Stem Cells Tracked with MR Imaging

**ALSO INSIDE:**

- Experts Address Breast Density Laws
- Radiology Responds to Tragedies
- Latest Compensation Rates Fluctuate
- Patients Trust RadiologyInfo.org

RSNA 2014 Online Abstract Submission Open
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Top physician compensation specialties 2013 2012 2012-2013
Percentage Change
2011 2010 2011-2013
Percentage Change
2010-2013
Percentage Change
Dollar Change
Cardiology — Cath Lab
(Invasive Interventional) $547,112 $524,731 4.27% $504,099 $484,092 8.53% 13.02% 63,020
Cardiac/Thoracic Surgery $525,944 544,087 -3.33% 532,567 533,084 -1.24% -1.34% -7,141
Orthopedic Surgery 525,000 515,759 1.79% 501,808 500,672 4.62% 4.86% 24,328
Diagnostic Radiology ( Interventional) 504,772 485,277 4.02% 492,102 478,000 2.57% 5.60% 26,772
Diagnostic Radiology (Non-Interventional) 453,216 459,186 -1.30% 461,250 454,205 -1.74% -0.22% -989
Source: American Medical Group Association (AMGA) 20XX Medical Group Compensation and Financial Survey.
ASTRO awarded Gold Awards for Media

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

• Dr. Giaccia is director of the Division of Radiation and Cancer Biology at the University of California. Dr. Aldrich is a professor of radiation physics in Canada. John E. Aldrich, Ph.D., was awarded the Canadian Physical Society’s Gold Medal in Physics, the highest award given by the Canadian Physical Society, for his research on imaging systems and medical treatments.

• Dr. Mohan is a professor of radiation physics at the University of Wisconsin. His research focuses on the development of new imaging technologies.

• Dr. Triprupareni is head of the Division of Radiation Oncology at Scipio Cancer Network in La Jolla, Calif. He currently serves on RSNA’s Public Information Advisory Network.

RSNA Awards Second NIBIB Contract to Support QIBA Activities

RSNA was recently awarded a one- year, $2.4 million contract from the National Institute of Biomedical Imaging and Bioengineering (NIBIB) to support research and development activities associated with quantitative imaging. Planning and design of imaging data infrastructure (DBI) and radiomics, which is the extraction of new information from imaging data, is a key element of the QIBA initiative.

Aldrich Receives COMP Gold Medal

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

2014 RSNA Membership Renewal Underway

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

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

Practitioners can take advantage of RSNA’s group buying option. For more information on the option and/or to renew membership by phone, contact the RSNA Membership Department toll-free at 1-888-RSNA-MEM or at 630-571-9783, or send an email to membership@rsna.org.

In Memoriam

Mutsamasa Takahashi, M.D.

Mutsamasa Takahashi, M.D., one of the world’s most prolific radiologists, died September 16, 2013. Dr. Takahashi served as president of the Japanese Association for Cancer Detection and Diagnosis and was a member of the American Society for Radiation Oncology.

His research focused on the use of computer-aided detection and diagnosis in radiation oncology. He was also a pioneer in the development of computer-aided diagnosis systems for medical imaging.

Takahashi was born in Japan in 1924 and received his medical degree from the University of Tokyo in 1948. He completed his residency in radiation oncology at the University of Tokyo and the University of California, San Francisco, where he served as a professor of radiology from 1973 to 1980. He was the primary editor of 28 books, wrote 85 book chapters, and completed 450 articles in English and 290 articles in Japanese. He was also the editor of three radiology journals.

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

CALL FOR CENTENNIAL ARTICLES FOR RADIOGRAPHICS

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

To encourage more programs to become accredited by the American Board of Radiology, RSNA has increased its funding to support these residencies through the AAPM/RSNA Imaging Physics Residency Grant Funding program.

The requirements for accredited residency programs from the American Board of Radiology go into effect in 2014. Dr. Arenson noted that while there are a number of approved residencies in medical physics, most are for radiation oncology—there are not enough residencies producing physicists for diagnostic radiology. To ensure that there are enough programs to become accredited, the AAPM has revised the requirement for residency training by the ABR. The ABR has implemented a new accreditation system in which programs are evaluated based on the recommendations of the AAPM board several years ago.

A “qualified medical physicist” is defined by the ABR as one who has five years of experience in medical imaging and has completed a training program approved by the AAPM and the ABR. The AAPM has also shifted its focus from accreditation to establishing sustainable new imaging physics education programs.

The AAPM, like RSNA, is committed to making this program a success, said Dr. Hafe. “We very much appreciate the RSNA’s financial and programmatic support in this effort.”

In Remembrance

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The gold medal is the highest award given by COMP and recognizes an active or retired member who has made a significant contribution to medical physics in Canada.
RSNA Board of Directors Report

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

Committee Members, R&E Trustees Appointed
The Board approved appointments to RSNA many committees. The Board is grateful to the hundreds of dedicated volunteers who help RSNA to meet its mission every year.

In the committee appointment process, the RSNA Board aims to maximize volunteer participation in the Society and involve members in training to help ensure that RSNA products, services, programs, and activities meet the needs of trainers now and as they develop professionally.

More than 1,000 members are serving the Society on committees and editorial boards, and as representatives to other organizations.

N. Reed Dunnick, M.D., was appointed to a new RSNA Research & Education Foundation board trustee, and trustees Gregory C. Karnaze, M.D., and Thomas N. McCausland were reappointed. G. Scott Gazelle, M.D., Ph.D., and Dr. Karnaze were appointed as secretary and treasurer, respectively. Burton P. Ross, and Dr. Karnaze were appointed as secretary and treasurer, respectively.

Collaborations Supporting Imaging Physics Residencies, BRAIN Initiative
RSNA has increased its financial commitment to the American Association of Physics Residencies (AAP/RSA Imaging Physics Residencies Grant Funding Program on Page 2).

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

RSNA joined the American Society of Neuroradiology in a statement on the vision of opportunities in the area of brain imaging. RSNA has agreed to be a co-sponsor of the Ad-Hoc RSNA Centennial Planning Committee.

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

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

Watch upcoming issues of RSNA News and the RSNA.org website for more information about centennial activities and how you can get involved.

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

RonalD L. Armenn, M.D. Chairman, 2013 RSNA Board of Directors

The Importance of Radiology Showing Value

This month in the RSNA News Tablet

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

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


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RSNA News

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

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

However, in the outpatient or less critical inpatient settings, we have not done a very good job of demonstrating the essential role that imaging, and more generally, radiology plays in the outcomes for our patients. Some good examples come to mind, in which imaging makes large contributions by detecting and following complications after surgery, and diagnosing and following fractures and pneumonias. In the screening environment, mammography, virtual colonoscopy, lung cancer screening, and cardiac CT are well proven, although their penetration in the U.S. is somewhat variable and not without controversy.

Imaging has increased dramatically over the past couple of decades. In fact, it is the fastest growing category of physician-generated orders, excluding drugs. Imaging is under attack by the government and insurance companies who look for easy targets to reduce the rapid rise in healthcare costs.

Adding to these concerns about the rising cost of imaging, consider the impact of the ever-increasing medical needs of aging baby-boomers on the system, as well as the increasing life expectancy of our population as a whole.

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

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

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

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

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

Soon after the law was passed, Debra Ikeda, M.D., chief of breast imaging and professor of radiology at Stanford University School of Medicine, and colleagues formed the California Breast Density Information Group (CBDIG) to develop a common response framework to help referring physicians, patients and radiologists navigate the new challenges posed by the law. The result of their efforts is a user-friendly, evidence-based website (www.breastdensity.info) that contains flow charts illustrating clinical scenarios that they may encounter while complying with the law in California. (See sidebar.)

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

Legislation Should "Trigger a Discussion"

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

Dr. Lipson and colleagues researched scientific evidence to develop a response to the key elements of the law. Overall, CBDIG recommends an individualized risk-based approach for guiding decision-making. Women with a high risk of breast cancer, such as those with BRCA1 or BRCA2 mutations, are more likely to benefit from additional screening with MR imaging, ultrasound or tomosynthesis. For women with intermediate risk, the decision to have screening MR imaging should be made on a case-by-case basis using a shared decision-making approach, Dr. Lipson said.

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

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

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

Legislation Presents Drawbacks

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

As of October 2013, 12 states have passed similar legislation, while 18 others are considering breast density notification laws. A federal breast density notification law is pending, and the U.S. Food and Drug Administration (FDA) is also considering modifications to national mammography reporting guidelines to include breast density notification.

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

Dr. Cappello stresses that breast density laws are critical to realizing the ultimate goal of women being notified of their breast tissue composition to inform their conversations with healthcare providers about their personal screening surveillance,” and says no roadblock will stop her from getting this critical health information out to women.

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

Despite the challenges, there is consensus among patients and patient advocates that these laws are a "win-win" for everyone involved. "I've had more questions from healthcare providers about supplementary screening than I have from patients," said Dr. Harvey, a presenter of the RSNA 2013 Special Interest Session: Breast Density: Risk Assessment, Communication, and Approaches to Supplemental Imaging. "But I believe patients have a right to this information. I think it gets to the issue of trust between a patient and physician regarding decision making."

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

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

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

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

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

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

“Our solution was to give an iron oxide supplement to the stem cell donor intravenously before harvesting,” said Dr. Daldrup-Link.

After transplanting the labeled stem cells into cartilage defects in the knees of seven rats, researchers performed MR imaging to track the cells for up to four weeks. Microscopic examination confirmed the presence of iron in the labeled transplants and showed evidence that repair was underway in the damaged joints. In vivo labeling not only eliminates the risk of contamination from ex vivo labeling procedures, but also provides more immediate feedback on the status of the cells.

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

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

MR Imaging Plays Pivotal Role in Stem Cell Tracking

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

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

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

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

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

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**ON THE COVER**

Confoocal image of ferumoxytol labeled cells (ferumoxytol had been conjugated with green fluorescent fluorocyan isothiocyanate (PTTC)).

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**Left: MR image of ferumoxytol labeled stem cells implanted in a rat cartilage defect model; right: the dark transplant shows the labeled cells (arrows show the location of the implanted cells).**
Radiology becomes ‘nerve center’ during tragedies

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

“Radiology plays such an integral role in the work up and treatment of trauma patients,” said Mark Wilson, M.D., professor and chief of radiology at San Francisco General Hospital, who was on duty in the aftermath of the Asiana Airlines disaster at San Francisco International Airport on July 6, 2013. “That really came to light here.”

That day, Dr. Wilson was visiting friends in Lake Tahoe and decided to make a 5½-hour dash back to San Francisco after learning of the crash. By the time he got to the hospital, the first wave of victims had already gone through the emergency department (ED). Along with Dr. Wilson, four other attending radiologists were on-site along with three residents and a number of radiologic supervisors and technologists, making it possible for the department to scale up to handle the initial wave of 53 patients and crew brought to the hospital’s trauma center that day.

The big questions, Dr. Wilson said, became: “What do we do with the patients after they are imaged? How do we triage them? How do we decide who needs to go to the ED?” Those decisions were complicated by the fact that trauma physicians were chasing down radiologists to review imaging findings in person.

“With inspiration hit: Why not make the radiology reading room the nerve center for reviewing patient imaging and clinical data? So, at around 5 p.m. that day, radiologists, trauma team physicians representing the ED, trauma surgery, neuroradiology, neurology, pediatricians and orthopedists, as well as several high-level nurses, gathered around a PACS station and began reviewing imaging and clinical data for each patient. Every patient was reviewed by each of the attending radiologists at that time.

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

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

The approach was so successful it will be codified as an ongoing activity. “Our goal is to utilize all the best imaging center we can,” Dr. Wilson said. “We will keep the best imaging center to free up capacity.”

Radiology Plays Such an Integral Role in Decision Making.

To a large extent the ED was waiting for our reads on these patients so they could determine how to triage them.

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

James P. Borgstede, M.D.

HURRICANE SANDY “VICTIMIZES” NY RADIOLoGY DEPARTMENT

While catastrophes can demonstrate the key role radiology plays in emergencies, disasters can also end up damaging radiology departments. That happened last October in New York when the impact of Hurricane Sandy caused NYU Langone Medical Center’s imaging department to lose access to millions of dollars in imaging equipment and supplies. The first order of business was to get imaging services back up and running as quickly as possible, so in the days after the hurricane, staff worked feverishly to recover and move imaging equipment and supplies into temporary spaces, said Michael Recht, M.D., chair of the medical center’s radiology department.

Within days, outpatient ultrasound services were available in a building four blocks from the main hospital previously used for offices and research. Radiologists were also able to use MR scanners reserved for dedicated research for clinical purposes. “Our first response was to get imaging services back up and running so we could serve patients,” Dr. Recht said.

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

“What we need to do now is build the best imaging center we can,” he said. “Our goal is to utilize all the resources we have.”

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

Of the 30 specialties surveyed for the 2013 American Medical Group Association (AMGA) 26th Annual Medical Group Compensation and Financial Survey, more than 60 percent experienced compensation increases from 2011 to 2012. Nevertheless, the overall weight averaged 1.6 percent marked the third consecutive year salaries increased below the approximate 5 percent average threshold, according to AMGA.

AMGA mailed the survey questionnaire to medical groups across the country in January 2013 and received responses from 289 groups representing more than 67,000 providers.

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

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

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

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

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

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

Overall Flatness in Compensation Continues in 2012

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

The troubled U.S. economy and uncertainty in payment reform models continued to be a factor in keeping overall compensation increases below the approximate 5 percent average, which historically tracks at or slightly above the overall inflationary index, Vaudrey added.

“Overall we’re seeing a relative flattening in compensation rates,” Vaudrey said. “In some cases we’re seeing decreases, but overall we’re anticipating a low-single digit increase for the next year or two. We’re not going to see significant jumps overall, but we will see more in some specialties.”

Cardio lab cardiologists outpaced cardiac/thoracic surgeons by Medicare and nearly all health maintenance organizations.

To P Physician RVUs

<table>
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<tr>
<th>Specialties</th>
<th>2012</th>
<th>2013</th>
<th>Percentage Change</th>
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<tr>
<td>Cardiology — Cath Lab (Non-Interventional)</td>
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<td>-1.30%</td>
<td>$2,965</td>
<td>461,250</td>
<td>454,205</td>
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<tr>
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<td>504,772</td>
<td>500,672</td>
<td>-1.74%</td>
<td>$25,360</td>
<td>492,102</td>
<td>478,000</td>
<td>-2.57%</td>
<td>$14,102</td>
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<tr>
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<td>459,186</td>
<td>459,186</td>
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<td>$0</td>
<td>461,250</td>
<td>454,205</td>
<td>-1.74%</td>
<td>$7,050</td>
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<td>Gastroenterology</td>
<td>7,992</td>
<td>8,356</td>
<td>4.72%</td>
<td>$3,644</td>
<td>7,992</td>
<td>8,356</td>
<td>4.72%</td>
<td>$3,644</td>
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<tr>
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<td>4.72%</td>
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<td>7,992</td>
<td>8,356</td>
<td>4.72%</td>
<td>$3,644</td>
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<tr>
<td>Orthopedic Surgery</td>
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<tr>
<td>Orthopedic Surgery (Interventional)</td>
<td>501,808</td>
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<td>-0.22%</td>
<td>$1,136</td>
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<td>$14,102</td>
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<td>Radiology Continues Downward Trend in RVUs</td>
<td>Relative Value Units are a measure of physician output based on the value assigned to each Current Procedural Terminology (CPT) code through the resource-based relative value scale used partially</td>
<td>829,296</td>
<td>829,296</td>
<td>-0.00%</td>
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Over two years (2010 and 2012), the survey shows a downward trend in work RVUs for both diagnostic (-2 percent) and interventional (-7.5 percent) radiology. Experts believe this could be related to the recent CMS Medicare Fee Schedule guidelines lowering fees for multiple studies provided to the same patient by the same physician during a single health-care visit and for imaging contiguous body parts in the same session.

“The CMS change has affected radiology to a great degree,” said David Youssef, M.D., M.B.A., a professor in the Department of Radiology, vice-chair of program development and director of neuroradiology at Johns Hopkins Hospital in Baltimore, and a nationally recognized expert on radiology economics.

“RVUs are down because of the new way they are calculated. When radiologists conduct a chest and abdomen exam, the second study only gets credited for 50 percent of the RVUs, as opposed to the previous rate of 100 percent.”

Overall Compensation Increases Likely to Remain Flat

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

“Don’t think we’ll see a decrease unless there is a decrease in the production levels,” Vaudrey said. “We’ll see moderate increases for the next two or three years and the same with productivity. RVUs will probably remain fairly steady, barring CMS value changes.”

I was surprised by the 4.02 percent decrease. We've seen a definite slowing down on the revenue side with radiology,” Brad Vaudrey, M.B.A., C.P.A.
Patients View RadiologyInfo.org as Trustworthy, Helpful

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

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

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

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

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

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

New to the site is a Screening and Wellness section which offers patients View radiology information, helping them better understand radiologic procedures,” Dr. Fishman said. “People need information on how to detect disease before they get treatment.”

We need to make certain that RadiologyInfo.org is giving patients what they want, the way they want it,” Elliot K. Fishman, M.D.
The R&E Foundation thanks the following gifts made for July 15 – September 30.

**RESEARCH & EDUCATION FOUNDATION DONORS**

The R&E Foundation thanks the following gifts made for July 15 – September 30.

**Vanguard Program**

Companies supporting endowment programs and long-term gifts.

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A founding Vanguard company since 1998.

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A giving program for private practices and academic departments.

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**Individual Donors**

Donors who give $1,500 or more per year towards the RSNA President's Circle. Their names are shown in bold face.

<table>
<thead>
<tr>
<th>Name</th>
<th>City</th>
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**Your Donations in Action**

**Grant Recipient Survey Yields Impressive Results**

A survey of past R&E grant recipients was conducted earlier this year to track the outcomes of the foundation's efforts, the effects they have on recipients' careers, the radiologic sciences, and patient care. More than 50 percent of past grant recipients completed the survey for a response rate of 63 percent.

- 89 percent of the respondents remain active, 27 percent of those are currently department chairs or division heads.

- On average, each recipient of an R&E grant has published more than $40 dollars of additional grants as principal investigator from NIH funding sources such as the NIH.

- For every $1 awarded by the foundation, R&E grant recipients receive more than $80 dollars from additional grant funding or principal investigator from funding sources such as the NIH.

**Vitals**

The RSNA R&E Foundation supports the research and development that keeps radiography in the forefront of medical care.
Diabetes Mellitus: Long-term Prognostic Value of Whole-Body MR Imaging for the Occurrence of Cardiac and Cerebrovascular Events

CARDIOVASCULAR DISEASE as assessed with whole-body MR imaging confers strong prognostic information in patients with diabetes mellitus (DM), according to new research. Fabian Bamberg, M.D., Ph.D., of Ludwig Maximilians University, Munich, Germany, and colleagues studied the predictive value of whole-body MR imaging for the occurrence of a major adverse cardiac and cerebrovascular event (MACCE) in 65 patients with diabetes.

The patients underwent a contrast-enhanced whole-body MR imaging protocol, including brain, cardiac, and vascular sequences. Researchers then conducted follow-up inquiries to assess the rate of MACCE in the study group. Follow-up was completed in 61 patients. After a median of 5.8 years, 14 patients experienced MACCE. Patients who had detectable vascular changes on whole-body MR imaging faced a cumulative MACCE risk rate of 20 percent at three years and 35 percent at six years. None of the patients with a normal whole-body MR imaging went on to experience MACCE.

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

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

MR imaging of the knee from patients self-referred by clinicians who owned financial interest (FI) in the MR imaging equipment used and one with no financial interest (NFI) in the MR imaging equipment used.

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

“Physicians then conducted follow-up inquiries to assess the rate of MACCE in the study group. Follow-up was completed in 61 patients. After a median of 5.8 years, 14 patients experienced MACCE. Patients who had detectable vascular changes on whole-body MR imaging faced a cumulative MACCE risk rate of 20 percent at three years and 35 percent at six years. None of the patients with a normal whole-body MR imaging went on to experience MACCE. The patients underwent a contrast-enhanced whole-body MR imaging protocol, including brain, cardiac, and vascular sequences. Researchers then conducted follow-up inquiries to assess the rate of MACCE in the study group. Follow-up was completed in 61 patients. After a median of 5.8 years, 14 patients experienced MACCE. Patients who had detectable vascular changes on whole-body MR imaging faced a cumulative MACCE risk rate of 20 percent at three years and 35 percent at six years. None of the patients with a normal whole-body MR imaging went on to experience MACCE.”


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

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

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

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

Media Coverage of RSNA

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


DECEMBER PUBLIC INFORMATION OUTREACH ACTIVITIES FOCUS ON MR IMAGING

In December, RSNA’s 60-Second Checkup radio program focuses on the potential of MR imaging to predict heart attack and stroke risk in people with diabetes.
CT and MR Enteroigraphy in Children and Adolescents with Inflammatory Bowel Disease

Although CT enterography and MR enterography have become the imaging modalities of choice for inflamma-
tory bowel disease (IBD), each has advantages and dis-
advantages, in terms of diagnosing pediatric IBD. In an article in the November-December issue of Radiographics (OPEN and Radiographics), Alexander J. Dillman, M.D., University of Michigan Health System, C.S. Mott Children’s Hospital Medical Center, and colleagues dis-
cuss the use of CT enterography and MR enterography in the context of pediatric IBD in terms of advantages and disadvantages, protocol and imaging findings. Although CT enterography has many advantages over other radiologic and endoscopic modalities, its main disadvantage is its reliance on ionizing radiation. This has limited its use and has helped MR enterography become the primary method of evaluating the pediatric bowel. In addition to being radiation free, MR enterography can help evaluate peristalsis, has high contrast resolution and allows the use of diffusion-weighted imaging.

R&E Foundation Individual Donors

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Gaining access to Fellowship Connect is easy. With RSNA’s online resource Fellowship Connect, residents and practicing radiologists can search for fellowship positions by specialty, location and institution. Users can read current profiles, find out if fellowship positions are available, get con-
tact information and more. Gaining access to Fellowship Connect is easy.

RSNA Members: Using their member login, RSNA members can personalize their search by entering keywords such as the name of the institution, state or specialty. Fellowship Connect provides a print feature and save option that allows members to store search results for later viewing.

Institutions: After creating an account, institutions can post company profiles, available fellowship positions, contact information and website links. Each institution is responsible for keeping fellowship information current on the website. To access Fel-
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The Value of the Membership

Use Fellowship Connect to Find, Post Fellowship Positions

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loship Connect, go to fellowships.rsna.org.
Professionalism Vignettes Spark Discussion of Daily Dilemmas

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

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

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

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

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

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

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

COMING NEXT MONTH

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