

RSNA *News*

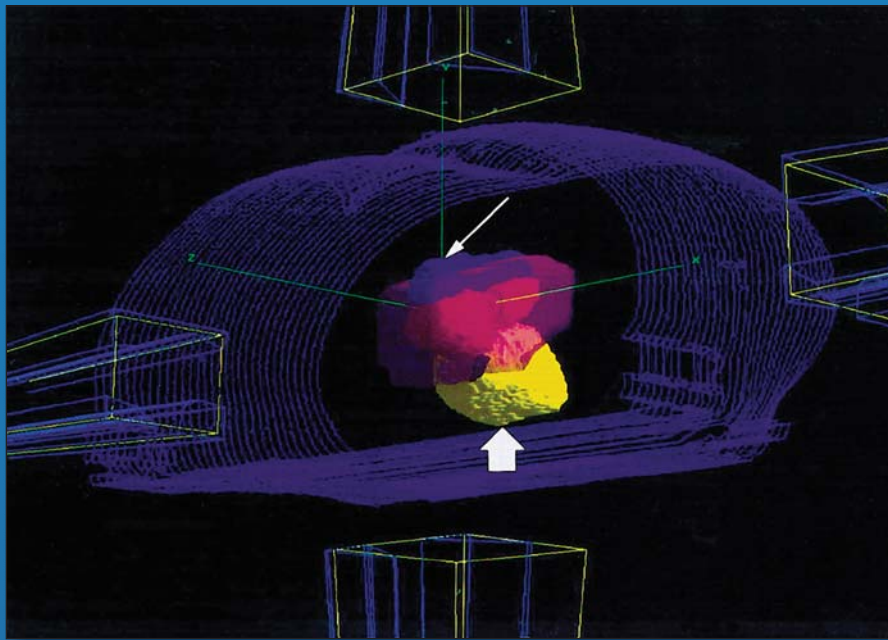


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Studies Clarify Radiation Therapy Effects on Rectum, Heart

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- U.S. House Subcommittee Hears Testimony on Overuse of Diagnostic Imaging
- NCI Forum Looks at Rapid Changes, Challenges in Quantitative Cancer Imaging
- Performance Measures Essential to Successful Radiology Practice
- Innovation, Practice Patterns Change Refresher Courses for RSNA 2005
- Curiosity about Lung Function Inspires RSNA Research Scholar

Refresher Course Enrollment Begins June 20
rsna2005.rsna.org

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Distinguished Honorees and Lecturers

THE RSNA Board of Directors has announced this year's list of distinguished honorees and lecturers to whom the Society will pay tribute at the 91st Scientific Assembly and Annual Meeting. They are:



RSNA2005
Connecting for Lifelong Learning

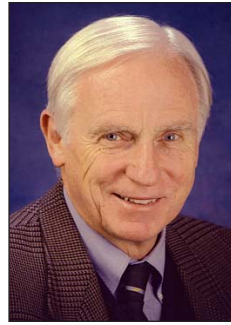
GOLD MEDALISTS



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Iowa City, Iowa

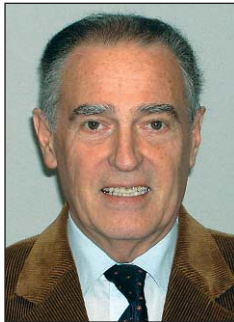


C. Douglas Maynard, M.D.
Winston-Salem, N.C.



H. Rodney Withers, M.D.
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Brescia, Italy



Janet E. Husband, M.D.
Sutton Surrey, U.K.



Rolf-Peter Mueller, M.D.
Cologne, Germany

RSNA MEETING PROGRAM DEDICATION



In memory of
Robert G. Parker, M.D.

EUGENE P. PENDERGRASS NEW HORIZONS LECTURE

*Imaging in Drug
Discovery: Emerging
Roles and Challenges*



Lawrence Schwartz, M.D.
New York City

ANNUAL ORATION IN DIAGNOSTIC RADIOLOGY

*Radiology—Back to
the Future*



William R. Brody, M.D., Ph.D.
Baltimore

ANNUAL ORATION IN RADIATION ONCOLOGY

*Integration of Functional
Images into Future Radi-
ation Oncology Research
and Practice*



K.S. Clifford Chao, M.D.
Houston

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

NEW!**Associated Sciences Program in New Format**

THE Associated Sciences Consortium has updated the format for its refresher course series and symposium at the RSNA annual meeting. Instead of the refresher courses being spread over six days, four courses will be held on Monday and four will be held on Tuesday during RSNA 2005. The symposium will be held on Wednesday morning.

For more information, go to *rsna2005.rsna.org*. Course enrollment begins June 20.

**Refresher Courses****MONDAY – NOVEMBER 28**

- Capital Asset Management: From Acquisition to Replacement Strategies
- Development of the Radiologist Assistant: An Education and Certification Update
- HIPAA: Ongoing Impacts and Re-inventions in Radiology
- Joint Commission on Accreditation of Healthcare Organizations National Patient Safety Goals

TUESDAY – NOVEMBER 29

- PET/CT and SPECT/CT Fusion Imaging: Technical and Clinical Highlights
- The Art and Science of Radiology Planning and Design
- Digital Imaging: Computed Radiography and Direct Radiography
- Controversies in Image-based Screening

Symposium**WEDNESDAY, NOVEMBER 30 (8:30 a.m. – 12:00 p.m.)****Associated Sciences: Radiology's Leaders—Challenges of the Future**

Moderators: Bobbi Miller, B.A., R.T.(R)(M), C.R.A., and Judy LeRose, B.S., R.T.(R), C.R.A.

A. Tomorrow's Leader: The Radiology Business of the Future

Patricia Kroken, C.R.A.

B. Radiology in the Clinical Setting: The Final Frontier

Suzanne K. Ramthun, M.B.A., R.T.(R), and Carrie E. Abendroth, M.B.A., M.H.A.

C. Education: The Amazing Race

Carole South-Winter, M.Ed., R.T.(R), C.N.M.T., B.S.

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

Abstract Submissions Top 9,500

The RSNA Scientific Program Committee will meet in mid-June at RSNA Headquarters in Oak Brook, Ill., to work on the program for the scientific sessions at RSNA 2005.

This year, a record 9,515 abstracts were submitted for presentation consideration—that's up 243 from last year. Abstracts were required for scientific papers, scientific posters, education exhibits, *infoRAD* exhibits and radiology informatics, as well as a new interventional oncology program. The Interventional Oncology Symposium is a joint effort between RSNA and the Society of Interventional Radiology Foundation.

More information will be available in a future edition of *RSNA News*.

RSNA
World Marks Year of Physics

The United Nations has endorsed 2005 as the World Year of Physics.

The international celebration commemorates the 100th anniversary of the pioneering contributions of Albert Einstein. Through the efforts of a worldwide collaboration of scientific societies, it is hoped that the World Year of Physics will bring the excitement of physics to the public and will inspire a new generation of scientists.



The American Association of Physicists in Medicine (AAPM) is promoting the World Year of Physics with the logo on its Web site and on the cover of its publications. A special booth is planned at the AAPM annual meeting next month in Seattle.

For more information, go to www.physics2005.org.

McClennan President of ARRS

Bruce L. McClennan, M.D., was named president of the American Roentgen Ray Society (ARRS) during the society's annual meeting last month in New Orleans.

Dr. McClennan said he is grateful for the opportunity to serve the profession: "Leadership in radiologic societies requires an understanding of the challenges to and changes in our field. It further recognizes the enormous volunteer efforts that

radiologists make to advance the missions of our societies," he said. "Service can be its own special reward. I look forward to my opportunity to work with my colleagues to advance the educational and research causes of our great profession."

Dr. McClennan is a professor of diagnostic radiology at Yale University School of Medicine and Yale New Haven Hospital. He is also deputy editor of *RSNA News*.



Bruce L. McClennan, M.D.

ACR Elects New Leaders

Several new names were added to leadership positions at the American College of Radiology (ACR). Their names were announced at the ACR annual meeting in Washington, D.C.:

Milton J. Guiberteau, M.D.
President

William G. Bradley Jr., M.D.
Vice-President

Albert L. Blumberg, M.D.
Council Speaker

David C. Kushner, M.D.
Council Vice-Speaker

New members of the ACR Board of Chancellors are: **Manuel L. Brown, M.D.**; **Paul H. Ellenbogen, M.D.**; **Carol M. Rumack, M.D.**; **Geoffrey G. Smith, M.D.**; **James H. Thrall, M.D.**



2005-2006 ACR Leadership

(from left) **Arl Van Moore Jr., M.D.**, *Vice-Chair, Board of Chancellors*; **David C. Kushner, M.D.**, *Council Vice-Speaker*; **William G. Bradley Jr., M.D.**, *Vice-President*; **Sarah S. Donaldson, M.D.**, *Secretary-Treasurer*; **Albert L. Blumberg, M.D.**, *Council Speaker*; **James P. Borgstede, M.D.**, *Chair, Board of Chancellors*; **Milton J. Guiberteau, M.D.**, *President*.

IN MEMORIAM:

J. Hal Owsley, M.D.

J. Hal Owsley, M.D., died April 16 at his home in North Carolina. He was 73.

Dr. Owsley had been an RSNA member for more than 20 years. He served on the ACR Board of Chancellors from 1990 to 1997, and earned the North Carolina chapter's silver medal for his dedicated service.

XLR Medical Hires Boyd

Douglas P. Boyd, Ph.D., an adjunct professor of radiology at the University of California, San Francisco, has been appointed chairman of the board of directors for XLR Medical.

Dr. Boyd is a pioneer in the development of fan-beam CT scanners, Xenon detector arrays and EBT scanners. Until recently, he was the chief scientist at GE Imatron, a company he helped found in 1983. Imatron was acquired by GE in 2001.

McClennen Joins AMICAS

Industry executive **Peter McClennen** has joined AMICAS, Inc., as president and chief operating officer.

McClennen previously was the global general manager for GE Healthcare's IT PACS business. He was also director of marketing for PACS at FUJIFILM Medical Systems USA, Inc.

Thrall Elected Board Chair of Mobile Aspects

James H. Thrall, M.D., is the new chairman of the board for Mobile Aspects, Inc., a leading provider of radiofrequency identification (RFID) tracking solutions for the healthcare industry.

Dr. Thrall, radiologist-in-chief at Massachusetts General Hospital and Juan M. Taveras Professor of Radiology at Harvard Medical School, is also a member of the RSNA Research & Education Foundation Board of Trustees.



James H. Thrall, M.D.



Send your submissions for *People in the News* to rsnanews@rsna.org, (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.

U.S. House Subcommittee Hears Testimony on Overuse of Diagnostic Imaging

THE American College of Radiology (ACR) says it will continue to exercise all options—legislative and non-legislative—in its opposition to the inappropriate utilization of diagnostic imaging. “We will pursue anything that we think we can do to appropriately protect our patients,” said James P. Borgstede, M.D., chairman of the ACR Board of Chancellors.

On March 17, the House Ways and Means Subcommittee on Health heard testimony on managing the use of medical imaging. Dr. Borgstede was among five people invited to testify.

“Given the significant growth in imaging services, we need to carefully examine the existing quality and safety of these services provided in physicians’ offices before requiring providers to meet new quality standards,” said Subcommittee Chair Nancy L. Johnson (R-Conn.). “Is there a problem, and if so, how widespread is it? What types of services are involved? I want to ensure that seniors have access to appropriate, safe, and high-quality imaging services.”

Diagnostic imaging is now a \$100 billion a year industry in the United States and is the fastest growing type of physician service expenditure, according to the Medicare Payment Advisory Commission (MedPAC).

“The commission has concluded that it is time for the Medicare program to start to differentiate among providers when making payments. Currently, Medicare pays providers the same regardless of their quality,” said MedPAC Executive Director Mark E. Miller, Ph.D.



Cherrill Farnsworth (left) and James P. Borgstede M.D. (right) spoke before a House subcommittee in March in support of recommendations that physicians, technologists and facilities must meet quality and safety standards to bill Medicare for the performance or interpretation of medical imaging.

Photo courtesy of ACR

Dr. Borgstede told the subcommittee that the overuse of medical imaging procedures by non-radiologists lowers the quality of patient care, undermines patient safety, threatens the solvency of Medicare, and annually drains the American healthcare system of billions of dollars.

“Certainly the payers are concerned about costs, and we agree with them that there are unnecessary costs they are seeing from imaging services,” Dr. Borgstede said. “It is my feeling that a large reason for those costs is inappropriate utilization of imaging because of economically motivated self-referrals. Doctors put imaging equipment in their

offices and probably order more examinations than are necessary—and that drives up the cost of healthcare.”

ACR supports many of the MedPAC recommendations that urge Congress to enact laws directing the Secretary of Health and Human Services to set quality and safety standards for providers performing medical imaging.

Dr. Borgstede outlined several concerns: “Is the equipment appropriately maintained? Are registered technologists performing those examinations? Are there physics inspections? What is the quality of the image that’s produced? Are the technical parameters for producing those images appropriately

controlled? And are the appropriate parameters being used that deliver the minimum necessary dose of radiation? Who's doing the interpretation?"

The MedPAC report includes recommendations about using quality metrics to control the use of diagnostic imaging. Dr. Borgstede said ACR supports the idea.

"If you require people to have registered technologists, physics inspections, board-certified individuals interpreting the examinations with a record of the number of exams per year that they perform and interpret, and their hours of continuing medical education, then you can use quality metrics to keep out the entrepreneurs who are in this for financial motivation," he said.

Stark Law

ACR also supports the MedPAC recommendation that Congress include nuclear medicine and PET procedures under the existing Stark law (the physician self-referral law), and tighten other aspects of the Stark law dealing with physician ownership.

"There are loopholes in the Stark law. There are exemptions, including one involving imaging equipment in your office," Dr. Borgstede explained. "If you have an imaging center that is a joint venture between radiologists

and non-radiologists, that, generally speaking, violates the Stark law. But physicians can get around it by putting imaging equipment in their office. That's what is called the *in-office ancillary exemption*."

Many radiologists would like to see that exemption closed, but Dr. Borgstede said the Federal government hasn't made it a priority. At its annual meeting in April, ACR amended existing policy on self-referral by adding language identifying the risks of increased radiation exposure to the public.

Cherrill Farnsworth, executive director of the National Coalition for Quality Diagnostic Imaging Services (NCQDIS) and president and chief executive officer of Health Help Inc., also testified before the Congressional subcommittee. She told the panel that NCQDIS believes Medicare should take steps now to protect its beneficiaries.

The NCQDIS recommendations include ensuring that equipment and technologists in an imaging facility meet quality standards.

NCQDIS also recommends that current procedural terminology (CPT®) codes be upgraded to meet current technology. "Now that CT scans are so fast, the technical component should be cost-based," she said. "The professional component—where the doctor is

reading more scans than he ever did before—absolutely cannot be reduced."

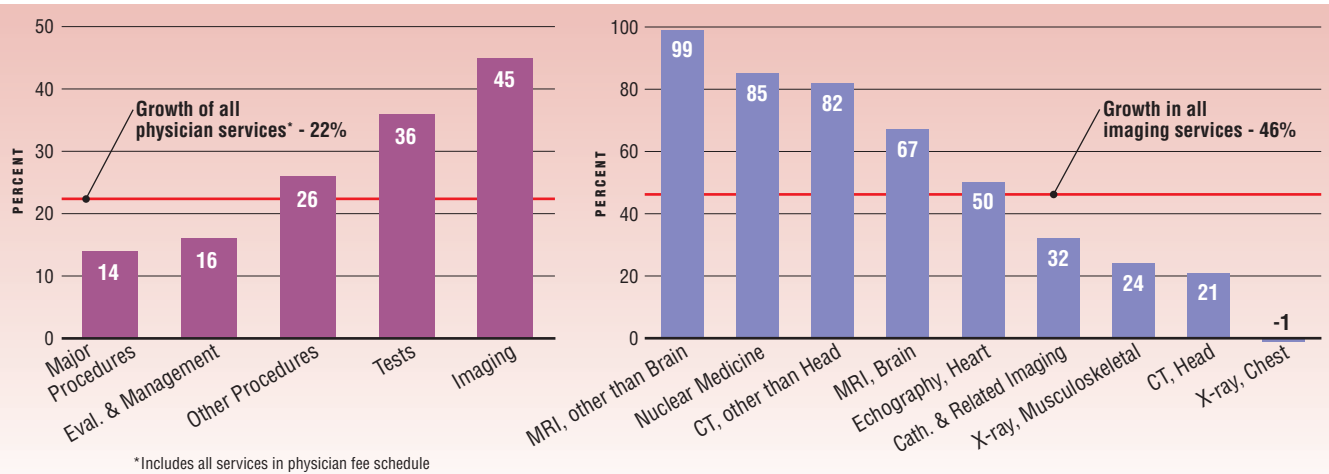
She added that NCQDIS supports physician privileging: "Only certain CPT codes could be done by certain medical specialties—specifically MR, CT and PET should be done only by board-certified radiologists. We're very big advocates of board-certified radiologists, where that particular modality is not taught in the training of the doctor in an accredited medical school."

She said that when a physician is not trained in an imaging modality in an accredited medical school environment, Medicare should not pay for their services.

"This is not about a turf battle," Farnsworth emphasized. "It's about the quality and safety of the Medicare beneficiaries. Many Medicare beneficiaries don't even know that their benefit allows them to ask for a board-certified radiologist. We think that's important and Medicare should be cognizant of that and use the most well-trained person. If we don't get the diagnosis right, we're surely not going to get the therapy or the surgery or the pharmacy right." □

This is not about a turf battle. It's about the quality and safety of the Medicare beneficiaries.

Cherrill Farnsworth



■ For more information about the Congressional subcommittee hearing, go to waysandmeans.house.gov/hearings.asp?formmode=detail&hearing=392. The Web site features the hearing advisory, witness list, testimony and hearing transcript.

■ To view the 2005 MedPAC Report to Congress, go to www.medpac.gov/publications/congressional_reports/Mar05_TOC.pdf.

Source: MedPAC Report to Congress

Studies Clarify Radiation Therapy Effects on Rectum, Heart

TWO NEW studies on radiation therapy quantify the effects of scattered radiation on surrounding organs and tissues. The underlying message in both studies is that the more targeted the treatment, the lower the risk of subsequent malignancy in the surrounding area—something that the radiation oncology community has always incorporated in the latest treatment options.

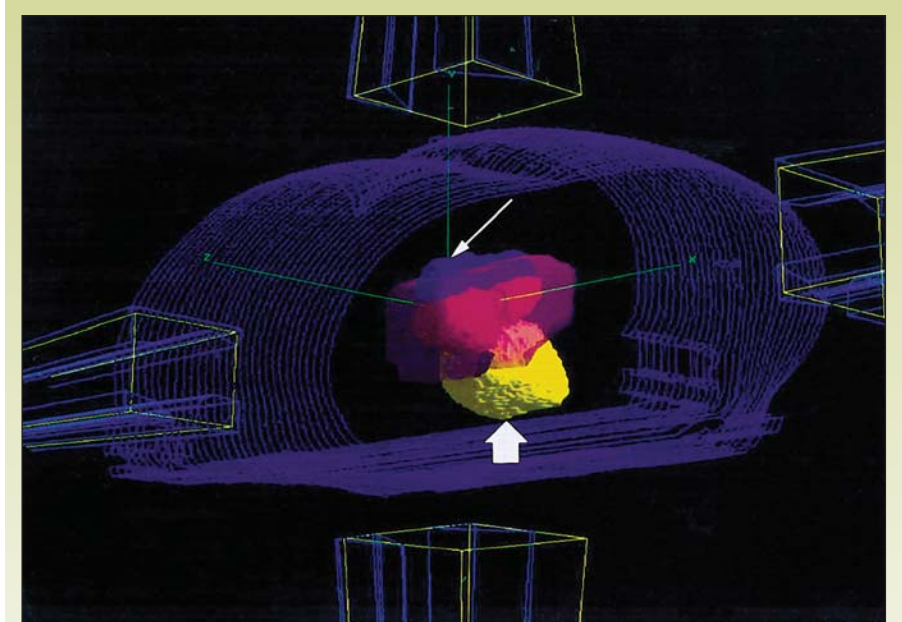
Radiation Therapy for Prostate Cancer

A retrospective cohort study of more than 80,000 men found that previous radiation treatments for prostate cancer significantly increased the long-term risk of secondary malignancies in the rectum when compared with prostatectomy.

Nancy N. Baxter, M.D., Ph.D., and colleagues at the University of Minnesota School of Public Health in Minneapolis, analyzed the Surveillance, Epidemiology and End Results (SEER) registry data from 1973 through 1994. “We focused on men with prostate cancer, but with no previous history of colorectal cancer, treated with either surgery or radiation who survived at least five years,” the authors wrote in the April 1 issue of *Gastroenterology*.

Compared with the surgery-only group, men who underwent radiation therapy had almost twice the risk of developing rectal cancer. The researchers said the increased risk is similar to that seen in patients with first-degree relatives who are age 65 years or older and who have colon adenomas or colon cancer.

The Baxter study is the third to examine SEER data links between prostate irradiation and secondary malignancies. In 1997, Alfred I.



Three-dimensional conformal four-field plan for a prone patient as generated by the treatment-planning computer. The prostate volume is red, the rectum (thin arrow) is blue, and the bladder (thick arrow) is yellow. Purple shading represents the 95% isodose line. The posterior part of the rectum and most of the bladder are well spared with this technique.

From “Rectal Bleeding after Radiation Therapy for Prostate Cancer: Endoscopic Evaluation” (*Radiology* 2000;217:215-218)

Illustration courtesy of Peter A.S. Johnstone, M.D. © 2000 RSNA. All rights reserved. Printed with permission.

Neugut, M.D., Ph.D., and colleagues found that eight years following treatment there was a significant but “undramatic” increase in the risk of bladder cancer but not rectal cancer in the radiation therapy group. In 2000, David J. Brenner, Ph.D., and colleagues found a “statistically significant, though fairly small” increased risk of second solid tumors of the rectum and bladder, particularly in long-term survivors.

“In light of the long latency for the induction of cancers by ionizing irradiation, the longer follow-up periods in the studies by Baxter and Brenner likely more accurately reflect the true risks of rectal cancer in men who have had prostate cancer radiation therapy,” wrote Ken Russell, M.D., and William

M. Grady, M.D., in an editorial accompanying the Baxter paper.

Dr. Russell is a professor in the Department of Radiation Oncology at the University of Washington School of Medicine in Seattle. Dr. Grady is an assistant member at the Fred Hutchinson Cancer Research Center and an assistant professor of gastroenterology at the University of Washington School of Medicine.

Dr. Russell said the Baxter study raises an issue that will become increasingly important as more and more men are successfully treated for prostate cancer. “The germane clinical question appears to be how to detect rectal cancer at an early stage in this group of patients,” he said. “From my

perspective, we've always known that there are risks and benefits to any treatment and that there's a slight risk of malignancy in other sites following radiation. This study notes that for prostate cancer and puts real numbers on it so we can better discuss the risks and benefits with our patients."

The study also found that with direct radiation of the rectum, nearby and remote tissues were not affected. "As we continue the trend to give treatments that are much more targeted, such as prostate brachytherapy, the risks to surrounding areas will diminish," said Dr. Russell.

The new study is unlikely to prompt changes in the way prostate cancer is treated given that the rate of rectal cancer was low in both the group treated with surgery and the group treated with radiation.

"The study is interesting from a large population-based perspective, but it is unlikely to significantly affect the widespread use of radiation therapy for prostate cancer," said Peter A.S. Johnstone, M.D., who is a professor in the Department of Radiation Oncology and director of the Cancer Survivorship

Program at the Winship Cancer Institute at Emory University. "Patients receiving radiation therapy for prostate cancer have a known malignancy being treated. Many of these patients are not surgical candidates, so radiation therapy may be the only curative option for the prostate cancer. Second malignancies are a known and rare complication of this potentially curative treatment."

As we continue the trend to give treatments that are much more targeted, such as prostate brachytherapy, the risks to surrounding areas will diminish.

Ken Russell, M.D.

Dr. Baxter added that no matter what form of radiation delivery is used, the rectum is so close to the prostate that some portion of the rectum will also receive radiation. "We recommend

that the potential for developing rectal cancer be included in conversations between doctors and patients when considering the individualized course of treatment and surveillance for patients with prostate cancer. Additionally, we recommend that men who have had prostate radiation be monitored for rec-

tal cancer starting five years after treatment."

Radiation Therapy for Breast Cancer

The risk of ischemic heart disease and, ultimately, cardiac death following radiation treatment for breast cancer has steadily declined over the last quarter-century, according to a study in the March 16 issue of the *Journal of the National Cancer Institute*.

The study, which also used SEER data, was conducted by investigators from the M.D. Anderson Cancer Center in Houston. It confirmed that improvements in radiation therapy techniques and delivery have greatly reduced cardiac side effects. The researchers found the hazard of death from ischemic heart

Continued on page 10

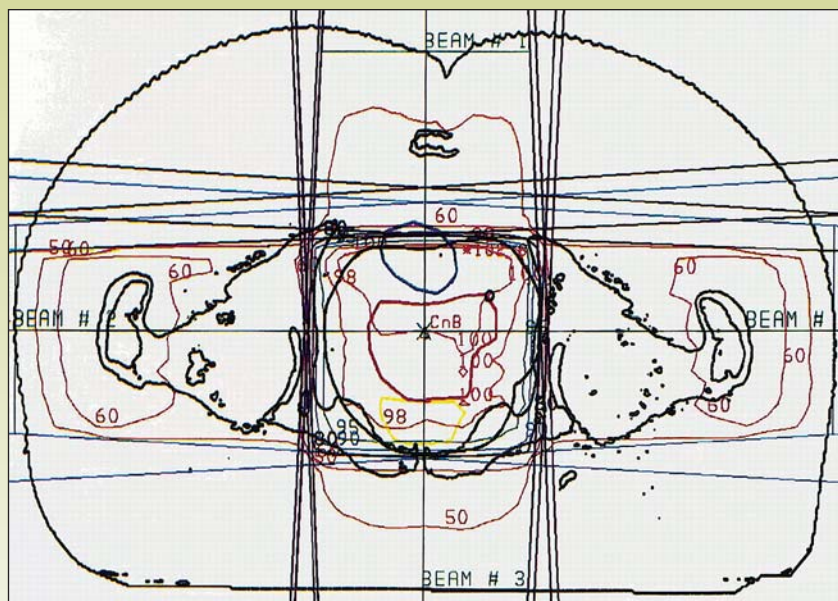


Image shows the isodose plan for the four-field technique of definitive irradiation of an intact prostate gland. Gland volume, determined on a CT scan, is outlined in red. Numbers represent isodose percentages.

From "Rectal Bleeding after Radiation Therapy for Prostate Cancer: Endoscopic Evaluation" (*Radiology* 2000;217:215-218)

Illustration courtesy of Peter A.S. Johnstone, M.D. © 2000 RSNA. All rights reserved. Printed with permission.

Web links:

- To view the abstract for the Baxter article, "Increased risk of rectal cancer after prostate radiation: A population-based study," go to www2.gastrojournal.org/scripts/om.dll/serve?action=searchDB&searchDBfor=art&artType=abs&id=as0016508504023339&nav=abs. To view the accompanying editorial, "Ionizing radiation and rectal cancer: Victims of our own success" go to www2.gastrojournal.org/scripts/om.dll/serve?action=searchDB&searchDBfor=art&artType=fullfree&id=as0016508505003525.
- To view the abstract for the Giordano article, "Risk of Cardiac Death After Adjuvant Radiotherapy for Breast Cancer," go to jncicancerspectrum.oupjournals.org/cgi/content/abstract/jnci;97/6/419.

NCI Forum Looks at Rapid Changes, Challenges in Quantitative Cancer Imaging

TO UNDERSTAND just how difficult it is to measure a tumor, look at a cloud. Imagine having to precisely define each and every edge.

Quantitative imaging to measure tumors and tumor activity is becoming increasingly important and complex as frontiers expand in both oncology and radiology. Daniel C. Sullivan, M.D., chief of the Cancer Imaging Program (CIP) at the National Cancer Institute (NCI), said tumors—like clouds—have indeterminate edges and obtaining good measurements can involve complex math. In fact, using “fuzzy mathematics,” a sophisticated method to define the parameters of a tumor in terms of probability, may be the best approach to dealing with tumor edges, he said.

Dr. Sullivan and other speakers at the Sixth Annual National Forum on Biomedical Imaging and Oncology, hosted by NCI and the National Electrical Manufacturers Association (NEMA) in April in Bethesda, Md., depicted a rapidly changing field in which new information, especially about molecular targets and biomarkers in cancer, is creating a need for more sophisticated and reliable quantitative imaging techniques. Major themes running through the two-day meeting were the need for more precise methods to assess response to treatment, the need for reference databases to validate software, the importance of standardization, and the need for radiologists and oncologists to work together.

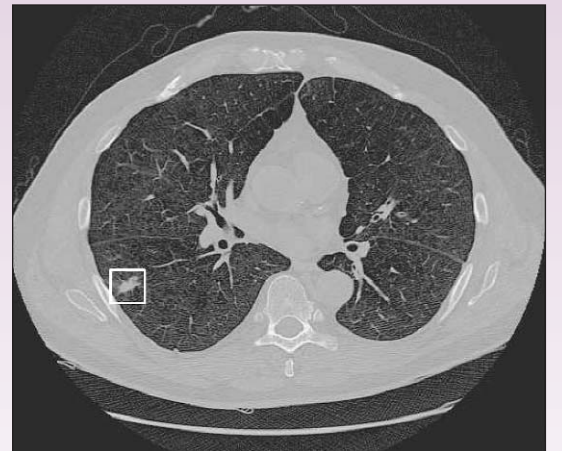
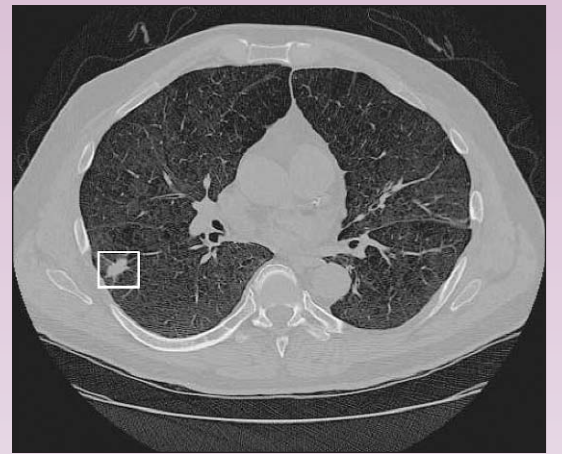
Driving rapid change in oncology is the growing focus on cancer biology at the molecular level. As more and more genes and proteins are implicated in

tumor development, researchers are identifying diagnostic markers and creating treatments aimed at molecular targets. Imaging these markers and targets and their activity—say a growth factor receptor that is overexpressed on cancer cells—can help in diagnosing and staging cancer, developing drugs, planning therapy and monitoring response.

Early Response Assessment

When developing a targeted drug, imaging can help show whether the drug is hitting the target and whether that hit results in tumor shrinkage, said Susan Galbraith, M.D., Ph.D., director of the Clinical Discovery Group at Bristol-Myers Squibb. In clinical trials, imaging can offer a way to assess response to a drug early, helping researchers decide whether to continue with development, she said.

Early response assessment can also be a boon to patients, said Richard Schilsky, M.D., associate dean for clinical research at the University of Chicago. “We would dearly love to be able to assess response after one cycle or one dose so we could avoid the toxicity if the drug was not working,” he said. He cited a recent study with FDG-PET to assess

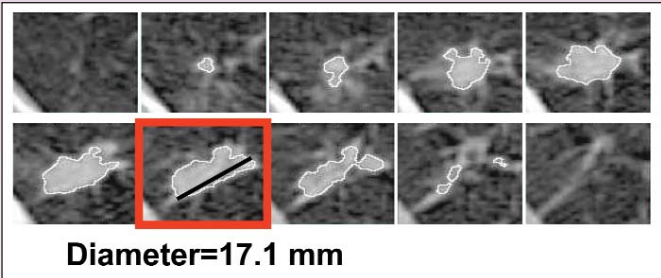
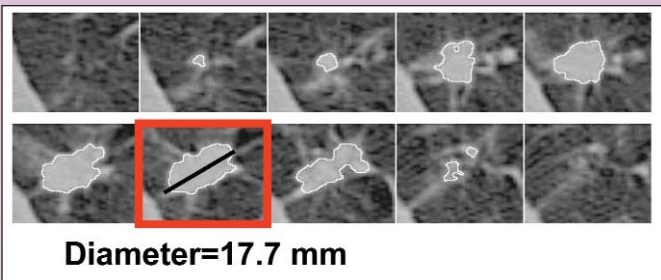


Two CT images, each at the same level, in the chest of a patient with an irregularly-shaped lung nodule. The top one is at baseline and the bottom one is after one month. It is very difficult to discern a difference.

Images and charts courtesy of Binsheng Zhao D.Sc., Laboratory for Computational Image Analysis, Department of Radiology, Memorial Sloan-Kettering Cancer Center

response in lung cancer, which showed that PET could help “make therapy decisions at three weeks, rather than after three months of toxic chemotherapy.”

Early response assessment and the imaging of molecular targets are just two of the frontiers in cancer that



Composites of several slices from these two CT scans, demonstrating RECIST measurements of 17.7 mm (*top*) at baseline and 17.1 mm (*bottom*) at one-month follow up. A portion of this small difference could easily be attributed to the expected amount of error in measurement. In other words, it would be easy to categorize this result as “no definite change.”

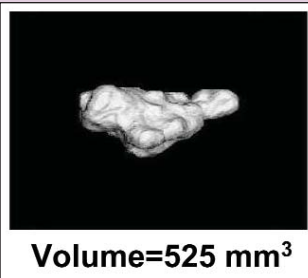
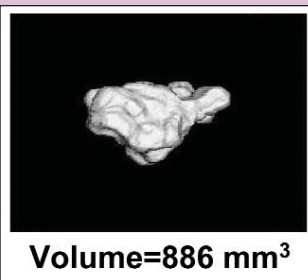
involve radiology. Dr. Schilsky also pointed to the use of non-invasive staging, such as the use of PET and CT scans to determine the stage of esophageal cancer. He noted that many people are now interested in using time to progression, or the amount of time before a tumor begins to grow again, as a measure of a drug’s effectiveness in clinical trials. Defining progression is a complex issue. Dr. Schilsky concluded that quantitative imaging could provide information on progression and other aspects of a tumor that can be a surrogate for clinical benefit, though refinements are needed in some areas.

One area in need of refinement is measuring tumor shrinkage in response to treatment. The most common approach to determining tumor size currently uses the Response Evaluation Criteria in Solid Tumors (RECIST) guidelines, which, like the older World Health Organization (WHO) guidelines, are subject to a good deal of intra- and inter-observer variability, said Lawrence Schwartz, M.D., the director of MR imaging at Memorial Sloan-Kettering Cancer Center in New

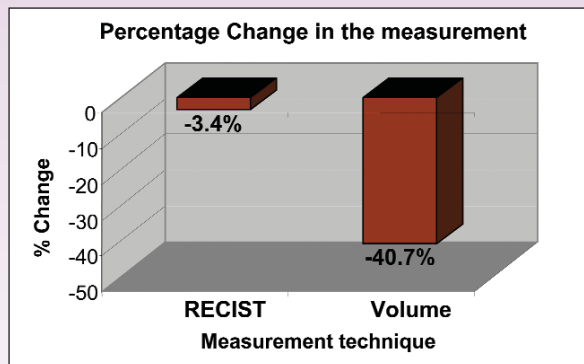
York City. Better, multidimensional methods are needed, including ways to show changes in the volume of the tumor, Dr. Schwartz said.

Software and Reference Databases

Software that can provide valid measurements of tumors, independent of the observer, is another area of intense interest. Noting that software tools have lagged behind image acquisition technology, NCI’s Laurence Clarke, Ph.D., said that one of the major needs in quantitative imaging is for reference databases that can be used to validate software. To this end, NCI is supporting two demonstration projects, both using CT scans from lung cancer trials. In addition, NCI and RSNA are working together to set up an infrastructure for public databases of images from clinical trials using RSNA’s Medical Imaging Resource Center (rsna.org/mirc). An expanded



Images show the results of applying a computer software algorithm to the problem. The 3D-volume renderings seem to show more of a difference with the irregularly shaped lung nodule smaller in size at one month (*bottom*). The volume calculations, which appear under the images, are 886 cubic mm at baseline and 525 cubic mm at one-month follow up.



Using the RECIST criteria, the change in tumor (linear measurement) at one month is only -3.4 percent, while the volume method shows the difference is -40.7 percent. The conclusions that might be drawn from these two very different methods of measurement and the actions that might be subsequently taken are vastly different.

article on MIRC will be included in the July issue of *RSNA News*.

More and better software is one approach to coping with the growing amount of imaging data, according to a panel of industry leaders. “Data volume grows relentlessly,” said James Williams, Ph.D., a department head at Siemens Corporate Research, Inc., who called for compatible, comparable and portable algorithms among other approaches to this data explosion. Wesley Turner, Ph.D., a computer scientist in imaging technologies at GE Global Research, emphasized the importance of open source software. David Rollo,

Continued on next page

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M.D., Ph.D., of Philips Medical Systems, called on device manufacturers to adopt interoperable software platforms for their imaging workstations to facilitate the dissemination of image processing algorithms.

As industry leaders discussed the data explosion, a recurring theme was the need for standardization and interoperability. Jeffrey Evelhoch, Ph.D., director of medical sciences imaging at Amgen, had earlier pointed to various barriers to standardized image acquisition, including variations in equipment from different manufacturers, technology changes and differences in protocols followed by different institutions. He advised careful training and monitoring of protocols at different sites. He also stressed the need to keep the image acquisition protocols as simple as possible while still getting the required information.

The culture at cancer centers is not rich with collaboration between radiologists and oncologists. This is something we're trying to change.

Gary J. Becker, M.D.

In recognition of these and other evolving challenges in information technology, RSNA and the Healthcare Information and Management Systems Society established Integrating the Healthcare Enterprise (IHE) in 1998. IHE is an initiative to improve the way computer systems in healthcare share information. It promotes the coordinated use of established information standards to address specific clinical needs.



Collaboration

One other recurring theme of the meeting was the need for radiologists and oncologists to collaborate. "The cul-

ture at cancer centers is not rich with collaboration between radiologists and oncologists," said Gary J. Becker, M.D., branch chief of image-guided intervention at NCI's CIP and an organizer of the meeting. "This is something we're trying to change." One step in

that direction is a new supplemental grant announcement from NCI that is designed to stimulate the creation of Imaging Response Assessment Teams (IRATs) in NCI-designated Cancer Centers. IRATs will be made up of radiologists, imaging scientists and oncologists who will integrate imaging with assessment of response to treatment.

Dr. Becker, who serves as RSNA's board liaison for science, said that he supports the idea of making oncologic imaging an official subspecialty of diagnostic radiology. He noted that cancer has now surpassed heart disease as the leading cause of death in people under age 85. "I firmly believe that it should be a subspecialty," he said. "We're in a different world now." □

Studies Clarify Radiation Therapy Effects on Rectum, Heart

Continued from page 7

disease for women with left-sided versus those with right-sided disease was higher in the patient treated before 1979 but equivalent in the patients treated in the 1980s.

"Our study is certainly encouraging," said co-author Thomas A. Buchholz, M.D., a professor of radiation oncology at M.D. Anderson. "Radiation oncology has always been troubled by early studies comparing radiation after mastectomy, which found that

after 10 years or so, women started to die of heart disease that likely was linked to their radiation treatment."

Dr. Buchholz said this new study, led by Sharon Giordano, M.D., showed that in the 1970s and 1980s, radiation therapy associated heart problems began to fall—most likely as a result of advances in technology and techniques used to deliver radiation. "I'm confident, based on these data and the further improvements that we've made, that the modern breast cancer patient

getting radiation does not have to be concerned about the risk of heart-related death."

He added that the important lesson is that while it's clear that radiation therapy improves the cure rate and survival of breast cancer patients, "Radiation oncologists should understand the advantages of new technology so that cardiac risk can be reduced." □

Performance Measures Essential to Successful Radiology Practice

NOT SCRUTINIZING a radiology practice's performance indicators is like driving a car without a dashboard, according to Pablo R. Ros, M.D., M.P.H., a radiology professor at Harvard Medical School, chief of the Division of Radiology at the Dana-Farber Cancer Institute and executive vice-chairman of the Department of Radiology at Brigham and Women's Hospital.

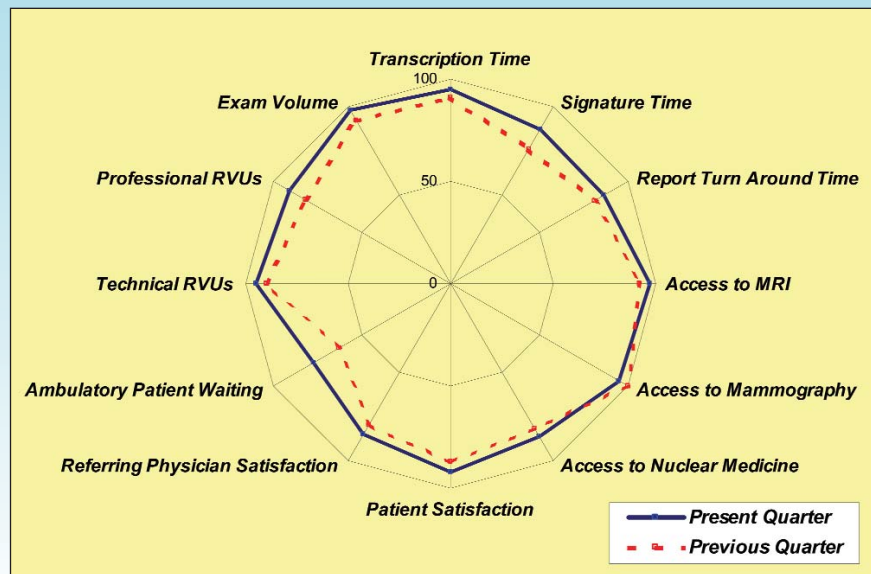
He's convinced that identifying and reviewing the data from performance indicators can help radiologists create a roadmap that effectively leads their practice into the future.

July 29–31, RSNA will host a course in Chicago, "Business Strategies for Radiology Leaders." Dr. Ros will present "Essential Performance Indicators: What You Need to Run Your Practice."

"Expert presenters will offer valuable insights in the areas of financial management, strategic planning, billing compliance, contracts and legal matters," explained course director Lawrence Muroff, M.D., CEO of Imaging Consultants in Tampa. "RSNA took the lead in establishing this course and there's no doubt about the demand for this information in private practice and in academia."

Dr. Ros concurred, saying most radiologists attending business courses have been previously recognized for their scientific and clinical leadership, and now they've become involved in practice management. "They are like I was 20 years ago," Dr. Ros explained. "I never had medical management or business training. At that time, you either had to learn business concepts by going to school and earning an M.B.A. or M.P.H. in healthcare management, or learn

Performance Spiderweb Chart



Graphic courtesy of Pablo R. Ros, M.D., M.P.H.

through trial and error. I think there is a tremendous demand among radiologists for education in these arenas."

Survey of Academic Radiology Departments

Interest in practice economics is part of what motivated Dr. Ros and his research partners to conduct a national survey of U.S. academic radiology departments. The research team, led by Silvia Ondategui-Parra, M.D., M.P.H., M.Sc., published their findings in the December 2004 issue of *Radiology*.

The goal was to find out which management performance indicators were most frequently used in overall assessments. They found that academic radiology departments in the United States do not use a comprehensive set of indicators

to monitor performance, and there is no consistency among departments as to which indicators are used.

"Unlike other industries, such as finance or insurance, where you can observe through standard measures how a business is performing, we sur-

The best way to be efficient and maximize your potential with the resources you have, is to use a meaningful radiology dashboard.

Pablo R. Ros, M.D., M.P.H.

prisingly found that in radiology it is almost a free for all," Dr. Ros explained.

The researchers found that in academic radiology departments, productivity indicators were most frequently used to measure performance; however, comparisons among institutions were difficult because of the lack of uniform measures of productivity.

"One department may use examination volume, while another uses relative

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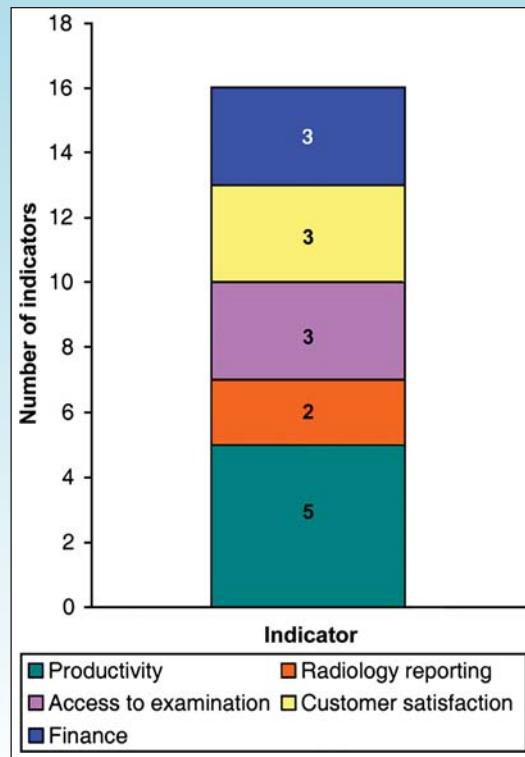
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value units, which take into account the time, complexity and cost of performing a service,” Dr. Ros explained. “Benchmarking efforts within radiology have been slowed by inconsistencies, but I think eventually we will get into a more normalized situation. It’s hard to count volumes because in some departments if you do a CT scan of the chest, abdomen and pelvis on the same patient, it will count as three exams while in another department it will count as one exam.”

Drive Toward Standardized Practice Performance Measures

One of the factors driving the need to collect and standardize information is the new emphasis on department and radiology practice goals. “If you ask heads of radiology departments about their multi-year strategic plans, we are finding not too many chairs are doing them. People are planning at one or two-year vistas and are trying to concentrate on what we are getting for the next fiscal year cycle,” said Dr. Ros. “In some hospitals, this is changing. There is a tendency to require radiologists to have multi-year strategic plans because margins are decreasing as a result of decreasing reimbursements per study. The best way to be efficient and maximize your potential with the resources you have, is to use a meaningful radiology dashboard.”

The “Essential Performance Indicators” session will describe ways successful radiology leaders—in private practice or in hospital-based settings—can convert broad goals into quantifiable metrics. Those measurements are



Bar graph shows main categories of management performance indicators used by academic radiology departments, as well as average number of performance indicators used in each category.

(*Radiology* 2004;233:716-722) © 2004 RSNA. All rights reserved. Printed with permission.

compiled and examined in ways that provide a window into a practice or department’s activity. Dr. Ros describes graphic representations of the indicators on a circular “spiderweb.” Performance indicators are plotted in points along the circle’s circumference and values are then plotted inside the chart.

Simply connecting the dots provides a visual snapshot of

all the indicators at once and can provide a monthly, quarterly or yearly comparison. Dr. Ros believes such a snapshot supplies vital information to physicians under increasing pressure in both academic and private practice settings. “In radiology, the technology and the economics have become so complicated that the expenses and the busi-

ness risks are high. The competition is such that radiologists have to become involved in the management of their practices.”

Dr. Muroff believes course attendees will have a valuable opportunity to learn budgeting and planning strategies they will use yearly. “The take-away message here is that good medicine and good business can go hand in hand. In fact, you can practice better medicine if you understand the business aspects of your practice.” □



- To learn more about the Business Strategies for Radiology Leaders course, go to www.rsna.org/education/shortcourses/index.html.
- To read the *Radiology* article, “Practice Management Performance Indicators in Academic Radiology Departments,” RSNA members and journal subscribers can go to radiology.rsnaajnl.org/cgi/content/full/233/3/716. The abstract is available to everyone at radiology.rsnaajnl.org/cgi/content/abstract/233/3/716.

Innovation, Practice Patterns Change Refresher Courses for RSNA 2005

JUST AS technologies are changing medical treatment and care, technology and methodology are changing how refresher courses are structured and delivered at the RSNA annual meeting.

Refresher courses are the most popular feature of the annual meeting. Each year, about 300 refresher courses are offered covering traditional and cutting-edge topics in subspecialty areas. At RSNA 2005, there will be 136 new refresher courses, four new refresher course tracks, four new Essentials of Radiology courses and a new case-based review course.

In the past, MR and CT had dedicated course tracks. Beginning this year, courses on these modalities will be folded into tracks organized by organ system. For example, musculoskeletal MR will be included within the musculoskeletal imaging course track.

"The changes in how course content is organized makes them more effective for the attendee," explained RSNA Board Liaison for Education Theresa C. McLoud, M.D. "Individuals will experience learning material that more closely mirrors today's practice."

RSNA Board Liaison-designate for Education George S. Bis-

set, III, M.D., agreed. "This is how people practice medicine today. We have moved away from a modality-based approach. Organ-based imaging should make the refresher courses more



appealing to those in private practice," he said.

"The blending of the MR and CT imaging content into the organ system course track is a pilot initiative that will be carefully assessed to determine its overall effectiveness," said Dr. McLoud.

Prominent Role for MR Imaging

Because new technological advances occur particularly rapidly in the field of MR imaging, a special mini-course at RSNA 2005 will be devoted to

advances in MR technology, pulse sequences and protocols.

Thirty refresher courses reference MR in the title and 64 additional courses include MR as a major portion

of the course curriculum. A new Essentials of Radiology course will focus on abdominal MR.

As with MR, CT topics have been expanded and folded into all of the diagnostic imaging tracks.

"This is the first time so many changes were made to the refresher courses in one year. These important transformations are needed to ensure that attendees maintain their professional excellence," said Robert A. Novelline, M.D., chairman of the RSNA Refresher Course Committee.

Four New Course Tracks

Four new refresher course tracks were developed to address the current educational needs of imaging professionals. The new tracks are cardiac radiology, emerging technologies, radiology education and vascular radiology.

Continued on next page

This is how people practice medicine today. . . . Organ-based imaging will make the refresher courses more appealing to those in private practice.

George S. Bisset, III, M.D.

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“The expanded cardiac track is a response to the increased demand for cardiac imaging,” explained Dr. Novelline. “It will cover the latest in cardiac CT, cardiac MR, coronary artery CT and myocardial infarction imaging with MR, SPECT and PET.”

The emerging technologies track will cover the latest in molecular imaging probes and molecular imaging modalities, as well as covering pertinent topics in molecular biology. “These new courses will allow us to address new and evolving trends in molecular imaging,” said Dr. Bisset.

The radiology education track will include sessions on medical student and radiology resident education, teaching skills, delivering presentations, reviewing manuscripts, continuing medical education, electronic aids and self-assessment.

The vascular track will feature the latest in vascular contrast agents and post-processing techniques for vascular imaging, MR angiography, CT angiography and digital subtraction angiography. It will also include presentations on vascular pathology in adults and children.

Interactivity in Refresher Courses

New maintenance of certification (MOC) requirements by the American Board of Radiology (ABR) were another driver behind the changes in the refresher courses. “RSNA is developing self-assessment modules (SAMs) to help members audit their radiology skills and knowledge base,” said Dr. Bisset. “Some of the refresher courses at RSNA 2005 may include a self-assessment component. Under the ABR MOC requirements, an individual is encouraged to complete at least two SAMs each year.”

The audience response systems (ARS), used in interactive courses, help the instructors tailor their courses to the competency level of the audience. “This year, the number of courses including ARS technology will double to about

15, and all case-based review courses will also include ARS,” said Dr. Novelline. “Instructors will be able to ask the audience questions and then see their answers on a screen. The instructors can then alter the course material based on the responses. Studies have shown that people learn more when they’re involved and get individualized feedback.”

The RSNA 2005-2008 Strategic Plan includes seven primary goals. The first goal is to “Conduct activities to meet the educational and continuing professional development needs of RSNA members.” Among the strategies to achieve that goal are to:

- Apply expertise in adult educational methodologies to maximize learning
- Tailor educational activities to meet the needs of members and allied professionals
- Facilitate continuing professional development and the means for maintenance of certification in collaboration with other societies as appropriate

“Changing and reorganizing the refresher courses help us meet that goal,” explained Dr. McLoud. “The RSNA Board understands that in order to keep up with the rapidly changing applications, technologies and methodologies in radiology, the organization needs to evaluate and update how it provides lifelong learning opportunities to its members.”

A special focus session is planned for RSNA 2005 featuring “best papers” from the International Society for Magnetic Resonance in Medicine (ISMRM) annual meeting held last month in Miami.

ISMRM is also working with RSNA to develop a case-based review

Refresher Course Highlights at RSNA 2005

RSNA2005
Connecting for Lifelong Learning



Four New Course Tracks

- Cardiac
- Emerging Technologies
- Radiology Education
- Vascular

Four New Essentials of Radiology Courses

- Abdominal MR
- Cardiovascular Imaging
- Chest Imaging
- Head and Neck Imaging

The new courses are in addition to four existing Essentials courses—knee imaging, gynecologic pelvic imaging, brain MR and urology.

New Minicourse

Optimizing Body MR Practice—From Safety to Protocol Design

New Case-based Review Course

- Radiation Oncology

The new course is in addition to case-based reviews in neuroradiology, pediatric radiology and interventional radiology.

course in MR that will debut at RSNA 2006.

Refresher Course Enrollment Begins June 20

Advance registration for refresher courses is required, so the earlier you sign up, the better the chances are that

you’ll get the courses you want.

Refresher course enrollment begins June 20. Go to rsna2005.rsna.org and click on the Advance Registration, Housing and Course Enrollment

brochure and follow the directions.

More information on how to register for RSNA 2005 is on page 27.

This year’s annual meeting offers the opportunity to earn up to 83 AMA PRA category 1 CME credits. □





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The product descriptions have been submitted by the publishers.



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BOOK

Report No. 149, A Guide to Mammography and Other Breast Imaging Procedures

This Report is intended to be a practical guide to physicians who interpret mammographic images, technologists who perform mammographic examinations, as well as medical physicists who monitor mammographic facilities, evaluate image quality, and determine radiation dose. Mammography is one of the most difficult radiographic examinations technically. Both specialized equipment and the correct use of that equipment are essential to the achievement of satisfactory results. Facilities should not perform the examination if they are unable or unwilling both to: (1) provide and maintain x-ray equipment, image receptors, film processors, and viewing conditions capable of producing the necessary images at acceptable dose levels; and (2) ensure that the examination is performed with the proper technique factors, patient positioning, and compression. In fact, the implementation of MQSA (1992) has made it illegal for facilities to continue to perform mammography unless these conditions are fulfilled. This Report contains several major sections, a summary, and conclusions, and an extensive bibliography.

RSNA Member Price \$88.00

BOOK

Report No. 147, Structural Shielding Design for Medical X-Ray Imaging Facilities

This Report includes a discussion of the various factors to be considered in the selection of appropriate shielding materials and in the calculation of barrier thicknesses. The Report presents the fundamentals of radiation shielding, discusses "shielding design goals" for "controlled" and "uncon-

trolled" areas in or near x-ray imaging facilities, and defines the relationship of these "goals" to the NCRP effective dose limits for radiation workers and members of the public. The Report includes a detailed discussion of the recommended shielding design methodology for x-ray imaging facilities, and provides an extensive collection of shielding data and sample shielding calculations for various types of x-ray imaging facilities.

The Report is mainly intended for those individuals who specialize in radiation protection. However, it will also be of interest to architects, hospital administrators, and related professionals concerned with the planning of new facilities that use x-rays for medical imaging. 194 pp.

RSNA Member Price \$80.00

BOOK

Report No. 145, Radiation Protection in Dentistry

This Report provides radiation protection guidance for the use of x-rays in dental practice, including advice on shielding design for dental x-ray facilities. It supersedes *NCRP Report No. 35, Dental X-Ray Protection*, which was issued in March 1970.

Dentists who conduct their radiology practices in accordance with the requirements and suggestions in this Report can obtain maximum benefit to the oral health of their patients and minimum radiation exposure to patient, operator and the public. All of the factors addressed in this Report are important and interrelated. Quality practice dictates that none be neglected. The technical factors, including office design and shielding, equipment design, clinical techniques, image receptors, darkroom procedures, and quality assurance are essential. However, the professional skill and judgment of the dentist in prescribing radiologic examinations and interpreting the results are paramount.

Informed consent requires that dental patients be provided with information as to the benefits and risks of dental procedures, including dental radiography. This Report provides the dentist with data on the magnitude of effective doses from typical dental x-ray procedures. General statements are given that can be used to inform the patient about the nature of risks associated with these doses. 191 pp.

RSNA Member Price \$40.00

BOOK

Report No. 133, Radiation Protection for Procedures Performed Outside the Radiology Department

This Report includes five sections, two appendices, a glossary, and references. Section 1 introduces sources of occupational radiation exposure and compares occupational exposures in medicine with other sources of occupational exposure. Section 2 describes radiologic medical procedures that are often performed outside the radiology department and categorizes the procedures according to their potential for occupational exposure. Section 3 addresses conditions that affect potential occupational exposure such as time, distance, shielding, and orientation of radiation source, patient and operator. Section 4 addresses medical personnel monitoring and Section 5 briefly addresses the responsibility of management to provide safe conditions for both employees and patients. Appendix A provides information on the philosophy of radiation protection and the biological effects of medical x-rays. Appendix B describes the x-ray imaging process for various imaging devices. 104 pp.

RSNA Member Price \$24.00

BOOK

Report No. 128, Radionuclide Exposure of the Embryo/Fetus

This Report is designed to provide information on radiation dose to the embryo/fetus from radionuclides in the mother. The Report has 10 sections making up some 92 pages consisting of an introduction, sources of exposure, review of recommendations and regulations regarding exposure of the embryo/fetus, prenatal development, maternal-fetal exchange, prenatal irradiation effects, fetoplacental concentrations and radiation doses, estimation of embryo/fetus dose in radiation protection practice, research needs, and a summary and conclusions. A large part of this Report, 125 pages, provides biological information, fetal/placental information and radiation dose estimates for 83 radionuclides. The Report contains a glossary of terms, 40 pages of references, and an index. 287 pp.

RSNA Member Price \$28.00

BOOK

Report No. 116, Limitation of Exposure to Ionizing Radiation

This Report is the latest in the long series of reports on basic radiation protection criteria that began in 1934. It supersedes the predecessor in the series, *NCRP Report No. 91*, which was published in 1987. The current Report takes advantage of new information, evaluations and thinking that have developed since 1987, particularly the risk estimate formulations set out in *NCRP Report No. 115*. While the recommendations set out in this Report do not constitute a radical revision of the basic criteria, they do represent a refinement of the system enunciated in *Report No. 91*. Important changes include the utilization of revised tissue/organ weighting factors and the introduction of radiation weighting factors. Also noteworthy is the introduction of an allowable reference level of intake. Noteworthy too is the recommendation of an age-based lifetime limit for control of occupational exposures and a major simplification of limits aimed at controlling the exposure of the embryo and fetus. This Report, after outlining the goals and philosophy of radiation protection and the basis for exposure limits, goes on to review, in some detail, absorbed dose, equivalent dose, radiation weighting factors, and effective dose. Committed equivalent dose and committed effective dose are also introduced. Risk estimates for radiation exposure are presented and then the dose limits are enunciated. The Report also covers exposure in excess of the limits, limits for unusual occupational situations, guidance for emergency occupational exposure, and remedial action levels for naturally occurring radiation. 88 pp.

RSNA Member Price \$28.00

BOOK

Report No. 113, Exposure Criteria for Medical Diagnostic Ultrasound: I. Criteria Based on Thermal Mechanisms

This Report is the second in a series treating the use of ultrasound in medicine. The first Report, *NCRP Report No. 74*, provided a comprehensive review of biological effects and mechanisms of action of ultrasound and an analysis of their implications for medical applications. This

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Report follows Report No. 74 with the first set of criteria for medical diagnostic ultrasound exposure—criteria based on thermal mechanisms.

Report No. 113 develops quantitative guidelines based on computed upper limits to the temperature rise produced by ultrasound during medical procedures. From estimates of these upper limits for different acoustical conditions, together with information on the biological consequences of hyperthermia, result in criteria expressed in acoustical parameters. Major sections of the Report cover:

- hyperthermia and life processes
- heat generation by ultrasound in mammalian tissues
- experimental studies of ultrasonically produced temperature elevation and associated biological effects
- the interrelationship of thermal and nonthermal ultrasonic process
- intensity and power needed in diagnostic ultrasound

Appendices to the Report provide background for calculations and information on approximations and assumptions employed in the Report. 278 pp.

RSNA Member Price \$32.00

B O O K

Report No. 105, Radiation Protection for Medical and Allied Health Personnel

This Report is intended to meet the needs generated by the many changes in medical practice and procedures that have occurred since the publication of NCRP Report No. 48. The Report provides information about radiation, its effects on humans, protection against radiation, and regulatory control requirements and is aimed, primarily, at individuals who have limited expertise in radiation protection terminology and principles. The first seven sections of the Report provide, for all readers, general information on radiation and its uses in medicine. A subsequent section provides pertinent job related information for personnel involved with radiation sources, with each subsection addressing individuals in a particular job category. Included are subsections for administrators, animal care personnel, clinical/research laboratory personnel, diagnostic x-ray technologists, escort personnel, housekeeping personnel, maintenance and engineering personnel, in-house fire crews, nuclear medicine technologists, nursing personnel, pathologists/morticians, physicians (nonradiation specialists), radiation therapy technologists, security personnel, shipping and receiving personnel, and ultrasonographers.

Treated in appendices of the Report are emergency procedures, special considerations for patients containing sealed or unsealed therapy sources, definitions, and sources of nonionizing radiation in medical facilities. 129 pp.

RSNA Member Price \$32.00



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B O O K

PACS: A Guide to the Digital Revolution

Keith J. Dreyer, Amit Mehta and James Hunter Thrall

With contributions from leaders in the field of PACS, this user-friendly guide addresses the introductory concepts, computing fundamentals, advanced imaging technologies and future opportunities. This text is geared toward radiologists, technologists, administrators and IT professionals wishing to gain a broader understanding of this emerging field. 408 pp., 122 illus.

RSNA Member Price \$85.50

B O O K

Atlas of Virtual Colonoscopy

Abraham Dachman

Virtual colonoscopy is a rapidly developing technique that promises to be safer, more economical and less intrusive than conventional diagnostic tests for colon cancer. Renowned radiologist Dr. Abraham Dachman and a distinguished list of international contributors have prepared a comprehensive atlas that explains and depicts the entire range of this new technique. The Atlas of Virtual Colonoscopy is a necessary resource for all radiologists and gastroenterologists who desire to learn about VC. 276 pp., 479 illus.

RSNA Member Price \$112.50

C D - R O M

EZTNM for the AJCC Cancer Staging Manual

Frederick L. Greene, Charles M. Balch, Irvin D. Fleming and Fritz April

EZTNM for the AJCC Cancer Staging Manual, 6/e and the AJCC Cancer Staging Handbook, 6/e provide the first physician-designed professional grade cancer staging program for handhelds. EZTNM puts TNM staging for 50 different anatomic sites at the user's fingertips. It is an essential and ground-breaking resource for all healthcare professionals who care for cancer patients.

RSNA Member Price \$35.95

B O O K & C D - R O M

AJCC Cancer Staging Manual

Frederick L. Greene, David L. Page, Irvin D. Fleming, April Fritz, Charles M. Balch, Daniel G. Haller, Monica Morrow

The AJCC Cancer Staging Manual and Handbook, prepared by the American Joint Committee on Cancer, are used by physicians and health care professionals throughout the world to facilitate the uniform description of neoplastic diseases. The staging information in the AJCC is uniform

with the UICC and must be used for all tumors staged as of January 1, 2003. The manual includes 45 staging forms on CD Rom for individual or institutional use. 480 pp., 95 illus., with CD-ROM.

RSNA Member Price \$53.95

Manual Plus EZTNM

480 pp., 95 illus.

RSNA Member Price \$74.45

H A N D B O O K & C D - R O M

AJCC Cancer Staging Handbook

From the AJCC Cancer Staging Manual prepared by the American Joint Committee on Cancer, the Cancer Staging Handbook contains the complete text of the manual, except for the staging forms and CD-ROM, conveniently sized to fit the pocket of a lab coat for complete portability. 408 pp., 37 illus.

RSNA Member Price \$35.95

Handbook Plus EZTNM

408 pp., 37 illus.

RSNA Member Price \$58.45

B O O K

Practical FDG Imaging

A Teaching File

Dominique Delbeke, William H. Martin, James A. Patton and Martin P. Sandler

This is a comprehensive reference of cases with FDG images obtained on dedicated PET tomographs and hybrid scintillation gamma cameras. With over 300 FDG images, this book will serve as an excellent stand-alone guide for nuclear medicine physicians, radiologists, oncologists and residents in their practice of clinical PET. 440 pp., 320 illus.

RSNA Member Price \$116.00

B O O K

Positron Emission Tomography

Basic Science and Clinical Practice

Peter E. Valk, Dale L. Bailey, David Townsend, Michael N. Maisey

This book covers the basic scientific principles and clinical applications of PET in research and medical practice and contains a final section discussing future directions of PET. It will be an invaluable reference resource to advanced research laboratories, clinicians, graduates and advanced trainees general nuclear medicine and radiology practices requiring more in-depth knowledge of the principles of PET. 904 pp., 546 illus.

RSNA Member Price \$152.00

B O O K

PET and PET-CT in Oncology

Peter Oehr, Hans-Jürgen Biersack, and R. Edward Coleman

In clear and straightforward fashion, this book offers instructive information and overviews of the basic principles of PET and PET-CT as well as the routine clinical PET scanning procedures for all important oncological indications. It is designed to serve as a reference work for specialists in nuclear medicine and radiology and for oncologists. It also provides student and physicians in other medical specialties with a general introduction to the effective integration of this modern technique into routine clinical diagnostics. Above all, this volume illustrates the importance of PET and PET-CT in comparison with other

imaging techniques. 350 pp.

RSNA Member Price \$125.00

B O O K

Normal and Abnormal Swallowing Imaging in Diagnosis and Therapy

Second Edition

Bronwyn Jones

This beautifully illustrated volume presents an updated approach to the role of imaging in the diagnosis and treatment of the patient with dysphagia. Centered around the "gold standard" imaging modality, i.e. videofluorography, the text also includes chapters on other modalities such as ultrasound, computed tomography and magnetic resonance imaging. 308 pp., 248 illus.

RSNA Member Price \$143.00

B O O K

PET

Molecular Imaging and Its Biological Applications

Michael E. Phelps

This book is a comprehensive guide to PET and PET CT and serves as a valuable resource for practicing physicians and residents. The text covers topics ranging from the basic principles of physics, molecular assays, preparation of molecular imaging probes and biochemistry relevant for PET. Additionally, clinical applications in cancer, cardiovascular diseases and neurological disorders are thoroughly discussed. 616 pp., 250 illus.

RSNA Member Price \$152.00

B O O K

Atlas of Cross-Sectional and Projective MR Cholangio-Pancreatography

A Teaching File

Lieven van Hoe, Dirk Vanbeckevoort, Werner van Steenberghe

Magnetic resonance cholangio-pancreatography (MRCP) is a novel non-invasive technique for diagnosis of pancreatic-biliary disease. This book highlights the advantages, limitations and indications of MRCP, including specific examples that showcase the utility of this technique in a large variety of clinical conditions. 429 pp., 450 illus.

RSNA Member Price \$89.00



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B O O K

Atlas of Radiologic Anatomy, 7th Edition

Lothar Wicke

This new edition of this classic atlas incorporates the latest technological advances in radiologic anatomy, including increased resolu-

tion and numerous new images in computed tomography and magnetic resonance. It features 232 copies of line drawings that can be placed as transparent overlays on the images for direct identification of the anatomical structures.

Students and healthcare professionals alike will find this authoritative atlas indispensable for its unique balance of historical insight, detailed images and drawings, and techniques for practical application.

Table of Contents:

- Conventional Radiography
- Angiography
- Lymphography
- Gynecologic Radiography
- Sonography
- Computed Tomography (CT)
- Magnetic Resonance Imaging (MRI)
- Scintigraphy

Paperback, 362 pp., 2004

RSNA Member Price \$44.00

BOOK

Atlas of Human Anatomy, Third Edition

The ultimate anatomy atlas for medical study, clinical reference, and patient education, this updated masterpiece offers the power of over 500 precise visual images that teach without an overwhelming amount of confusing text. Chosen by more students for their anatomy coursework than any other human anatomy atlas published today. Paperback, 2003

RSNA Member Price \$55.16

BOOK & CD-ROM

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The ultimate anatomy atlas for medical study, clinical reference, and patient education, this updated masterpiece offers the power of over 500 precise visual images that teach without an overwhelming amount of confusing text. Casebound edition includes the FREE CD (Interactive Atlas of Human Anatomy, v3.0) packaged with the book.

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BOOK

Netter's Atlas of Human Physiology

This new systems-based illustrative atlas of human physiology adds a concise, mechanistic and conceptual description to each Netter illustration—300 in all. These key concepts will serve as a review of the broad, clinical applications to medical, dental, allied health and undergraduate physiology courses.

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Netter's Atlas of Human Neuroscience

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BOOK

Netter's Concise Atlas of Orthopaedic Anatomy

This concise, easy-to-use atlas of orthopedic anatomy utilizes Netter images from both the *Atlas of Human Anatomy* and the 13-volume *Netter Collection of Medical Illustrations*. Each image includes key information on bones, joints, muscles, nerves, and surgical approaches. Each chapter contains clinical material showing trauma, minor procedures, history and physical exam, disorders, and radiology.

RSNA Member Price \$34.80

BOOK

Netter's Obstetrics, Gynecology and Women's Health

This comprehensive clinical guide uses a quick-reference tabular format to present the major diseases and conditions traditionally seen in the practice of obstetrics and gynecology, as well as general medical conditions commonly seen in women. Includes more than 200 topics and over 300 Netter illustrations.

RSNA Member Price \$51.96

BOOK

Netter's Internal Medicine

Designed to help practitioners manage everyday medical problems with confidence and authority, this superior reference is also invaluable to students, residents, and specialists who need quick access to reliable clinical information. Combines over 450 Netter images and the most current knowledge on common diseases/conditions, diagnostics, treatments and protocols into a single, easy-to-use guide.

RSNA Member Price \$67.96

BOOK

Atlas of Palpatory Anatomy of Limbs and Trunk

Serge Tixa

Palpation anatomy is based on the manual inspection of surface forms—a visual and instructive method of investigating anatomic structures. In this new atlas, each structure is shown with a photo and is accompanied by a description of the technique used. Netter illustrations are used to introduce each section of the atlas and highlight key anatomical structural features.

RSNA Member Price \$44.00

BOOK

Netter Anatomy Charts

With 20 charts, and more coming in 2004, this growing series of rich, full-color anatomical charts is based on the same medical art and images found in *Netter's Atlas of Human Anatomy, Third Edition*. They're generously sized at 20" x 26" for easy viewing in a classroom, lab, or exam room wall and laminated for easy cleaning and years of durability. 2003 Single Chart

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CD-ROM

Interactive Head & Neck

Barry Berkovitz, Claudia Kirsch, Bernard J. Moxham, Ghassan Alusi, Tony Cheeseman

Detailed and labeled 3D model of the head and neck that can be rotated and layers of anatomy added or stripped away. 3D model is supplemented by text, MRI, clinical slides, video clips and 3D animations.

RSNA Member Price: \$250.00

CD-ROM

Interactive Spine

Hilali Noordeen, Hazem Elsebaie, Alan Crockard, Robert B. Winter, John Lonstein, Ben Taylor, Roger Soames, Peter Renton, Stewart Tucker, Lester Wilson, Joseph J. Crisco

Detailed and labeled 3D model of the entire spine that can be rotated and layers of anatomy added or stripped away. 3D model is supplemented by text, MRI, clinical slides, video clips and 3D animations.

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CD-ROM

Interactive Shoulder

Stephen Copeland, Louis U. Bigliani, Roger Emery, Andrew Amis, Andrew Chippindale, David W. Stoller

Detailed and labeled 3D model of the shoulder, forearm and elbow that can be rotated and layers of anatomy added or stripped away. 3D model is supplemented by text, MRI, clinical slides, video clips and 3D animations.

RSNA Member Price: \$250.00

CD-ROM

Interactive Hip

Andrew Chippindale, Fares Haddad, Jorge Gallante, Marchi Maheson, Sarah Muirhead-Allwood, Edmund Chao, David W. Stoller

Detailed and labeled 3D model of the hip joint and upper leg that can be rotated and layers of anatomy added or stripped away. 3D model is supplemented by text, MRI, clinical slides, video clips and 3D animations.

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Interactive Knee

Paul Aichroth, Vishy Mahadevan, Justin M. Harris, David W. Stoller

Detailed and labeled 3D model of the knee that can be rotated and layers of anatomy added or stripped away. 3D model is supplemented by text, MRI, clinical slides, video clips and 3D animations.

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CD-ROM

Interactive Foot & Ankle

Vishy Mahadevan, Robert Anderson, Lloyd Williams, Penny Renwick, David W. Stoller

3D model of the foot and ankle that can be rotated and layers of anatomy added or stripped away. 3D

model is supplemented by text, MRI, clinical slides, video clips and 3D animations.

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Interactive Hand

D.A. McGrouther, Judy C. Colditz, Justin M. Harris, David W. Stoller

3D model of the hand, wrist, forearm and elbow that can be rotated and layers of anatomy added or stripped away. 3D model is supplemented by text, MRI, clinical slides, video clips and 3D animations.

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Sports Injuries: The Knee

Paul Aichroth, Roger Wolman, Tracy Maunder, Andrew Amis, Anthony Bull

3D model of the knee that can be rotated and layers of anatomy added or stripped away. 3D model is supplemented by sports injuries, rehabilitation and biomechanics text, clinical slides, video clips and 3D animations.

RSNA Member Price: \$250.00

CD-ROM

Orthopaedics In Action:

Primary Hip Arthroplasty

T.W.R. Briggs, M.Ch. (Orth) FRCS, Consultant Orthopaed, S.R. Cannon, J. Skinner

3D model of the hip that can be rotated and layers of anatomy added or stripped away. It covers all aspects required for primary Total Hip Arthroplasty, from patients first visit to out-patients clinic through pre-operative planning phase and the surgical procedure itself, utilizing both lateral and posterior approaches. Descriptive text is supplemented by live surgery video clips and 3D animations.

RSNA Member Price: \$250.00

CD-ROM

Interactive Spine Chiropractic Edition

Alexandra Webb, Guy Gosselin, Jonathan Cook, Dana J. Lawrence, Roger Soames

Detailed and labeled 3D model of the entire spine that can be rotated and layers of anatomy added or stripped away. 3D model is supplemented by chiropractic examination, conditions and treatment sections including text, clinical slides, video clips of tests and treatment.

RSNA Member Price: \$250.00



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BOOK

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Daniel Johnson

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Continued on next page

Continued from previous page

imaging cases offered by competing texts, this reference stands as the foremost guide to common diseases and radiographic presentations found within the gastrointestinal tract—authoritatively covering the entire range of gastrointestinal diseases to include conditions affecting the esophagus, stomach, duodenum, small bowel, colon, liver, biliary tree, gallbladder, pancreas, spleen, peritoneum, and mesentery.

RSNA Member Price: \$89.95

BOOK

Imaging in Oncology

Janet Husband

Imaging in Oncology, Second Edition, presents an extensively referenced, evidence-based analysis of the role of imaging in planning treatment. Emphasizing image interpretation for tumor staging and follow-up, the editors and their handpicked panel for chapter authors explore the advantages and limitations of all relevant imaging modalities including ultrasound, CT, MRI, PET/CT, and other nuclear medicine techniques.

RSNA Member Price: \$445.50

BOOK

Bioelectromagnetic Medicine

Paul Rosch

This 50-chapter volume emphasizes cutting edge breakthroughs in disorders ranging from cancer, coronary disease and obesity to neuropsychiatric disturbances, including Parkinson's disease; epilepsy; multiple sclerosis; tinnitus; macular degeneration; migraine; musculoskeletal pain syndromes; depression; insomnia; and anxiety.

RSNA Member Price: \$179.95



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NEWSLETTER

The RBMA Bulletin

Your premier resource when it comes to radiology education. *The RBMA Bulletin* includes featured stories written by industry professionals as well as pertinent articles on practice management, compliance issues and legislation, HIPAA and ACR updates. You will also find up-to-date information on RBMA educational seminars, conferences, networking opportunities and products. Published six times per year.

RSNA Member Price: \$90.00

BOOK

The HIPAA Workbook for Privacy and Security

The HIPAA Workbook for Privacy and Security: A Radiology Guide to Implementation of the Health Insurance Portability and Accountability Act is a radiology-specific guide to implementing the HIPAA Privacy and Security Standards that includes sample policies and procedures, consent and authorization forms, sample business associate and chain of trust agreements, planning and implementation guidelines, and much more.

RSNA Member Price: \$995.00



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JOURNAL

International Medical Devices (IMD)

International Medical Devices (IMD) furnishes China's healthcare field with vital information on the latest developments in this vibrant industry. IMD is distributed to general and military hospitals across China. It is supported by the Department of Pharmaceutical Administration of State Economic and Trade Commission and the Bureau of Drugs and Medical Instruments of Health Department of General Logistics Department of the PLA, etc. (12 issues)

RSNA Member Price \$58.80

JOURNAL

Conventional Clinical Equipment (CCE)

Conventional Clinical Equipment (CCE), launched in 2002, provides vital information on conventional medical equipment to serve the needs of small- and medium-size hospitals in China. With innovated friendly design, the magazine reports the latest development directions and technological advancements of various medical devices. (6 issues)

RSNA Member Price: \$29.40

JOURNAL

China Now: Medical Products (CN:MP)

China Now: Medical Products keeps foreign marketers abreast of China's medical device industry developments. It reports on the country's latest policy and regulations, market trends, technologies, products and other relevant information. (Spring & Autumn issues)

RSNA Member Price: \$14.00



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BOOK & CD-ROM

Intensity-Modulated Radiation Therapy: The State of the Art

Jatinder Palta and T. Rockwell Mackie, eds.

Presents a snapshot of the current IMRT planning and delivery technology. Discusses issues that confront safe implementation of IMRT and encourages reflection on its future. A "handbook" that will aid both experienced radiation oncology physicists and newcomers to the field.

RSNA Member Price \$80.00

BOOK

The Expanding Role of Medical Physics in Diagnostic Imaging

G. Donald Frey and Perry Sprawls, eds.

Provides a broad-based review of the status of radiographic and fluoroscopic imaging and emphasizes the expanding functions that medical physicists are providing in the transition from the traditional imaging environment to the fully digital imaging environment. 583 pp.

RSNA Member Price \$60.00

BOOK

Practical Digital Imaging and PACS

Anthony Seibert, Larry Filipow and Katherine Andriole, eds.

Emphasizes the new advances in imaging technology, covering all of the inherently digital imaging modalities such as computed radiography, CT, MRI, ultrasound and nuclear medicine. 577 pp.

RSNA Member Price \$50.00

BOOK

General Practice of Radiation Oncology Physics in the 21st Century

Almon Shiu and David Mellenberg, eds.

Includes specifications, performance expectations, quality-assurance testing, works-in-progress/ futures and general philosophies and is designed to enable readers to begin the implementation of these technologies at their facilities. 368 pp.

RSNA Member Price \$60.00

BOOK

Accreditation Programs and the Medical Physicist

Robert Dixon, Priscilla Butler and Wlad Sobol, eds.

Provides a broad overview of the accreditation programs currently avail-

able, as well as some programs in development. Illustrates the physical principles related to an image and what is required to provide acceptable images. 364 pp.

RSNA Member Price \$65.00

BOOK

Intravascular Brachytherapy / Fluoroscopically Guided Interventions

Stephen Butler, Rosanna Chan, Thomas Shope, eds.

Explores the techniques involved in the use of fluoroscopic guidance in minimally invasive therapeutic procedures, using intravascular brachytherapy as an example of such a procedure. 930 pp.

RSNA Member Price \$95.00

BOOK

Biological & Physical Basis of IMRT & Tomotherapy

Bhudatt Paliwal, et al., eds.

Presents the current status of the biological, physical/technical and clinical aspects of volume effects on time, dose and fractionation schemes for radiation treatment of cancer patients and the several parametric models (Both explanatory and predictive) of the effects thereof, with regard to optimization of treatment planning. 390 pp.

RSNA Member Price \$80.00

BOOK

Recent Developments in Accurate Radiation Dosimetry

Jan Seuntjens and Paul Mobit, eds.

The dramatic advances in absorbed-dose-to-water standards and in Monte Carlo ion chamber response calculations that have been made in the last 10 years and their application in accurate radiation dosimetry are summarized. 365 pp.

RSNA Member Price \$70.00

BOOK

Clinical Ultrasound Physics: Workbook for Physicists, Residents, and Students

James Koffer Jr., et al.

An instructor's manual to assist physicists in teaching ultrasound physics concepts to non-physics personnel (residents, sonographers, graduate students, etc.) 85 pp.

RSNA Member Price \$40.00

BOOK

Nuclear Medicine Instrumentation Laboratory Exercises for Radiology Residency Training

R.J. Van Tuinen, et al.

These exercises provide residents with insight into each instrument, its capabilities and limitations and the value of quality control testing. 88 pp.

RSNA Member Price \$30.00

Journal Highlights

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

Multi-Detector Row CT Systems and Image-Reconstruction Techniques

A MILESTONE in the evolution of computed tomography came in 1998 when the major manufacturers introduced multi-detector row CT (MDCT). **Radiology**

MDCT allows substantial reduction in examination time for standard protocols, coverage of extended anatomic volumes, and, most important, substantially increased longitudinal resolution by means of reduced section width.

In a special review article in the June issue of *Radiology* (rsna.org/radiologyjnl), Thomas G. Flohr, Ph.D., from Siemens Medical Solutions in Forchheim, Germany, and colleagues discuss:

- General technical principles of MDCT
- Most recent 16-section scanners

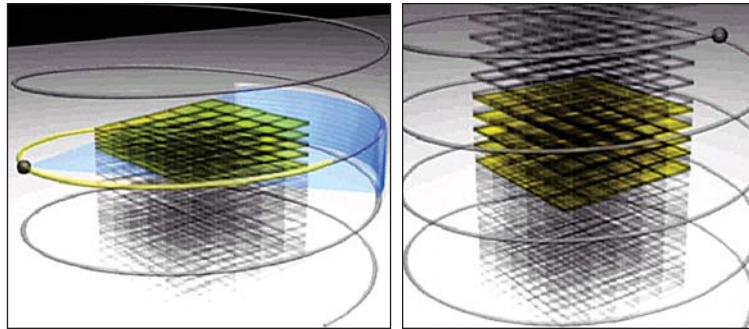


Illustration of adaptive multiplanar reformation approach.

(left) First, multisection spiral CT data are used to reconstruct several partial images on double-oblique image planes, which are individually adapted to the spiral path. Partial images fan out like pages of a book. (right) Second, final images with full dose utilization are calculated with z-axis interpolation between tilted partial image planes.

(*Radiology* 2005;235:756-773) © 2005 RSNA. All rights reserved. Printed with permission.

- Future generations of MDCT systems
- Patient radiation exposure
- Evolution of spiral CT

Clinical examples are used to demonstrate both the potential and the

limitations of the different scanner types.

The article also includes “Essentials” or highlighted points to help busy readers recognize important information at a glance.

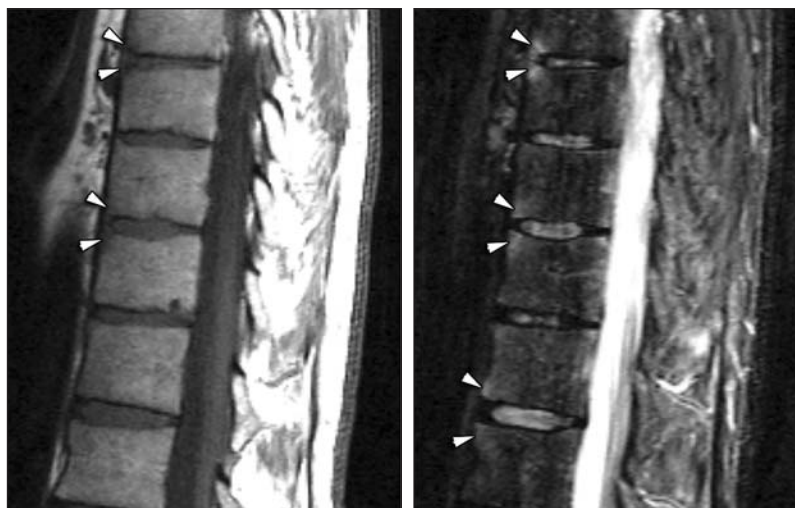
Spinal Changes in Patients with Spondyloarthritis: Comparison of MR Imaging and Radiographic Appearances

THE RECENT availability and effectiveness of tumor necrosis factor (TNF) α inhibitors for treating spondyloarthritis have resulted in referring rheumatologists requesting sensitive visualization of inflammatory changes of the entire spine. **RadioGraphics**

Because changes in spondyloarthritis may be very subtle, the proper MR imaging protocol is very important.

In a review article in the May-June issue of *RadioGraphics* (rsna.org/radiographics), Kay-Geert A. Hermann, M.D., from the Charité Medical School in

Continued on next page



Spondylitis (active Romanus lesions) in a 34-year-old patient with ankylosing spondylitis.

Sagittal T1-weighted turbo spin-echo (a) and STIR (b) images of the thoracic spine show florid Romanus lesions (anterior spondylitis) at T6-7, T8-9, and T10-11 (arrowheads). The lesions are seen at the anterior vertebral edges as a circumscribed increase in signal intensity on the STIR image and a decrease in signal intensity on the T1-weighted image.

(*RadioGraphics* 2005;25:559-570) © 2005 RSNA. All rights reserved. Printed with permission.

Radiology in Public Focus

A press release has been sent to the medical news media for the following article appearing in the June issue of *Radiology* (rsna.org/radiologyjnl):

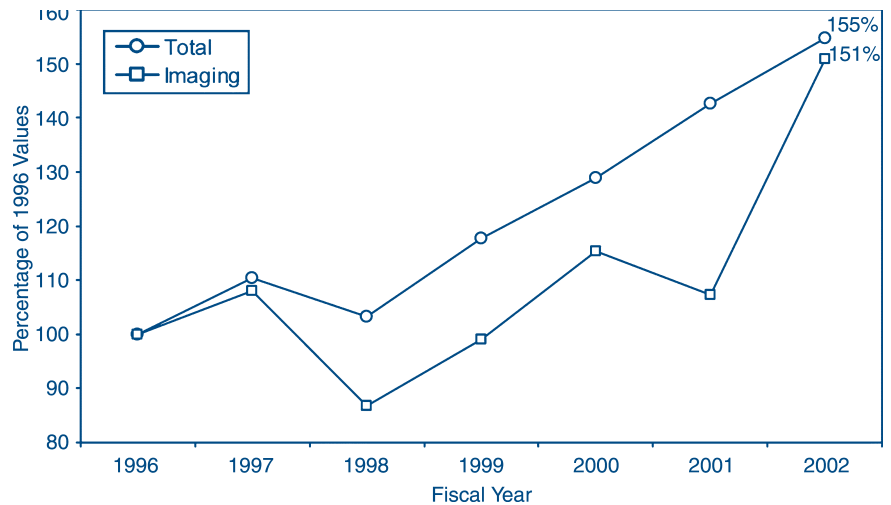
Diagnostic Imaging Costs: Are They Driving Up the Costs of Hospital Care?

UTILIZATION of inpatient CT, MR imaging and other imaging technologies has increased substantially over the past few years, but diagnostic imaging does not appear to be the catalyst behind the crisis in healthcare costs. In fact, for every \$100 spent on inpatient diagnostic imaging, hospitalization was reduced by about six hours.

Molly T. Beinfeld, M.P.H., and G. Scott Gazelle, M.D., M.P.H., Ph.D., from Massachusetts General Hospital (MGH) and Harvard Medical School in Boston, retrospectively studied data on patients admitted to MGH between 1996 and 2002.

In that time period, they found total costs increased an average of 7.8 percent per year while imaging costs increased 8.3 percent per year.

"Despite substantial increases in utilization of inpatient CT, MR imag-



Graph depicts total hospital and inpatient imaging costs at MGH, according to fiscal year for years 1996 through 2002. All costs are presented relative to 1996 levels (i.e., 1996 levels are set to 100 percent). In 2002, total hospital costs were 55 percent higher than they were in 1996 and inpatient imaging costs were 51 percent higher than they were in 1996.

(*Radiology* 2005;235:934-939) © 2005 RSNA. All rights reserved. Printed with permission.

ing, and other imaging technologies, diagnostic imaging costs increased at approximately the same rate as did total costs for inpatients with several diagnoses. CT and MR imaging do not

appear to be driving the cost increases seen between 1996 and 2002," they concluded.



RSNA press releases are available at RSNA.org/media.

Spinal Changes in Patients with Spondyloarthritis

Continued from previous page

Berlin, and colleagues describe the typical MR imaging features of inflammatory lesions in ankylosing spondylitis and other spondyloarthritis and compare them with radiographic findings.

They also discuss:

- Suitable MR imaging protocol
- Various inflammatory changes of the spine
- Role of MR imaging and conventional radiography in depicting different findings of seronegative spondyloarthritis

A commentary by Betty J. Manaster, M.D., Ph.D., is also available.

This article meets the criteria for 1.0 CME credit.

Media Coverage of Radiology

In April, 118 print, broadcast and online media outlets carried news stories generated from articles appearing in *Radiology*. These stories reached an estimated 90 million people.

Highlights included NBC national syndication about staffing shortages at community mammography facilities (*Radiology* 2005; 235:391-395) and a brief article in the May issue of *Health* magazine about the costs associated with whole-body

CT screening (*Radiology* 2005;234:415-422).

Other notable coverage was included in the *New York Daily News*, *Newsday*, *Orlando Sentinel*, *Fort Worth Star-Telegram*, *St. Petersburg Times*, *Hartford Courant*, *New York Sun*, National Public Radio, United Press International, Reuters,

Discovery Health, Ivanhoe Broadcast News, Yahoo! News, *ABC-News.com*, *Forbes.com*, *Kiplinger.com* and Medscape.



Working For You

Radiology Program Directors

RSNA is working with radiology program directors to make sure that all first-year residents take advantage of free membership in RSNA. A sampling of RSNA journals and some membership applications will be sent to the program directors.

Residents who submit a completed application by

August 15 will receive three complimentary print copies of *Radiology* (October, November and December 2005, and two complimentary issues of *RadioGraphics* (September-October and November-December 2005).

For more information or membership applications, go to RSNA.org/mbrapp.

Fellows, Where Are You?

Fellows are also entitled to free membership in RSNA. Letters have been sent to all residents, who completed their training this spring, requesting that they provide RSNA with their updated contact information to keep their membership current.

Fellows are eligible for free admission, with advance registration, to the RSNA annual meeting, as well as free online access to *Radiology* and *RadioGraphics*.

You can update your information by e-mail at membership@rsna.org or by phone at (877) RSNA-MEM [776-2636].

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(Standing, from left) Cara Cernick, M.B.A., Maureen Morley, Patrick Williamson, Adam Indyk, Doug Dusik and Heather Babiar. (Seated, from left) Robert Zak, Natalie Boden, Assistant Director, Joseph A. Taylor, Director, Marijo Millette Zerfoss

RSNA Marketing & Communications

UNDER THE leadership of Joseph A. Taylor, the Marketing & Communications Department contributes to RSNA's overall success by communicating the Society's mission, values, programs and activities; promoting the benefits of membership; and increasing public awareness about radiology.

Working for you DEPARTMENT PROFILE

The department comprises four main areas: member communications (*RSNA News*, *RSNA Annual Report*, etc.), direct marketing (annual meeting registration, R&E Foundation annual appeal, etc.), media relations (press releases for *Radiology* and the annual meeting, etc.) and public outreach (*RadiologyInfo.org*,

public service announcements, etc.).

Each area has distinct responsibilities and objectives, and works collaboratively with others to achieve success.

The department reports to RSNA Assistant Executive Director Roberta E. Arnold, M.A., M.H.P.E.

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

Curiosity about Lung Function Inspires RSNA Research Scholar

DAVID L. Levin, M.D., Ph.D., describes his life and experience with his 2000 RSNA Research Scholar Grant in the same terms physicists use to describe the movement of subatomic particles—“a random walk”—referring to chaotic movement that can appear well-ordered when viewed from a distance.

This month, Dr. Levin became an associate professor of radiology at the University of California, San Diego (UCSD). He earned his joint M.D., Ph.D., in the Medical Scientists Training Program at UCSD. He completed the Radiology Scholars Program and a thoracic imaging fellowship at the University of California, San Francisco before working as a clinical instructor at Harvard's Beth Israel Deaconess Medical Center in Boston. In 1999, he returned to UCSD.

While at Beth Israel, Dr. Levin participated in research projects using MR perfusion imaging techniques to evaluate pulmonary function. It was this work that he set out to refine and expand using his RSNA research grant.

“I have always been interested in finding out how the lung works,” said Dr. Levin. “I thought it would be fascinating to apply radiology methods to look at how the lungs function rather than just looking at their structure.”

Blood flow and ventilation are the two key factors that define pulmonary function, according to Dr. Levin. It's how the blood flow and ventilation are distributed that determines how well the lung works for sick patients, as well as for healthy patients who are exposed to conditions such as exercise and altitude.

MR imaging previously had been limited in evaluations of this sort, but advances in hardware design and imag-

ing sequences have improved screening to the point where it can now be used to evaluate pulmonary perfusion.

He began work on five research objectives that he hoped would allow him to develop a replacement for lung assessment techniques that had not been updated since the 1950s and 1960s.

His objectives were to:

1. Use existing MR sequences to evaluate pulmonary perfusion in healthy volunteers
2. Improve methods of data analysis and quantification of regional perfusion
3. Verify independently measures of regional perfusion in an animal model
4. Use existing MR sequences to evaluate alterations in pulmonary perfusion in patients with disease states
5. Develop new sequences to allow for multislice coverage with improved spatial and temporal resolution

But there was a problem. “We began working on objectives 1 through 4 and quickly realized that we simply couldn't complete them until we had undertaken objective 5, which was to completely redefine how we were going to evaluate the lung,” explained Dr. Levin. “The traditional methods we had immediately available were limited and simply would not allow us to answer the questions we felt were important from a physiology and pathophysiology standpoint.”

Consequently, Dr. Levin spent most of the RSNA cycle pursuing objective 5 by outlining what the team needed to know and then successfully developing the necessary assessment technique.

“Starting at 5 was not what I had envisioned,” he said laughing. “I often look at other people's research and think, ‘Wow, theirs was this nice, logical progression that worked out exactly



David L. Levin, M.D., Ph.D.
University of California, San Diego

how they anticipated it would and I started with objective 5.”

Nevertheless, his technique was recently used to address a 40-year-old question, “Why are some people prone to high-altitude pulmonary edema while others remain unaffected?”

The theory had been that the potentially fatal illness, which may affect as many as 10 percent of people traveling to high altitudes, was the result of a change in uniformity of blood flow brought on by hypoxia. But there had never been a way to prove it—until now.

Dr. Levin and his UCSD colleague, Susan Hopkins, M.D., Ph.D., identified three groups:

- Those who had been to high altitude for long durations without a problem
- Those who had experienced high-altitude pulmonary edema
- Those who had never traveled to high altitudes

All the subjects were made hypoxic at sea level by inhaling a low-oxygen-

Continued on page 24

Program and Grant Announcements

Business Strategies for Radiology Leaders

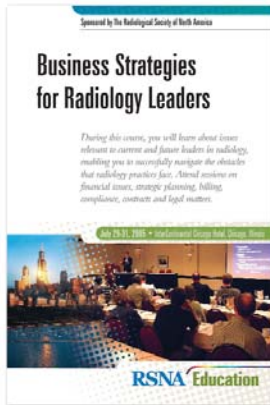
REGISTER ONLINE at RSNA.org/education/shortcourses for this three-day, RSNA course designed for radiologists in leadership positions and for radiology business managers. The course will be held **July 29–31** at the Hotel InterContinental Chicago.

Topics include:

- Strategic Planning
- Radiology Department Budgeting
- Business Infrastructure
- Contracting with Managed Care Entities
- Contracts Between Radiology Groups and Their Group Members and Hospitals
- Turf Battles in Radiology
- Joint Ventures Between Hospitals and Radiology Groups
- Self-Referral in Diagnostic Radiology
- Marketing a Radiology Practice

The course, directed by Lawrence R. Muroff, M.D., also explores obstacles facing today's radiology practices—financial issues, strategic planning, billing, compliance, contracts and legal matters—and ways to successfully navigate these challenges.

For more information, contact the RSNA Education Center at (800) 381-6660 x3747 or at ed-ctr@rsna.org.



21 CME credits available

PowerRAD 2005

RSNA is sponsoring a one-day workshop designed for radiologists, radiologic technologists and support personnel. The course, directed by Paul J. Chang, M.D., will be held on Saturday, **August 13, 2005**, at RSNA Headquarters in Oak Brook, Ill.

During this workshop, attendees will learn to convert analog and digital radiology images into electronic formats for presentations, case files and personal teaching files, and to edit images and text using lecture software. RSNA will provide attendees with the use of a desktop computer.

This course includes:

- Practical hands-on experience and personalized instructions
- Conference material binder
- CD-ROM software

6.25 CME credits available

For more details or to register, go to RSNA.org/education/shortcourses, or contact the RSNA Education Center at (800) 381-6660 x 3747 or at ed-ctr@rsna.org.

Continued on next page



RSNA Teaching and Learning Conference

RSNA hosted a teaching and learning conference in April to discuss the implications of what is currently known about learning and perception in four major spheres in radiology—maintenance of certification, education research, continuing professional development/CME, and self-assessment and assessment by others. The participants were also asked to make recommendations for subsequent RSNA activities, programs and products, based on what was learned during the conference. (clockwise, from left) Gary J. Becker, M.D., Richard B. Gunderman, M.D., Ph.D., and Louise M. Samson, M.D.

Continued from previous page



Molecular Imaging Summit

REPRESENTATIVES from 15 organizations participated in brainstorming sessions on education, definitions of, and a collaborative organizational framework for molecular imaging.

Attendees included radiologists, medical physicists, chemists, nuclear cardiologists, nuclear medicine practitioners and radiopharmaceutical scientists.

The Molecular Imaging

Summit, sponsored by RSNA and the Society of Nuclear Medicine, was held in April in Oak Brook, Ill. A feature article will appear in the July issue of *RSNA News*.

(clockwise, from top left) **Brian C. Lentle, M.D., RSNA; Mathew L. Thakur, Ph.D., Society of Nuclear Medicine; Thomas J. Meade, Ph.D., Society for Molecular Imaging; audience; Philip Alderson, M.D., American Board of Radiology; Johannes Czernin, M.D., Academy of Molecular Imaging.**

Curiosity about Lung Function Inspires RSNA Research Scholar

Continued from page 22

content gas mix to simulate the equivalent of 14,000 feet for 30 minutes. This was just enough time to see if there were changes in the subjects' blood flow without putting them at risk. The technique found the group prone to high altitude pulmonary edema to be the only group where blood flow uniformity changed. Theory proven.

Currently, Dr. Levin and his team are using the technique to tackle objectives 1 through 4. "Now we know what normal blood flow looks like," said Dr. Levin. "But it's not enough to generate an image and to say, 'That looks about normal.' So, we are working on ways to quantify things so that we can more

specifically define what is and is not normal."

"Lung disease is an insidious intruder," according to Dr. Levin, who said that the lungs become symptomatic so late in the disease process that it is often difficult to find treatment options. "Once we know what disease looks like, we can detect problems earlier and begin to look at effects of potential therapies."

Dr. Levin said that while starting with objective 1 might have seemed more logical, his was the right approach. "If I hadn't had the time and flexibility that the RSNA Research Scholar Grant offered, I might have been forced to just stay with the original plan, to use the techniques that

were readily available and to live with their limitations just to get the job done," he said.

During his career, Dr. Levin has received numerous awards and honors.

"David Levin is a unique combination of scholar, researcher and clinician," said George Leopold, M.D., professor and former chair of the UCSD Department of Radiology. "His demeanor with patients and residents makes him a favorite with all at UCSD, and he has become a much sought-after mentor and confidante. If cloning of humans becomes generally available, he will be our first choice."

How's that for a random walk. □



Research & Education Foundation Donors

THE BOARD OF TRUSTEES of the RSNA Research & Education Foundation and its recipients of research and educational grant support gratefully acknowledge the contributions made to the Foundation **March 30 – April 30, 2005.**

For more information on Foundation activities, a quarterly newsletter, *Foundation X-aminer*, is available online at www.rsna.org/research/foundation/newsletters/x-aminer/x-aminer.pdf.

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COMMEMORATIVE GIFTS

Nancy & Robert E. Campbell, M.D.
In memory of Robert G. Parker, M.D.

RSNA MEMBER BENEFITS

Continued from page 21

RadiologyInfo™ Adds New Procedures, Updates Features

INFORMATION on more than 80 diagnostic, interventional and radiation therapy procedures are available on *RadiologyInfo.org*, the patient information Web site cosponsored by RSNA and the American College of Radiology.

Recent additions include:

- Thyroid ultrasound
- Prostate MRI
- Hysterosonography
- Hysterosalpingography
- Cardiac CT for calcium scoring
- Carotid stenting for stroke prevention

The image gallery is also now available from the home page.



Product News

NEW PRODUCT

Upgraded Vascular X-Ray System

TOSHIBA America Medical Systems Inc. (www.medical.toshiba.com) has released exclusive software upgrades (v3.5.1) for the Infinix™-i series vascular and cardiac imaging system to enhance the Vitrea® 2 workstation from Vital Images, Inc. (www.vitalimages.com).

Enhancements include advanced 3D bone fusion angiography and imaging functionalities, such as independent control of window/level in separate volumes, dynamic display of 3D volume relative to positioner projection, and the ability to transfer displayed images from the workstation back to the acquisition system.

play of 3D volume relative to positioner projection, and the ability to transfer displayed images from the workstation back to the acquisition system.

“The new imaging capabilities enabled by the upgrades will not only

improve the image quality of bone and vessels, but also [will] offer visualization tools to assist in surgical planning and improve the overall accuracy of interventional procedures,” said Don Volz, director of Toshiba’s Vascular X-Ray Business Unit.



FDA CLEARANCE

Extended Use for Mammography Workstation

Siemens Medical Solutions (www.medical.siemens.com) has received 510(k) FDA clearance to market MammoReportPlus, a mammography softcopy reporting workstation.

The clearance allows Siemens to further develop diagnostic opportunities when dealing with CAD applications and multi-modality viewing. “In fact, MammoReportPlus can accept CAD images from any approved vendor,” said Michael Monahan, vice-president of



Siemens’ Special Systems Division.

MammoReportPlus is also now Windows®-based, which allows it to run on syngo®—the intuitive software platform from Siemens that delivers powerful networking and post processing capabilities.

NEW PRODUCT

Enhanced Calibration Software

Image Systems Corp. (www.imagesystemcorp.com) has updated its Calibration Feedback System® (CFS) with 10 new features and functions.

CFS enables calibration of medical imaging hardware and software without loss of image quality.

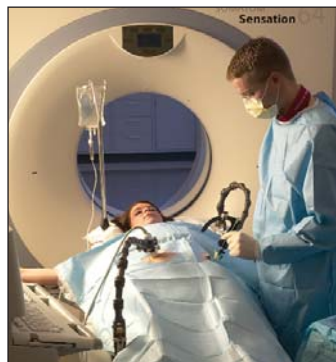
The new features include graphing capabilities, additional options for automatically logging compliance activities, extended options for look-up table creation and use, comprehensive scheduling capabilities, and security measures to aid in HIPAA compliance.

NEW PRODUCT

Stabilizing and Positioning System for US, CT

CIVCO Medical Instruments (www.civco.com) has introduced the CIVCO Assist™ Positioning Arm System for interventional procedures.

CIVCO Assist holds medical instruments in a fixed location for an extended period of time, reducing the risks of repetitive stress injuries, while a physician performs ablations, biopsies or other minimally invasive procedures in the CT or ultrasound environment.



“Image-guidance is a crucial element in interventional radiology,” said Charles Klasson, president and CEO of CIVCO Medical Instruments. “With growing demand for the biopsy of very small lesions and the increased use

of percutaneous ablative therapies, physicians face increased pressure for accuracy of targeting, instrument placement and image-guidance.”

News about RSNA 2005

Refresher Course Enrollment Begins June 20

COURSE ENROLLMENT information for RSNA 2005 will be mailed in mid-June and will also be available online at rsna2005.rsna.org.

Enrollment is required for various components of the meeting, including refresher courses, *infoRAD* workshops, hands-on workshops, investment courses and RSNA tours and events. The new "Interventional Oncology Symposium" program also requires registration.

Request a Printed Copy of the RSNA Meeting Program

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

To request your printed copy, go to rsna2005.rsna.org and click on Meeting Program. Members may also call the RSNA Membership and Subscriptions Department at (877) RSNA-MEM [776-2636] (U.S. and Canada) or (630) 571-7873.

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

The deadline to request a printed copy of the RSNA Meeting Program is September 15. Members who do not exercise this Web option will not receive a printed copy in the mail. The content of the *RSNA Meeting Program* will be available online before, during and after the meeting.

How to Register

There are four ways to register for RSNA 2005:

1 Internet

Go to RSNA.org/register. Use your member ID# from the **INSTANT REGISTRATION** *RSNA News* label or meeting flyer sent to you. If you have questions, send an e-mail to rsna@itsmeetings.com.

2 Fax (24 hours)

(800) 521-6017
(847) 940-2386

3 Telephone

(Monday – Friday,
8:00 a.m.–5:00 p.m. CT)
(800) 650-7018
(847) 940-2155

4 Mail

ITS/RSNA 2004
108 Wilmot Rd.,
Suite 400
Deerfield, IL
60015-5124
USA

International Delegates

Invitation Letters

Personalized invitation letters are available at *RSNA.org* listed under both Annual Meeting and International.

Apply Early for Your Visa!

Visa applicants are advised to apply as soon as they decide to travel to the United States and at least **three to four months** in advance of their travel date. That means international attendees should start the visa process by July or August.

The following Web sites have additional information on applying for a visa:


- www.unitedstatesvisas.gov
- travel.state.gov/visa
- nationalacademies.org/visas

Earn up to 83 AMA PRA category 1 CME credits at RSNA 2005

Registration Fees

BY 11/11	ONSITE	
\$0	\$100	RSNA Member, AAPM Member
\$0	\$0	Member Presenter
\$0	\$0	RSNA Member-in-Training, RSNA Student Member and Technical Student
\$0	\$0	Non-Member Presenter
\$120	\$220	Non-Member Resident/Trainee
\$120	\$220	Radiology Support Personnel
\$570	\$670	Non-Member Radiologist, Physicist or Physician
\$570	\$670	Hospital or Facility Executive, Commercial Research and Development Personnel, Healthcare Consultant, Industry Personnel
\$300	\$300	One-day registration to view only the Technical Exhibits area

For more information about registration at RSNA 2005, visit RSNA.org, e-mail reginfo@rsna.org, or call (800) 381-6660 x7862.



RSNA2005
Connecting for Lifelong Learning

91st Scientific Assembly and Annual Meeting
November 27 – December 2, 2005
McCormick Place, Chicago

Important Dates for RSNA 2005

June 20	Course enrollment opens
Oct. 28	Badge mailing deadline for international registrants
Nov. 7	Final housing deadline
Nov. 11	Advance registration deadline
Nov. 27–Dec. 2	RSNA 91st Scientific Assembly and Annual Meeting

RSNA 2005 Exhibitor News

NEW!

Exhibitors May Benefit from Union Agreement with McCormick Place

CHICAGO'S McCormick Place, home of the RSNA annual meeting, has announced an agreement with labor unions that could lead to lower costs for exhibitors.

Officials of the Metropolitan Pier and Exposition Authority, which owns and operates McCormick Place, said the agreement addresses many of the major categories of concern for exhibitors, such as expanded hours that

unions would be paid straight-time wages and increased flexibility for exhibitors to perform some of their own work. This includes a new rule that allows exhibitors to hang signs and hook up electrical connections without assistance from union personnel.

Mayor Daley called the agreement a start, "We are crawling, and hopefully we will walk and will all run together."

Important Exhibitor Dates for RSNA 2005

June 6	Exhibitor block housing point system initiated Individual exhibitor housing system opens
June 28	Exhibitor Planning/Booth Assignment Meeting
July 5	Technical Exhibitor Service Kit available online
July 6	Block Housing deadline date
July 29	Deadline for reduction/cancellation (for full refund)
August 12	Deadline for final payment Deadline for reduction/cancellation (for partial refund)
August 15	Deadline to submit Block Housing room deposits
August 26	Headquarter Office Space Assignments close
Nov. 4	Exhibitor advance badge request deadline
Nov. 27–Dec. 2	RSNA 91st Scientific Assembly and Annual Meeting

For up-to-date information about technical exhibits, go to rsna2005.rsna.org.

Technical Exhibitor Service Kit

The RSNA 2005 Technical Exhibitor Service Kit will be available beginning July 5 at rsna2005.rsna.org. Click on the Service Kit link in the Technical Exhibition area on the right.

The exhibitor contact will be sent a password to the site to download service request forms and easily find important information such as registra-

tion hours, exhibit installation and dismantling hours, rules and regulations, RSNA forms and official contractor information.

The electronic kit also will allow online ordering capabilities with some contractors.

Advertising at RSNA 2005

Many opportunities exist for companies to promote their exhibit at RSNA 2005—the world's largest annual medical meeting. For more information, go to www.rsna.org/advertising/index.html or contact:

- **Jim Drew**
Director of Advertising
(630) 571-7819
jdrew@rsna.org
- **Judy Kapicak**
Senior Advertising Manager
(630) 571-7818
jkapicak@rsna.org

June Exhibitor Planning Meeting

Booth assignments will be released on June 28 at the Exhibitor Planning Meeting and Luncheon. All exhibitors for RSNA 2005 are invited to attend the meeting at Rosewood Restaurant and Banquets near Chicago's O'Hare International Airport. An e-mail invitation was sent to all confirmed 2005 exhibitors in mid-May.

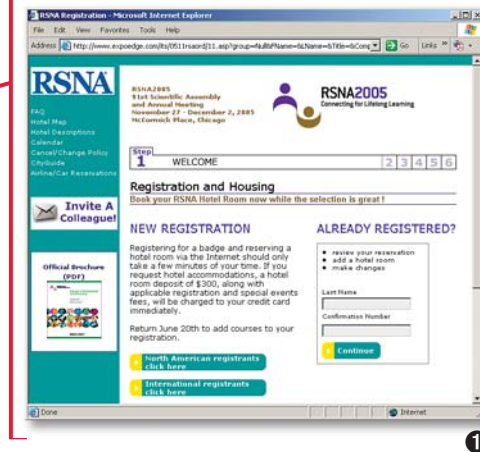
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■ For more information, contact RSNA Technical Exhibits at (800) 381-6660 x7851 or e-mail: exhibits@rsna.org.

RSNA.org



Online registration produces an instant confirmation.

Latest News About RSNA 2005

STAY INFORMED about RSNA 2005 by regularly visiting the annual meeting Web site, rsna2005.rsna.org.

You can register for the meeting ① or see what's new to this year's program ②.

Beginning June 20, you can view the refresher course program and register for courses ③.

The left-hand navigation bar will be updated as we get closer to the meeting to include the *RSNA Meeting Program, Tours & Events, Exhibitor List* and other important information.

Other Web Tutorials Available in *RSNA News*

These tutorials are available in html or PDF format.

How to...

- Update Your Member Profile September 2004
- Use RSNA's Medical Imaging Resource Center November 2004
- Navigate the Education Portal December 2004
- Use the RSNA Membership Directory January 2005
- Register and Use the CME Gateway February 2005
- Renew Your RSNA Membership March 2005
- Access Scientific Posters and Education Exhibits April 2005
- Use RSNA Career Connection May 2005

econnections Your online links to RSNA

RSNA.org
www.rsna.org

Radiology Online
rsna.org/radiologyjnl

Radiology Manuscript Central
rsna.org/radiologyjnl/submit

RadioGraphics Online
rsna.org/radiographics

RSNA News
rsnanews.org

Education Portal
rsna.org/education

CME Credit Repository
rsna.org/cme

CME Gateway
CMEgateway.org

RSNA Medical Imaging Resource Center
rsna.org/mirc

RSNA Career Connections
rsna.org/careers

RadiologyInfo™
RSNA-ACR patient information Web site
radiologyinfo.org

RSNA Press Releases
rsna.org/media

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rsna.org/mbrapp

RSNA Membership Directory
rsna.org/directory

Register for RSNA 2005
rsna.org/register

RSNA 2005
rsna2005.rsna.org

Medical Meetings

July – October 2005

JULY 17–30

Federación Mexicana de Radiología e Imagen (FMRI), National Meeting on Breast Imaging, Acapulco, Mexico • www.fmri.org.mx

JULY 24–28

American Association of Physicists in Medicine (AAPM), 47th Annual Meeting, Washington State Convention and Trade Center, Seattle • www.aapm.org

JULY 29–31

Business Strategies for Radiology Leaders, RSNA, Hotel InterContinental Chicago • www.rsna.org/education/offerings/index.html

AUGUST 1

American Society of Interventional & Therapeutic Neuroradiology (ASITN), 2nd Annual ASITN Course & Workshops, Turtle Bay Resort, Oahu, Hawaii • www.asitn.org

AUGUST 11–14

Clinical Magnetic Resonance Society (CMRS), 2005 Annual Society Meeting, Vail Cascade Resort & Spa, Vail, Colo. • www.cmrs.com

SEPTEMBER 7–10

Society for Molecular Imaging (SMI), 4th Annual Meeting, Gürzenich Congress Center, Cologne, Germany • www.molecularimaging.org

SEPTEMBER 10–14

Cardiovascular and Interventional Society of Europe (CIRSE), Annual Meeting and Postgraduate Course, Nice Acropolis, Nice, France • www.cirse.org

SEPTEMBER 14–17

International Organization for Medical Physics (IOMP), 14th International Conference of Medical Physics, 9th European Congress of Medical Physics, 64th Annual Meeting of the German Society of Medical Physics (DGMP), 39th Annual Meeting of the German Society for Biomedical Engineering, Congress-Center Nürnberg, Germany • www.icmp2005.org

SEPTEMBER 14–17

Sociedad Mexicana de Radiología e Imagen, IV Annual Ultrasound Course, Hotel Sheridan Maria Isabel, Mexico City • www.smri.org.mx

SEPTEMBER 15–17

Journal of the American Medical Association (JAMA), *British Medical Journal (BMJ)*, 5th International Congress on Peer Review and Biomedical Publication, Fairmont Hotel, Chicago • www.jama-peer.org

SEPTEMBER 21–24

American Society of Head and Neck Radiology (ASHNR), 39th Annual Meeting, Renaissance Parc 55 Hotel, San Francisco • www.ashnr.org

SEPTEMBER 21–24

American Society of Emergency Radiology (ASER), Annual Meeting and Postgraduate Course, Westin La Paloma Resort and Spa, Tucson, Ariz. • www.eraad.org

SEPTEMBER 22–24

European Society of Head and Neck Radiology (ESHNR), Annual Congress, Keble College, Oxford, United Kingdom • eshnr2005.org

SEPTEMBER 25–28

European Federation of Societies of Ultrasound in Medicine and Biology, 17th European Congress of Ultrasound, Palexpo Congress & Exhibition Centre, Geneva, Switzerland • www.euroson2005.org

SEPTEMBER 28–OCTOBER 1

International Skeletal Society (ISS), 32nd Annual Refresher Course, Raffles City Shopping and Convention Centre, Singapore • www.iss2005.com

SEPTEMBER 29–OCTOBER 2

Canadian Association of Radiology (CAR), 68th Annual Scientific Meeting, Fairmont Château Lake Louise, Alberta, Canada • www.car.ca

OCTOBER 5–8

II Iberian Forum on Telemedicine: Teleradiology in the Digital Era, Expoveiras, Viseu, Portugal • www.fitelemed.org

NOVEMBER 27–DECEMBER 2

RSNA 2005, 91st Scientific Assembly and Annual Meeting, McCormick Place, Chicago • rsna2005.rsna.org

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