First FDA-approved Mobile Radiology App Poised for Daily Use

ALSO INSIDE:

Tumor-tracking Technique Minimizes Healthy Tissue Damage

Surge in Emergency CT, MR Shows No Sign of Waning

Research Fuels Debate Over Bismuth Breast Shields

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Population Change, Cultural and Linguistic Appropriateness among Topics for Associated Sciences Symposium

A discussion of the effects of population shifts—particularly when it comes to aging—in healthcare will kick off the Associated Sciences Symposium at RSNA 2011. Also scheduled during the 2½-day symposium are sessions on understanding new standards for culturally and linguistically appropriate services and marketing creatively. Associated Sciences sessions for RSNA 2011 are:

- **Monday, November 28**
  - Implications of the Changing Face of Health Care: Aging and the Shift of Population
  - Implications of the Changing Face of Health Care: Delivery and Regulatory Impacts
  - Changes in the Scope of Practice: Gaps and Overlaps
  - Medical Imaging Radiation Exposure: Sources, Consequences, and Control: Optimization of Radiation Dose

- **Tuesday, November 29**
  - Ethics in the Era of Health Care Reform
  - Understanding Health Literacy and the New Joint Commission CLAS Standards for Culturally and Linguistically Appropriate Services
  - Impacts of Emerging Practice Models
  - Picking Up the Pieces: Forensic Radiography Following Mass Disasters

- **Wednesday, November 30**
  - Imaging Facility Design in an Age of Diminishing Resources
  - Creative Strategies for Marketing: Keeping It Legal

RSIR®RSNA 2011 Gold Medalists

The Society of Interventional Radiology (SIR) presented gold medals to Andrew B. Crummy, M.D., and Gordon K. McLean, M.D., at its annual meeting held in March in Chicago. A gold medal was also presented posthumously to Peter B. Lauer, C.A.E.

An interventional radiology pioneer, Dr. Crummy is perhaps best known for his role in developing digital subtraction angiography while at the University of Wisconsin. Elected SIR president in 1981, Dr. Crummy has authored or co-authored more than 180 journal publications as well as 38 book chapters. A SIR past-president, Dr. McLean is an original innovator of hepatobiliary and gastrointestinal interventional procedures and aided the development of original techniques and devices for the past three decades. Dr. McLean, who practices interventional, vascular and diagnostic radiology at Western Pennsylvania Hospital in Pittsburgh, has published nearly 500 scientific papers.

A SIR executive director for more than seven years before his 2010 death, Lauer focused on developing the society infrastructure to support the explosive growth of the interventional radiology specialty. Lauer contributed to advancing the science, clinical practices, public awareness, patient care and business aspects of interventional radiology.

Jianne M. Loberge, M.D., a radiation oncology researcher and professor for more than 20 years at the University of California, San Francisco, delivered the 2011 Dr. Charles T. Dotter Lecture during the SIR meeting.

Latest CIBR Newsletter Spotlights RSNA Meeting

The latest issue of CIBR Advocate, the newsletter published by the Coalition for Imaging and Bioengineering Research (CIBR), takes a look at the RSNA annual meeting through the eyes of a patient advocate.

“arly in this patient care and show the potential cost savings of advanced imaging technologies,” Nolan notes. Nolan focuses on patients as stakeholders in imaging. “More and more often, especially with the amount of information available online, patients and their loved ones are able to educate themselves about their disease and possible treatment options,” Nolan notes. Find the latest issue of CIBR Advocate at the CIBR website, www.imagingsolution.org.
Dr. Griem was among the Chicago radiologists who successfully lobbied for a bill allowing them to prescribe low dose radiation therapy. The program is perfectly balanced between observation and active participation, both at the editorial offices of the two journals and the publications office at RSNA headquarters in Oak Brook, Ill.

As associate editor, the office has integrated into the editorial team and interacts directly with the editors, associate editors and staff members. Activities include reading manuscripts for correct format and required materials, making reviewer assignments, and doing a variety of editorial tasks that involve real time decision-making. The experience is carefully organized, concentrated and intense, but most of all enjoyable.

At the headquarters, the editorial fellow has a firsthand view of the entire production process of transforming accepted articles into publications. I found myself directly interacting with many seasoned specialists—managing editors, copy editors, graphic artists and even marketing. The level of professionalism and the finished product were inspiring.

In my view, the RSNA Editorial Fellowship provides aonce-in-a-lifetime, high-impact opportunity to see what goes on behind the editorial processes of two of the world’s most respected journals.
Getting Published in Radiology: What Every Author Should Know

Authors who submit a manuscript to RSNA’s peer-reviewed science journal Radiology should keep in mind that readers are seeking novel, practical research in a specified format with a clear question in mind, editors say.

“We’re looking for research that is novel, informative and important—that affects the way physicians practice, that introduces new concepts, new technologies,” Herbert Y. Kressel, M.D.

The presentation offered insight on how editors select manuscripts from more than 2,400 pieces of original research Radiology receives each year.

“We’re looking for research that is novel, informative and important—that affects the way physicians practice, that introduces new concepts, new technologies—and we’re always cognizant of the need to provide practical, useful information,” Dr. Kressel said.

Editors strongly urge researchers to consult Radiology’s Publication Information for Authors section, accessible online and in every print issue, before preparing and submitting a manuscript.

Editors are “Author Advocates.”

With those in mind, Dr. Levine also urges authors to take advantage of the Institutional Review Board (IRB) process used by investigators working with human subjects.

“That process compels the researcher to ask questions about the number of patient records, whether the study is prospective or retrospective, to talk about informed consent—those processes you work through when submitting an IRB can actually help in writing a good research paper,” said Dr. Levine, a radiology professor at Beth Israel Deaconess Medical Center in Boston.

Dr. Levine also offered advice for authors whose native language is not English, which can hinder the review process.

“Authors are at a disadvantage if reviewers get stuck trying to understand what’s being said, versus dealing with the principles of science,” Dr. Levine said. “Those authors should get help with their manuscript from a native English speaker to make sure their manuscript reads well.”

Ultimately, Radiology editors—authors themselves—stand firmly in the writer’s corner, Dr. Kressel said.

“We try to be author advocates,” Dr. Kressel said. “If the ideas are good and have the data to support their analysis and conclusions, we’ll work with authors. Editors sometimes spend hours clarifying the language and, more importantly, making sure readers can understand exactly what was done, the data obtained and the importance of the research.”

Concurred Dr. Levine, “Authors should describe their methods in enough detail so that somebody else could perform their experiment.”

November 1923 cover

Online Submission is Streamlined

Communication among authors, editors and reviewers has been dramatically streamlined since the all-online submission system was implemented in 2004, Dr. Levine said. “It eliminated the mailing time back and forth and the mailing expenses,” she said. “It enabled more rapid communication when questions arose—every step of the process was shortened.”

All accepted original scientific manuscripts are sent out for statistical review: currently, the first response, on average, is about six weeks.

Radiology online has become more dynamic, with website-only features including articles published ahead of print, podcasts, videos, interactive poll questions and virtually unlimited space for supplemental materials that won’t fit in the print journal.

“An online appendix is a wonderful way of making details about the experiments available for other researchers,” Dr. Levine said. “Also, if someone has multiple images showing different pathologies, we can include those online.”

Continued on Page 8


Published in Radiology: What You Always Wanted to Know and Never Asked,” is available at rsna.org/publications/rad/PIA/index.html.
Tumor-tracking Technique Minimizes Healthy Tissue Damage

Researchers have developed a dynamic, real-time tumor motion and tracking technique that they say can help minimize the amount of radiation delivered to surrounding healthy tissue while maximizing the dose the tumor receives.

Medical researchers at Thomas Jefferson University (TJU) in Philadelphia have developed an active tracking and dynamic delivery method that predicts tumor position. Simulations of the robotic system—using their programmed algorithms—were able to continuously track the tumor during radiation treatments, allowing precise dose delivery to the moving target and reducing dose to nearby critical organs. The tumor tracking method was simulated for two couches, HexaPOD™ and the ELEKTA Precise Table. The research was published in the online February 1 issue of Physics in Medicine and Biology journal.

“We wanted to coordinate control of the linear accelerator and the couch, so that from a beam's-eye view, the tumor appears to be stationary,” said study co-author Yan Yu, Ph.D., director of medical physics at TJU. “We were able to show that we might irradiate 20 to 30 percent less of a normal lung with tumor tracking.”

The linear accelerator and couch generally have latency time from 200 milliseconds to one-third of a second, Dr. Yu said. Their algorithm predicts where the tumor will be given the latency time. The efficacy of the proposed method was investigated by extensive computer simulation, researchers said.

“When we control relatively heavy parts of the machine, it actually takes a fraction of a second to move something, for the signal to be transmitted to the controller and for the motors to get to the right location,” Dr. Yu said. “If we do not attempt to predict ahead of time, we will always be lagging behind.”

The technique was shown to reduce damage to the critical organs such as the spinal cord when a lung tumor is present. Researchers examined 15 patients who had tumor motion from 1.5 to 2.5 cm and found the spinal cord received from 0.5 to 1 Gy less than when the current tumor-tracking technique was used.

“This technique can potentially improve dose distribution of the tumor volume,” said study author Ivam Buzurovic, Ph.D., medical physics resident and researcher in the Department of Radiation Oncology at TJU. “In turn, that will improve a patient's treatment by minimizing radiation to healthy tissue and critical organs and possibly lowering toxicity.”

Movement, Increased Dose Raise Concern

Currently technology is available for gating the radiation beam to turn on when the tumor comes into a predefined window and turn off when the tumor exits at the other end. This method prolongs the treatment for the same dose.

“We really want to complete the delivery quickly before there is any movement or any type of small shifts in the patient,” Dr. Yu said. This technique could increase the dose delivered. Dr. Buzurovic said, because the radiation is more specifically targeted to the tumor and not as much to the surrounding healthy tissue.

“At this point, any potential dose increases are theoretical,” Dr. Buzurovic said. “We are still investigating that. Right now we are working on tumor-control probability and normal tissue complication probability.”

Bruce G. Haffty, M.D., co-chair of the RSNA Radiation Oncology Editorial Board, said the technique could increase the dose delivered, Dr. Buzurovic said, because the radiation is more specifically targeted to the tumor and not as much to the surrounding healthy tissue.

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Yan Yu, Ph.D.
First FDA-approved Mobile Radiology App Poised for Daily Use

The clearance process took more than two years, but the first U.S. Food and Drug Administration (FDA)-approved mobile diagnostic radiology application for the iPhone®/iPad® could quickly become part of the daily work routine for radiologists in remote locations.

“I see these devices being a mainstay for radiologists on call away from a clinical workstation,” said Keith Dreyer, D.O., Ph.D., vice-chair of Radiology Computing & Information Sciences at Massachusetts General Hospital (MGH) and an associate professor of radiology at Harvard Medical School in Boston. “The devices may currently be too limited in functionality and screen size to provide adequate throughput for a heavy case load, but for answering an immediate question, they will be quite adequate for many examination types.”

Approved by the FDA in February, the application—the Mobile MIM from Cleveland-based MIM Software”—can be used to view results of CT, MR imaging and PET exams on mobile devices and use those images to make diagnoses. The application is indicated for use only when there is no access to a workstation, according to the FDA.

Made for use with Apple products, the new application allows radiology images taken in a hospital or physicians’ office to be “compressed for secure network transfer then sent to the appropriate portable wireless device,” according to the FDA statement.

Although individual facilities have developed similar applications for their own use, the FDA has been hesitant to approve such applications intended for primary diagnosis rather than secondary viewing, according to David Hirschorn, M.D., director of radiology informatics at New York’s Storm Island University Hospital. FDA clearance of Mobile MIM should open the floodgates for approval of similar devices from other companies, he said.

“This is the first company to get the FDA’s blessing, because there is nothing in this product that is magic,” he said. “Other companies are following right behind.”

Research validating the efficacy of the mobile app, presented by Dr. Dreyer and other experts at RSNA 2010, was also shared with FDA during its evaluation process, paving the way for approval. “Engineers have done an excellent job of working with the FDA to clear several hurdles around calibration, environmental lighting and security,” said Dr. Dreyer, a member of RSNA’s Radiology Steering Committee and chair of the American College of Radiology IT and Informatics Committee-Government Relations Subcommittee.

Approved only for CT, MR imaging and PET, the application could easily apply to other radiology modalities including ultrasound, angiography and fluoroscopy, Dr. Hirschorn said. Radiographs, however, are not app-friendly simply because the devices are too small to achieve the contrast and resolution needed to view an X-ray, Dr. Hirschorn said. “Even if the device had a larger screen—which would defeat the purpose entirely—you would still not be able to control the calibration capability,” he said.

While calibration and surrounding light are factors with any display device, variables can change more rapidly with handheld devices. For that reason, the app includes an interactive contrast test in which small parts of the screen are a slightly different shade than the rest of the screen in sequence. If the physician can identify and tap these targets on the screen, the lighting conditions won’t interfere with the physician’s ability to discern subtle differences in contrast, Dr. Hirschorn said. “It’s a simple idea but very effective,” he said. “If you are able to see the contrast, you know the display is functioning within normal parameters.”

FDA approval of the Mobile MIM hinged largely on the effectiveness of this test, Drs. Dreyer and Hirschorn said.

Enormous Potential Tempered by Unknowns

In terms of day-to-day use, the mobile app has considerable potential for clinicians as well as radiologists. That is the case at MGH, where clinicians have embraced the internally developed iPad/iPhone-based mobile electronic health record application that includes access to all medical images with full fidelity, Dr. Dreyer said.

“I see these devices being used extensively, but not exclusively, by ordering clinicians on the move throughout the hospital, clinic and office settings,” he said. Although the app will be useful for remote consultation overall, the technology will be especially beneficial for accessing subspecialty expertise not otherwise available, said Dr. Hirschorn, who also envisions the app enhancing the resident/radiologist on-call partnership. “Off-site radiologists previously had to access a computer in case a resident called,” he said. “With this app, the resident can consult the on-call radiologist at any location.”

While the app undoubtedly offers benefits, it also plagues the industry into uncharted territory, creating unknowns on a number of fronts, including liability. Problems could arise, for example, if a physician makes a remote diagnosis from a state in which he is not licensed. “Is a lawyer going to make the argument that I rendered care in a state I’m not licensed in?” Dr. Hirschorn asked. “This is all untested.”

The application’s novel approach to hardware/software integration also breaks new ground, Dr. Dreyer said. “Never before was there a portable device offering a multi-touch user interface system with medical grade display capabilities,” Dr. Dreyer said. “It is a new territory for us all, including the FDA, RSNA and ACR.”

Nevertheless, Drs. Dreyer and Hirschorn said the application is essentially the tip of the iceberg in terms of technology’s evolving role in radiology. “I feel quite strongly, however, that in the coming years we will see advances to our industry never before possible, due in large part to these devices and their upcoming competitors,” Dr. Dreyer said.

MOBILE MIM AVAILABLE AS FREE DOWNLOAD

The Mobile MIM from Cleveland-based MIM Software is a remote diagnostic imaging tool for the iPhone, iPad and iPod Touch. To download the App, including sample images to demonstrate its functionality, for free, go to the App Store at www.mimsoftware.com.
Surge in Emergency CT, MR Shows No Sign of Waning

Two recent studies that reveal steady increases in CT and MR use in emergency departments (ED) over roughly the past decade underscore the need for more in-depth research into developing evidence-based decision models for imaging appropriateness, authors said.

Using data from the 1995–2007 National Hospital Ambulatory Medical Care Survey, David B. Larson, M.D., M.B.A., and colleagues discovered that CT use in the nation’s EDs is growing at 16 percent per year—higher than rates reported in other settings. At that rate, nearly 20 percent of all ED visits this year will involve a CT exam, according to the study, published in the January 2011 issue of Radiology. Researchers analyzed data on a mean of 30,044 ED visits each year over the 15-year period to estimate overall usage of CT in the ED.

In a study published in the Journal of the American Medical Association (JAMA) in October 2010, lead author Frederick Korley, M.D., and colleagues discovered that the use of CT or MR tests nearly tripled over a 16-year period without a corresponding change in the prevalence of life-threatening conditions among ED patients. Using data from the National Hospital Ambulatory Medical Care Survey between 1998 and 2007, Dr. Korley and colleagues discovered that the share of injury-related ED patients who received MR or CT tests increased from 6 to 15 percent, based on a nationwide sample of more than 300,000 ED visits.

“This report confirms our suspicion that the increased use of advanced imaging during emergency department visits in recent times has not led to a similar increase in the diagnosis of important clinical conditions,” said Dr. Korley, an associate professor of radiology at the University of Florida in Gainesville, and an associate editor of Radiology. “It is not surprising that CT utilization has increased.

More research is also necessary, according to Dr. Larson. “Evidence indicates that utilization becomes more appropriate when ordering physicians know their decisions are being reviewed,” he said.

Guidelines Can Reduce Unnecessary Imaging

Despite the current surge in ED imaging, factors that may slow the ramping growth of CT use include cost, healthcare legislation, concern over radiation exposure and the use of population-based data to develop appropriate-use guidelines, Dr. Larson said.

Although limiting inappropriate CT use will become more successful with the improvement of evidence-based decision models to guide imaging appropriateness, the ED has typically been excluded from such efforts, he said. “It’s the life-threatening nature of what happens in the ED that makes a difference,” Dr. Larson said.

Part of the solution, according to Dr. Rao, is to develop best practice guidelines that will hold up in court and demonstrate that a physician met the standard for care. While American College of Radiology Appropriateness Criteria® can provide a foundation for such guidelines, they must be customized to individual institutions and created with input from the multiple disciplines involved in the care of specific conditions—from head trauma to abdominal pain—in order to be accepted, Dr. Rao said.

Providing a forum for discussion and giving feedback to physicians is also critical to developing such guidelines, according to Dr. Larson. “Evidence suggests that utilization becomes more appropriate when ordering physicians know their decisions are being reviewed,” he said.

Physicians also need to become better educated, according to JAMA authors, who cited a 2004 survey of emergency department physicians showing that only 9 percent were aware that CT can increase a patient’s lifetime risk of cancer. More research is also necessary, according to Dr. Korley. “We need to improve our understanding of the reasons for the increase in the use of advanced imaging, better understand what constitutes appropriate use and how inappropriate use can be reduced,” he said.

While increasing awareness of radiation risk and implementing order entry systems are Herculean tasks, political challenges involved in decreasing CT utilization are ever greener, Dr. Sistrom said. “Lack of standards, lack of knowledge—we can work on these factors,” Dr. Sistrom said. “But basic conflicts of interest about money and time between doctors, healthcare organizations, payers and patients—those are much harder to tackle.”

“It is not surprising that CT utilization has increased. What’s surprising is the sustained high rate of that growth.”

David B. Larson, M.D., M.B.A.
While not disputing that bismuth breast shields reduce radiation, leading medical physicists contend the shields can cause errors in CT numbers or create streak artifacts that negatively impact image quality, according to AAPM President J. Anthony Seibert, Ph.D., a professor of diagnostic imaging physics at the University of California, Davis.

“That breast dose can be reduced with shields is certainly a fact; however, because the X-ray tube goes around to the other side during 360-degree rotation during acquisition, photons that irradiate the breast are subsequently attenuated by the shield which would, in the best scenario, be unattenuated,” Dr. Seibert said.

Although AAPM is not endorsing any one technique, many physicists contend that organ-based angular tube current modulation (TCM) offers similar levels of dose reduction at equivalent or improved levels of image quality as breast shields.

Since breast shields were introduced in 1997, conflicting data regarding their impact on diagnostic accuracy have emerged, creating two schools of thought: Many radiologists maintain that the shields reduce radiation without sacrificing diagnostic accuracy, whereas others feel that the negatives outweigh any benefits.

Research from investigators on both sides of the issue was presented at RSNA 2010.

Tube Current Method Reduces Noise
In a study comparing bismuth shielding with organ-based angular TCM and global reduction of tube current, lead author Cynthia H. McCollough, Ph.D., a professor at the CT Clinical Innovation Center at the Mayo Clinic in Rochester, Minn., and her team demonstrated that organ-based TCM and global reduction offer similar levels of dose reduction to the breast at equivalent or improved levels of image quality.

“Simply reducing the tube current can provide the same dose reduction as bismuth shielding at similar image noise levels, but without causing errors in CT numbers or streak artifacts,” Dr. McCollough said.

Ju Wang, Ph.D., a research fellow in Mayo’s CT Clinical Innovation Center, studied thoracic phantoms representing patient sizes ranging from a typical 3-year-old to a large adult. He measured dose to the anterior surface of the phantoms using an ionization chamber with and without bismuth shields. After calculating dose reduction achieved by applying the shields, he decreased the tube current to match the dose reduction achieved with the shield. He then repeated the scan and dose measurements at the lower tube current without shields.

“As we expected, the same dose reduction was achieved by lowering scanner output by the appropriate amount as by using bismuth shields,” Dr. Wang said. “However, the dose reduction achieved using shields was limited to the anterior surface of the phantom, while lowering the tube current reduced the dose by the same amount to all phantom surfaces. As expected, total dose to the patient is lower when the tube current is globally decreased compared to when using bismuth shielding.”

In comparing image noise in the heart and lung regions of the phantoms, Dr. Wang and colleagues found a similar noise increase between the use of bismuth shielding and reducing tube current throughout the entire scan. While shielding altered CT numbers and generated streak artifacts, reducing tube current did not create these problems.

All experiments were repeated using organ-based TCM, which decreased tube current to the anterior surface but increased it to the lateral and posterior surfaces. With this approach, image noise did not increase, CT numbers remained accurate and no artifacts were produced. Also, dose reduction to the breast was similar to that generated by bismuth shielding.

Artifacts Don’t Limit Diagnostic Accuracy
In a second study, researchers at Rhode Island Hospital, affiliated with Brown University in Providence, demonstrated that the shields reduced radiation without impacting diagnostic quality. Lead author Kathryn McGillen, M.D., a second-year diagnostic radiology resident at the university, and colleagues reviewed the first 50 consecutive patients receiving a noncontrast chest CT who had also received a prior chest CT at the hospital before the routine use of breast shields. Researchers used the first 25 patients who had both exams performed on a 64-slice CT scanner followed by another 25 who had both scans performed on a 16-slice CT scanner.

Two radiologists evaluated the studies for diagnosis and the presence of artifact. No diagnostic errors, missed findings or non-diagnostic examinations were identified, although artifact occurred in 62 percent of shielded patients, researchers found.

Streak artifact was most common in superficial soft tissues nearest the shield (62 percent), followed by artifact extending into the mediastinum (16 percent). In one patient, artifact limited visualization of a breast mass; however, the finding was not missed.

The distance of shield placement from the skin proportionately affected artifact and noise, researchers demonstrated. The farther away the shield, the less artifact and noise, with no difference between scans performed on a 16- or 64-slice CT scanner.

While breast shields commonly result in beam hardening and streak artifact, researchers did not find the artifacts to limit diagnostic accuracy in any of the study participants, Dr. McGillen said. She stressed that this retrospective study was unique in using patients rather than phantoms that use surrogate markers to evaluate noise and artifacts.

“By using patients, we are able to look at the actual diagnostic impact of artifact and found that it did not affect diagnosis,” she said. “Therefore the issue of shielding, artifact and noise become negligible. Additionally, by keeping the breast shield off of the patient by approximately 2 cm, artifact becomes inconsequential while dose savings remain unchanged.”

“Until TCM becomes more widely available, I would still encourage breast shields as a methodology proven to reduce breast dose that is easily implemented, inexpensive and widely available,” Robert Gould, Sc.D., a professor and vice-chair, Technology and Capital Projects Department of Radiology and Biomedical Imaging at the University of California, San Francisco. “It should also be noted that the effectiveness of TCM in reducing dose depends on the patient’s anatomy and its use also requires a degree of care by the technologist to maximize the benefits.”

While agreeing AAPM should encourage the use of TCM, Dr. Gould feels the use of breast shields should not yet be discouraged. “While bismuth shields must be positioned appropriately so that streak artifacts through the anatomy are minimized and do not interfere with the diagnostic quality of the images, we have found that with some instruction, technologists have little difficulty in placing the shields to avoid problematic artifacts,” Dr. Gould said.

“Until TCM becomes more widely available, I would still encourage breast shields as a methodology proven to reduce breast dose that is easily implemented, inexpensive and widely available,” Dr. Gould said.
Radiology in Public Focus

A press release was sent to the medical news media for the following article appearing in the latest issue of Radiology.

Characteristics of a First-Generation X-Ray System

In a comparison of antiquated versus modern X-ray equipment, radiation dose and exposure time in the older system were greater than those of the modern system by about three and five orders of magnitude, respectively.

In the study, Martin Kemenick, M.D., of Pritzker University in the Netherlands, and colleagues compared an 1896 system—still in operation—with modern X-ray equipment in terms of radiation dose, beam properties, image quality and some electrical parameters. When measured on the skin of a hand specimen, the radiation dose of the antiquated system was about 50 times greater than that of the modern system for the same detector signal. Estimated skin dose was about 74 mSv for the antiquated system and 0.05 mSv for the modern system.

“In the following century, the image quality and nearly all components of the X-ray system were greatly improved,” researchers concluded. “Simultaneously, radiation dose and exposure time were lowered by three and five orders of magnitude, respectively, turning X-ray imaging into a convenient and safe modality.”

Media Coverage of RSNA

In March 2011, media outlets carried 416 RSNA-related news stories. These stories reached an estimated 393 million people.

More than 100 broadcast coverage included Associated Press, Dow Jones International News, USA Today, Los Angeles Times, WGRZ-TV (Buffalo, N.Y.), KTBS-TV (Shreveport, La.), WPTA-TV (Fort Wayne, Ind.), WLBT-TV (Jackson, Miss.) and WBRE-TV (Wilkes Barre, Pa.).


May Public Information Activities Focus on Stroke

In recognition of American Stroke Month in May, RSNA distributed public service announcements (PSAs) focusing on:

• Signs of stroke
• Stroke imaging
• Interventional treatments for stroke
• Importance of receiving stroke treatment quickly

In addition to the PSA, RSNA also distributed the “60-Second Checkup” audio program to radio stations focusing on detecting stroke in its early stages.

Images of the hand of an 86-year-old woman obtained with Crookes tube number 9 (left) and a hand specimen obtained with modern X-ray system (right). In both cases, the image receptor was a modern computed radiography plate. The exposure time with the 1996 system was 21 minutes, and the distance from the image to the plate was 46 cm. With the modern system, the following settings were used: 45 kV, 3.5-mm Al filtration, 5 mAs (225 mA, 21 msec), and 1 mm between the hand specimen and the image receptor.

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More than 100 broadcast coverage included Associated Press, Dow Jones International News, USA Today, Los Angeles Times, WGRZ-TV (Buffalo, N.Y.), KTBS-TV (Shreveport, La.), WPTA-TV (Fort Wayne, Ind.), WLBT-TV (Jackson, Miss.) and WBRE-TV (Wilkes Barre, Pa.).


May Public Information Activities Focus on Stroke

In recognition of American Stroke Month in May, RSNA distributed public service announcements (PSAs) focusing on:

• Signs of stroke
• Stroke imaging
• Interventional treatments for stroke
• Importance of receiving stroke treatment quickly

In addition to the PSA, RSNA also distributed the “60-Second Checkup” audio program to radio stations focusing on detecting stroke in its early stages.

Images of the hand of an 86-year-old woman obtained with Crookes tube number 9 (left) and a hand specimen obtained with modern X-ray system (right). In both cases, the image receptor was a modern computed radiography plate. The exposure time with the 1996 system was 21 minutes, and the distance from the image to the plate was 46 cm. With the modern system, the following settings were used: 45 kV, 3.5-mm Al filtration, 5 mAs (225 mA, 21 msec), and 1 mm between the hand specimen and the image receptor.

Radiology in Public Focus

A press release was sent to the medical news media for the following article appearing in the latest issue of Radiology.

Characteristics of a First-Generation X-Ray System

In a comparison of antiquated versus modern X-ray equipment, radiation dose and exposure time in the older system were greater than those of the modern system by about three and five orders of magnitude, respectively.

In the study, Martin Kemenick, M.D., of Pritzker University in the Netherlands, and colleagues compared an 1896 system—still in operation—with modern X-ray equipment in terms of radiation dose, beam properties, image quality and some electrical parameters. When measured on the skin of a hand specimen, the radiation dose of the antiquated system was about 50 times greater than that of the modern system for the same detector signal. Estimated skin dose was about 74 mSv for the antiquated system and 0.05 mSv for the modern system.

“In the following century, the image quality and nearly all components of the X-ray system were greatly improved,” researchers concluded. “Simultaneously, radiation dose and exposure time were lowered by three and five orders of magnitude, respectively, turning X-ray imaging into a convenient and safe modality.”

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Antioxidants Prior to Radiation Exposure Can Protect DNA

A unique formulation of antioxidants taken orally before imaging with ionizing radiation can minimize cell damage, according to new research presented during the SIR meeting. Investigators observed as much as a 50 percent reduction in DNA injury after administering a proprietary formula prior to CT scans.

According to a press release, investigators looked specifically at whether a proprietary formula prior to CT scans might contribute to MS and its symptoms. In the recent retrospective safety study, 231 patients with MS (age range, 25 to 70 years old; 147 women, 84 men) underwent angioplasty of the internal jugular and ayzygos veins with or without placement of a stent. Ninety-nine percent were treated without incident. Complications included abnormal heart rhythm in three patients and immediate re-narrowing of treated veins in four patients. All but two of the patients were discharged within three hours of treatment.

“This is an entirely new approach to the treatment of patients with neurologic conditions, such as multiple sclerosis,” said Gary P. Siskin, M.D., an interventional radiologist with the University of Rochester Medical Center in Rochester, N.Y.

Mandato noted that research still must be conducted concerning patient selection, technique and outcomes after angioplasty.

Higher Doses of Y-90 Safe and Effective in Metastatic Liver Cancer

Treating liver tumors with higher doses of yttrium-90 than previously tried is safe, provides results when chemotherapies have failed, preserves quality of life and can be done on an outpatient basis, according to results from a large multi-institutional study presented at the SIR meeting.

“Now we know that patients can actually tolerate much higher doses of radiation than previously thought, which provides hope for patients progressing on standard chemotherapy,” researcher Riad Salem, M.D., M.B.A., said in a press release.

Dr. Salem is a professor of radiology, medicine and surgery and director of interventional oncology in the Division of Interventional Radiology, Department of Radiology at Northwestern University in Chicago. “While patients aren’t cured, their lives are being extended with less down time and their quality of life is improving.”

The four-year prospective study looked at 151 patients (the group was 55 percent males, with an average age of 64 years) with liver metastases from colorectal, neuroendocrine and other cancers. Several subgroups showed high rates of progression-free survival, including 186 days for neuroendocrine patients and 95 days for colorectal cancer patients.

The Nuclear Regulatory Commission recently changed its guidelines in both the neurology and interventional radiology communities about the condition, the treatment and the outcomes.

Dr. Mandato noted that research still must be conducted concerning patient selection, technique and outcomes after angioplasty.
For Your Benefit

New Learning Modules Make Physics Clinically Relevant

Needing—and wanting—to learn medical physics in order to effectively do their jobs, radiology residents benefit most from a resource that puts the subject into a practical context, according to an RSNA member who has found what he’s looking for in the RSNA/AAPM Online Physics Modules.

“Physics is a difficult topic and I wanted to find an educational review that was clinically relevant; the physics modules fit that well,” said Sword C. Cambron, M.D., a radiology resident at Dartmouth Hitchcock Medical Center in Lebanon, N.H. “Our program decided to integrate these modules into the curriculum and our physicist is going over questions from the modules in problem-based educational sessions.

The RSNA/AAPM modules were designed to educate radiologists and radiology residents about important concepts in physics as identified in the AAPM Physics Curriculum. Each module was developed by a team of individuals including at least one physicist and one radiologist and was peer reviewed for content and quality. Topics include radiation biology and protection, projection X-ray imaging, fluoroscopy, CT, ultrasound, MR and nuclear medicine. Dr. Cambron said he has reviewed about half of the modules by the end of his first year of residency. The modules are a great addition to basic physics texts, he said, and the questions at the end of each module are especially helpful.

“I hope the modules continue to be improved with new modules added often,” Dr. Cambron said. “We should be asked the kinds of questions that we could be quizzed about every day on our various rotations or by patients concerned about radiation risks.”

Access the modules at RSNA.org/Education/physics.cfm.

Residents and Fellows Corner

Topics Announced for RSNA 2011 Program

New for RSNA 2011 is a program tailored specifically for residents and fellows, featuring the following sessions, topics and speakers:

Introduction
N. Reid Dunnick, M.D.
Where and When to Look for a Job
Nancy J. McNulty, M.D.
Analyzing the Offer
• Academic Job
Joseph D. Chernoff, M.D.
• Clinic Job
Duane G. Mezwa, M.D.
• Small Private Practice
William T. Thornwarth Jr., M.D.
• Large, Subspecialized Private Practice
Ad Van Moor Jr., M.D.
Contract Negotiations
• Philosophical Framework
William G. Bradley Jr., M.D.
• Legal Issues
Lawrence R. Muroff, M.D.
• Quality of Life
Beth A. Erickson, M.D.
How to Get Hired
Vijay M. Rao, M.D.

Advance registration for RSNA 2011 is under way for RSNA members. Visit RSNA2011.RSNA.org for more information.

Cardiopulmonary Imaging Education Available

A new "Residents and Fellows" section on the Journal of Thoracic Imaging (JTI) website includes a variety of open-access educational content:

• Cardiopulmonary reviews articles targeted for examination preparation
• American College of Radiology Appropriateness Criteria® reviews
• Links to online lectures and interactive "unknown" cases created by two of the journal’s sponsoring societies, the Society of Thoracic Radiology and the Korean Society of Thoracic Radiology

"This educational initiative will help to fill in the gaps of cardiopulmonary education, especially for residents in training programs that do not have access to subspecialty-trained faculty in cardiopulmonary imaging," said JTI deputy editor Gautham P. Reddy, M.D., a professor of radiology at the University of Washington and past-president of the Alliance of Clinician-Educators in Radiology. See more at www.thoracicimaging.com.

Annual Meeting Watch

News about RSNA 2011

Member Registration and Housing Now Open
RSNA and AAPM members can register now for RSNA 2011. General registration and housing opens June 1. The Advance Registration and Housing brochure is available online at RSNA2011.RSNA.org

Course Enrollment Begins July 6
Course enrollment information will be mailed in late June to all members and 2011 meeting attendees and will also be available online at RSNA2011.RSNA.org. People registering for RSNA 2011 prior to June 8 who wish to view course enrollment information online only can “opt out” of receiving the copy by mail.

RSNA 2011 Spotlights Chicago

Vienna Boys Choir Returns to Chicago
One of the oldest boys choirs in the world and a symbol of Austria for nearly 500 years, the Vienna Boys Choir: Returns to the Symphony Center with a showcase of traditional and holiday songs sure to delight the whole family. The choir performs one day—Saturday, November 26 at 3 p.m., at the Symphony Center, 220 S. Michigan Ave.

For more information and to order tickets through the Chicago Symphony Orchestra, go to CSO.org/TicketsAndEvents/EventDetail.aspx?eid=4085. For order pre-arranged tickets through RSNA’s 2011 tours and events program beginning July 6, go to RSNA2011.RSNA.org.

Take in Chicago’s Sights, Sounds at RSNA 2011

RSNA will once again spotlight Chicago’s exciting array of sights, sounds and scenery through a series of exciting tours and events during the annual meeting week. On the agenda for 2011:

• "Memphis," the Tony Award-winning musical, at the Cadillac Palace Theater
• Danis Goderov at the Lyric Opera
• Ariadne auf Naxos at the Lyric Opera

The lineup will also feature city tours, shopping excursions, culinary experiences, museum exhibits and much more. RSNA course and tour enrollment opens July 6 at RSNA2011.RSNA.org.
RSNA 2011 Registration

How to Register
There are four ways to register for RSNA 2011:
1 INTERNET
Go to RSNA.org/Register
2 FAX (24 hours)
1-800-521-6017
1-847-996-5401
3 TELEPHONE
Mon.-Fri. 8:00 a.m. – 5:00 p.m. ct
1-800-650-7018
1-847-996-5876
4 MAIL
Experient/RSNA 2011
56 Atrium Drive
Vernon Hills, IL 60061 USA

For more information about registering for RSNA 2011, visit RSNA2011.RSNA.org, e-mail reginfo@rsna.org or call 1-800-381-6660 x7862.

For Your Benefit
RSNA Discounts Prices on Bundled Refresher Courses
For a limited time, RSNA is offering discount pricing on select refresher courses from past annual meetings. The three-CD Breast Imaging/High Risk Collection (BUN06) and two-CD Dosing Collection (BUN12) are specially discounted at 25 percent off the original bundle price. The discounted price is $90 for members and $130 for non-members for BUN06, and $60 for members and $100 for non-members for BUN12.

Online viewing is available through myRSNA. To order CDs, go to RSNA.org/orderCDs. E-mail confirmation will appear and a complete e-mail confirmation of your arrangements will be sent to you within 24–48 hours.

Start Now for Visa
Important Dates
| May 4 | RSNA/AAPM member registration and housing open |
| June 1 | General registration and housing open |
| July 6 | Course enrollment opens |
| October 21 | International deadline to have full-conference materials mailed in advance |
| November 4 | Final discounted advance registration, housing and course enrollment deadline to have full-conference materials mailed in advance |

RSNA.org
RSNA 2011 Registration
RSNA 2011 advance registration and housing is now open for RSNA and AAPM members. General registration and housing opens June 1. Advance Registration and Housing information is available at RSNA2011.RSNA.org.

Registration is required for various meeting components, including refresher and multisession courses, informatics workshops and RSNA tours and events. Information from the Profile Page will be used to create your name badge and send your materials prior to the meeting.

On the Demographic Information Page, select various demographics, including subspecialty and continuing education certificate needs.

Booking your hotel reservations gives you a choice of more than 70 hotels offering the lowest rates in Chicago and access to RSNA’s free shuttle to McCormick Place. Indicate your arrival and departure dates to see a list of hotels meeting your criteria.

On the Payment Information Page, enter your credit card information. A meeting confirmation will appear and a complete e-mail confirmation of your arrangements will be sent to you within 24–48 hours.

RSNA News
RSNA 2011 May 2011
COMING NEXT MONTH
Wondering about the future of computers in healthcare? Meet Watson, the IBM Supercomputer designed to help doctors make diagnoses and analyze healthcare resources, including electronic health records and medical journals, in ways that doctors and nurses may not be able to. Read about the recent “Jeopardy” champion in next month’s RSNA News.
Choose the Gold Standard. Choose ACR.

The CMS countdown clock continues to tick. On Jan. 1, 2012, only fully accredited providers of advanced diagnostic imaging services will receive Medicare reimbursements. Start your application today to ensure your facility meets the CMS deadline and continues to be competitive.

ACR accreditation is recognized as the gold standard in medical imaging. To apply, visit acr.org.

acr.org | 1-800-770-0145 | 

The ACR advantage
- Unmatched imaging review by radiologists
- Peer-reviewed, educationally focused
- Designed by radiologists and medical physicists
- Guided by expert technologists
- Multi-site, multi-modality pricing

“I’m proud of our ACR accreditation seals. They reflect the highest standard of medical imaging and patient care.”

— Scott R. Broadwell, MD, board-certified radiologist