson).

Print, wire and Web coverage included Reuters, UPI, *Orlando Sentinel*, *South Florida Sun Times*, *Greenville Record-Argus* (Greenville, Penn.), *Daily Advance* (Norfolk, Va.), *Women's Health Weekly*, *RT Image*, *Science Daily*, *Medscape*, *Red Orbit*, *The Medical News*, Yahoo! News, *Forbes.com*, *usnews.com*, *discovery.com*, *healthcentral.com*, *modernmedicine.com*, *drkoop.com*, *medicalnewstoday.com*, *diagnosticimaging.com* and *docguide.com*.

RSNA Public Information Activities Focus on Lung Cancer

In recognition of November as National Lung Cancer Awareness Month, RSNA will distribute public service announcements (PSAs) focusing on symptoms of lung cancer, risk factors and possible treatment options.

In addition to the PSAs, RSNA will distribute the "60-Second Checkup" audio program to radio stations. The radio segments will focus on radiation therapy and screening for lung cancer.

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Continued from Page 23

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Working For You

Associated Sciences Consortium

RSNA News continues its series highlighting the work of organizations working with RSNA in the Associated Sciences Consortium.

SNM-Technologist Section

ACCCESS TO SNM's Verification of Involvement in Continuing Education (VOICE) Credit Sharing program, which exchanges information with the American Registry of Radiologic Technologists, is the newest of a wide variety of benefits offered to members of SNM's Technologist Section (SNM-TS). Membership is made up of almost 9,700 technologists and more than 1,500 technologist students.

Along with access to annual and mid-winter meetings, members are also offered government relations, research and fellowship support through the SNM Education and Research Foundation and news about nuclear medicine and molecular imaging.

"SNM-TS also provides networking opportunities, chapter involvement and continuing education activities for technologists," said SNM-TS President Cybil Nielsen, M.B.A., C.N.M.T., coordinator of the Nuclear Medicine and Molecular Imaging Technology program at Jefferson Community and Technical College in Louisville, Ky. SNM-TS is dedicated to the advancement of molecular and nuclear medicine technologists by providing education, advocating for the profession and supporting research to achieve clinical excellence and optimal patient outcomes.

Members also receive subscriptions to the *Journal of Nuclear Medicine* and *Molecular Imaging*, as well as the *Journal of Nuclear Medicine Technology*, which features original contributions and current developments in imaging, radiopharmacy and radiation safety that aid technologists in their daily practices. *The Uptake* newsletter keeps technologists current with news affecting their profession and SNM-TS activities.

SNM-TS emphasizes advanced education for all technologists, supporting the proposal of a baccalaureate degree as the standard for entry level for nuclear medicine technologists by the year 2015. The organization also endorses the Nuclear Medicine Advanced Associate Degree, a new master's level degree program that instills patient management skills, specialized procedures and proper recognition and evaluation of diagnostic images.

In coming months, SNM-TS will become more involved in the SNM Clinical Trials Network, designed to facilitate the integration of imaging biomarkers into therapeutic clinical trials.

"It is essential that SNM-TS be intimately involved in this program as the technologists are on the front line when it comes to conducting clinical trials,"

Nielsen said.

More than 23 SNM-TS members are currently serving as members of a Clinical Trials Technologist Educators Committee to address the educational needs of technologists involved in clinical trials.

SNM is an international scientific and professional organization that promotes the science, technology and practical application of nuclear medicine.

Its 16,000 members are physicians, technologists and scientists specializing in the research and practice of nuclear medicine.

Associated Sciences at RSNA 2009

SNM-TS is actively involved in courses sponsored by the Associated Sciences Consortium at RSNA 2009. The series begins Monday, November 30, with "Where Is the Radiologist? Radiology's Changing Dynamics: Operations in Today's Economy—Balancing Viability and the Regulatory Minefield," moderated by Valerie R. Cronin, C.N.M.T., director of imaging services for the Catholic Health System of Western New York in Buffalo and 2005–2006 SNM-TS president.

Long-time Members Wear Special Ribbons

Those who have been RSNA members for 25 years or more wear special ribbons at RSNA 2009. The teal and gold ribbons can be picked up at RSNA Member Services during regular meeting hours in the Lakeside Center Ballroom. Ribbons can be attached to attendance badges so long-time members are easily recognizable.



50 YEAR MEMBER

Program and Grant Announcements

NIH Grantsmanship Workshop

November 28 • McCormick Place, Chicago

RSNA will hold a National Institutes of Health (NIH) Grantsmanship Workshop on Saturday, November 28, from 1:30 to 5:30 p.m. at McCormick Place Chicago. The workshop covers grantsmanship techniques from concept development to submission, as well as the NIH review process. There is also an opportunity to experience a mock study section. Speakers will address the entire NIH grant application experience, including basic applications as well as K grants. Register online at RSNA2009.RSNA.org. There is a \$35 registration fee.

FACILITATED BY: **Robert J Nordstrom, Ph.D.**, Cancer Imaging Program, National Cancer Institute, National Institutes of Health

SPEAKERS: **Ruth Carlos, M.D., M.S.**, University of Michigan, **Elizabeth Burnside, M.D., M.P.H.**, University of Wisconsin, **Mitch Schnell, M.D., Ph.D.**, University of Pennsylvania, **William Heetderks, Ph.D., M.D.**, NIH/National Institute of Biomedical Imaging and Bioengineering

Writing a Competitive Grant Proposal

January 29–30, 2010 • RSNA Headquarters, Oak Brook, Ill. • Registration Deadline—December 15

Registrations are being accepted 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.

A limited number of slots are available for this 1½-day intermediate-level program that combines didactic and small group interactive sessions designed to help radiologic researchers understand and apply the key components of writing a competitive grant proposal. Topics include the NIH grant review process, developing specific aims and funding opportunities.

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 provide tools for getting started. Faculty includes G. Scott Gazelle, M.D., Ph.D., M.P.H., of Massachusetts General Hospital in Boston, King C. Li, M.D., M.B.A., of Methodist Hospital in Houston, Robert Nordstrom, Ph.D., of the National Cancer Institute in Bethesda, Md., Ruth Carlos, M.D., M.S., of the University of Michigan Health System in Ann Arbor and Elizabeth Burnside, M.D., M.P.H., of the University of Wisconsin in Madison.

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



Prepare 2010 R&E Grant Applications Now

RSNA Membership Now Required

Applicants for R&E research and education grants can begin preparing their applications. Applicants for 2010 R&E grants are now required to be RSNA members (at any level) at the time of application.

Application deadlines are:

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

For more information on all Foundation grant and recognition programs, including current and past grant projects, go to RSNA.org/Foundation or contact Scott Walter, M.S., assistant director, grant administration at 1-630-571-7816 or swalter@rsna.org.

NCI/SBIR Funding Programs at RSNA 2009

Funding for Innovative Imaging Technology Development will be the subject of two Special Focus Sessions at RSNA 2009.

• Part I: Overview of the National Cancer Institute (NCI), National Heart, Lung, and Blood Institute (NHLBI) and Small Business Innovation Research (SBIR) Programs, will be held from 4:30 to 6:00 p.m., Monday, Nov. 30.

• Part II: The NCI SBIR Program and Challenges of Technology Commercialization, will be held from 4:30 to 6:00 p.m., Wednesday, Dec. 2. The session offers an overview of NCI/SBIR Program and Challenges of Technology Commercialization Registration for all RSNA 2009 courses is under way at RSNA.org.

IORC Launches Common Application Site

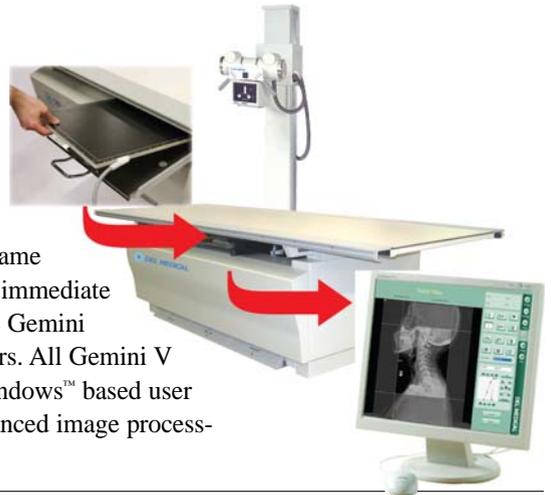
The Inter Organizational Research Council (IORC) recently launched a Common Application Web site developed by RSNA that will enable the storage, retrieval and update of key components of applications to the RSNA Research Scholar, American Roentgen Ray Society Scholar and General Electric-Association of University Radiologists Radiology Research Academic Fellowship Programs. Those submitting multiple applications will be able to access and modify grant requests stored in the system. Grant applicants are invited to visit www.radresearch.org/app/step1.cfm.

Product News

NEW PRODUCT

Flat Panel Detectors

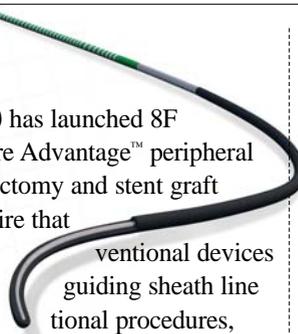
Del Global Technologies Corp. (www.delmedical.com) announces the Gemini V series of digital flat-panel detectors as a field upgradeable retrofit. The series of three detectors utilizes amorphous silicon (a-Si) technology. The Gemini 1400V is a portable flat-panel detector with the same dimensions of a regular 14" x 17" (36 cm x 43 cm) cassette, making it an immediate replacement for computed radiography plates and conventional films. The Gemini 1700V and Gemini 1700V-C are fixed 17" x 17" (43 cm x 43 cm) detectors. All Gemini V detectors come fully integrated with DelWorks acquisition software, a Windows™ based user interface designed to optimize workflow. Additional features include advanced image processing, automatic setting adjustment and full DICOM 3.0 compatibility.



NEW PRODUCT

Interventional Guiding Sheaths/Guidewires

TERUMO Interventional Systems (www.terumo.com) has launched 8F Pinnacle® Destination® guiding sheath and Glidewire Advantage™ peripheral guidewire. The Pinnacle Destination enables atherectomy and stent graft procedures, while the Glidewire Advantage is a single wire that enables the operator to cross the lesion and deliver interventional devices such as balloons and stents. The Pinnacle Destination supports virtually all applicable diagnostic and interventional procedures, offering a range of French sizes (5F – 8F), lengths and tip shapes as well as two different valve types. The design includes an atraumatic tip which minimizes the potential for vessel damage and allows smooth transition from guidewire to dilator and dilator to sheath, helping to ensure easy penetration without force. The sheath has a hydrophilic coating on a nylon outer layer with a polytetrafluoroethylene inner layer and stainless steel coil.



NEW PRODUCT

Referral Tracking for Radiology Practices

Tracking Works, a Web-based tool by Marketing Works (www.marketingworks.net), helps medical practices capture data and generate reports about referring practices, physicians and office staff. Users can strategically plan and manage office visits, manage and share feedback from referring practices, identify customer service issues and monitor referral volume and revenue. Tracking Works can help measure the effectiveness of marketing programs and identify the strongest customers for targeted outreach.

FDA CLEARANCE

Multiple Modality Imaging/Intervention Suites

IMRIS Inc., (www.imris.com) has received FDA clearance for *IMRISNV* and *IMRIScardio*, which allow the capabilities of both MR imaging and X-ray angiography in a single suite without the need to transport the patient between modalities.

IMRISNV features a wide bore 3.0 T MR imaging scanner and a bi-plane angiography system integrated into a single suite. Using *IMRISNV*, MR images can be taken before and during procedures to assess tissue health and can also be used in conjunction with fluoroscopic images during the interventional procedure. *IMRIScardio* provides enhanced images for visualizing the cardiovascular system before, during and after an intervention. The *IMRIScardio* suite includes a wide bore 1.5 T MR imaging scanner and a single-plane or biplane angiography system. Both are available in multiple room configurations to provide diagnostic, interventional and surgical capabilities.



RSNA News

Information for *Product News* came from the manufacturers. Inclusion in this publication should not be construed as a product endorsement by RSNA. To submit product news, send your information and a non-returnable color photo to *RSNA News*, 820 Jorie Blvd., Oak Brook, IL 60523 or by e-mail to rsnanews@rsna.org. Information may be edited for purposes of clarity and space.

RSNA.org

2009 RSNA Meeting Program Online

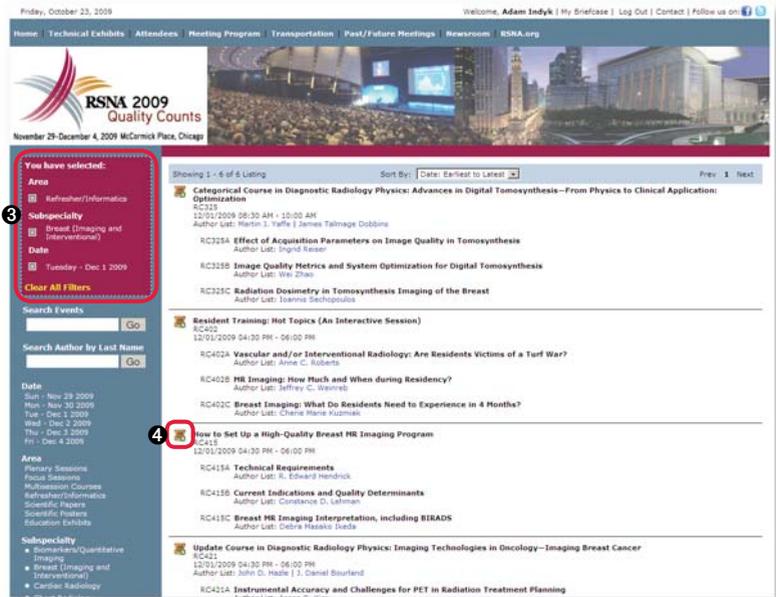
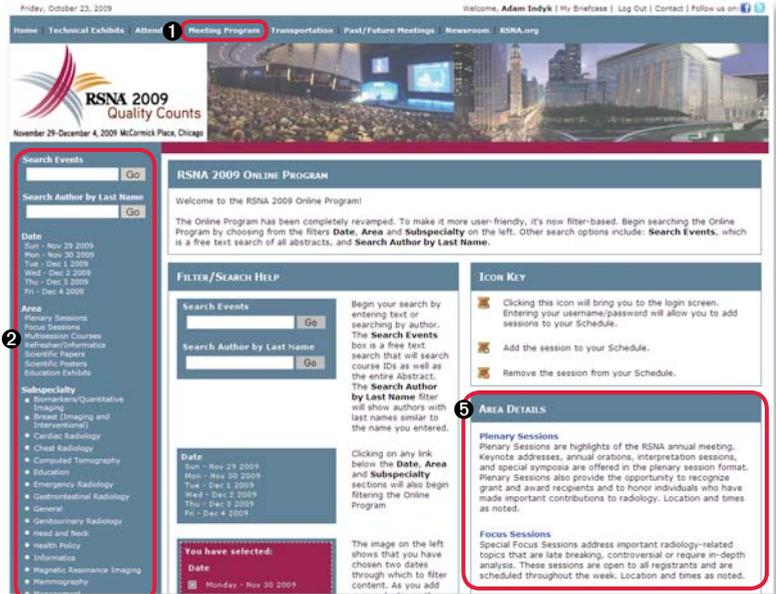
VISIT RSNA2009.RSNA.org to make the most of your time at RSNA 2009. Find scientific sessions, courses, education exhibits and scientific posters related to your areas of interest by accessing the *RSNA Meeting Program* online. This year's filter-based format makes the search process easier and more user-friendly.

Click Meeting Program on the navigation bar at the top of the screen ❶. Begin searching the entire online program by going to the Date, Area and Subspecialty categories on the left-hand side of the screen and clicking any link below these sections to begin filtering your search ❷. Other search options include: Search Events—a free text search of all abstracts—and Search Author by Last Name.

As you select dates, authors and other criteria, your choices will appear in a box on the top left-hand side of the screen ❸. As you add selections, your search will be narrowed. To remove a filter, either click the icon in front of the filter or the filter itself. To remove all your selections click Clear All Filters.

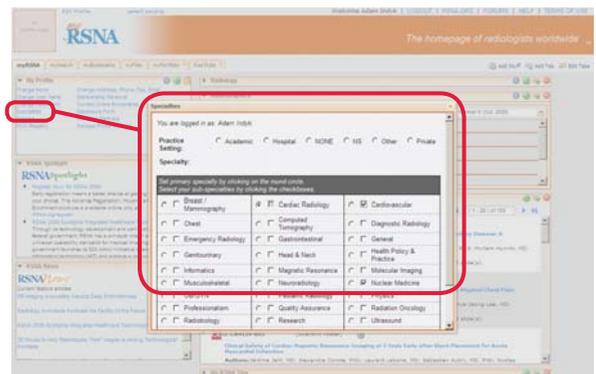
❹ When you have identified content of interest to you, click the icon next to the session to get to the Login screen. Enter your username/password to add sessions to your briefcase or to remove them.

❺ A full explanation of each of the program areas—plenary/focus sessions, multisession courses, refresher/informatics, scientific papers/posters and education exhibits—is provided on the right-hand side of the screen below the Icon Key.



Personalize Content: Identify a Specialty in myProfile

Your choice in the Specialty Section of the myProfile widget on the upper left-hand side of myRSNA.org affects other tools throughout the site. Available CME credits, articles in online publications, job listings and other categories all change dynamically when a specialty is chosen. For example, if a user chooses informatics as a specialty, the myRefresherCourses widget will display only informatics classes.



CALENDAR

Medical Meetings November 2009 – May 2010

NOVEMBER 29–DECEMBER 4

RSNA 2009, 95th Scientific Assembly and Annual Meeting, McCormick Place, Chicago • RSNA2009.RSNA.org

DECEMBER 2–4

French Nuclear Safety Authority (ASN), World Health Organization (WHO); European Commission (EC); French Society of Radiation Oncology (FSRO); French Society of Medical Physics (SFM), International Conference on Modern Radiotherapy, International Conference on Modern Radiotherapy, Palais des Congrès de Versailles, France
• www.conference-radiotherapy-asn.com/index.htm

JANUARY 11–15, 2010

Integrating the Healthcare Enterprise (IHE®) North American Connectathon, Hyatt Regency Chicago
• www.ihe.net/Connectathon

JANUARY 23–26, 2010

Indian Radiological & Imaging Association (IRIA), 63rd Annual Congress, Karnavati Club, Ahmedabad • www.iria.in

FEBRUARY 13–18, 2010

International Society for Optics and Photonics, (SPIE), Medical Imaging 2010, Town and Country Resort and Convention Center, San Diego • www.spie.org/medical-imaging.xml

FEBRUARY 21–26, 2010 VISIT THE RSNA BOOTH

Society of Gastrointestinal Radiologists (SGR) and Society of Uroradiology (SUR), Abdominal Radiology Course, Omni Resort at Champions Gate, Orlando, Fla. • www.sgr.org

FEBRUARY 28–MARCH 3, 2010

Society of Thoracic Radiology (STR), Annual Meeting, Hotel del Coronado, San Diego • www.thoracicrad.org

MARCH 1–4, 2010

Healthcare Information and Management Systems Society (HIMSS), Annual Conference and Exhibition, Atlanta
• www.himssconference.org

MARCH 4–8, 2010 VISIT THE RSNA BOOTH

European Congress of Radiology (ECR), Austria Center, Vienna
• www.astro.org

MARCH 13–18, 2010

Society of Interventional Radiology (SIR) 35th Annual Scientific Meeting, Tampa Convention Center, Florida • www.sirweb.org

MARCH 20–23, 2010

The 13th Asian Oceanian Congress of Radiology (AOCR), Taipei International Convention Center, Taiwan
• www.aocr2010.org/congress.htm

MARCH 23–26, 2010 VISIT THE RSNA BOOTH

Association of University Radiologists (AUR), 58th Annual Meeting in Joint Sponsorship with RSNA, Hilton San Diego Bayfront Hotel • www.aur.org

MARCH 24–27, 2010

American Institute of Ultrasound in Medicine (AIUM), Annual Meeting, San Diego Marriott • www.aium.org

APRIL 9–12, 2010 VISIT THE RSNA BOOTH

International Congress of Radiology, Shanghai International Convention Center, China • www.icr2010.org

APRIL 13–17, 2010

Society for Pediatric Radiology (SPR), Annual Meeting, Boston Park Plaza Hotel & Towers • www.pedrad.org

MAY 1–5, 2010

American Radium Society (ARS), 92nd Annual Meeting, JW Marriott Cancun, Mexico • www.americanradiumsociety.org

MAY 1–7, 2010

International Society for Magnetic Resonance in Medicine (ISMRM), European Society for Magnetic Resonance in Medicine and Biology (ESMRMB), Joint Annual Meeting, Stockholm International Fairs, Sweden • www.ismrm.org

MAY 2–7, 2010

American Roentgen Ray Society (ARRS), Annual Meeting, Manchester Grand Hyatt San Diego • www.rrs.org

MAY 15–19, 2010

American College of Radiology (ACR) Annual Meeting and Chapter Leadership Conference, Hilton Washington, Washington, D.C.
• www.acr.org

MAY 15–20, 2010

American Society of Neuroradiology (ASNR), 48th Annual Meeting, Hynes Convention Center, Boston • www.asnr.org