

ACR

LEADERSHIP

INTEGRITY

QUALITY

INNOVATION

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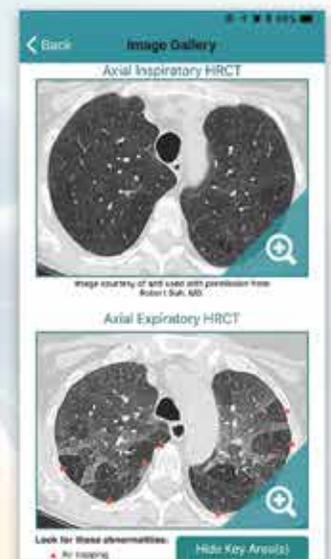
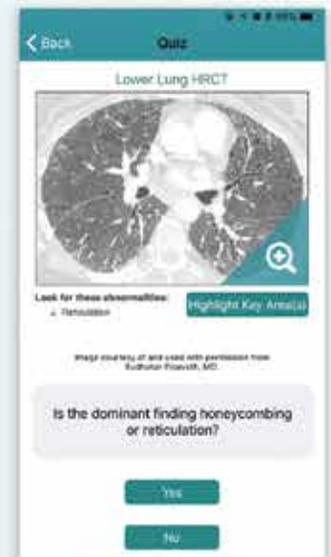
Bulletin



The Right
Exposure

Introducing a Peer-Reviewed
Interstitial Lung Disease
Educational App
for Pulmonary Healthcare Practitioners

Utilize our **Interactive Diagnostic Algorithm** to assist HRCT reading, test your knowledge by taking our **UIP to IPF Quizzes**, view examples in our **Image Gallery** and **Glossary**, and learn more about UIP and IPF with our **Informational Videos**



Rad Rounds - UIP to IPF



To learn more about idiopathic pulmonary fibrosis and the role of HRCT in the recognition of UIP, visit our website www.InsightsinIPF.com



To install on your iPhone text **RADIPF** to **313131** to receive link
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FEATURE

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The future of radiology depends on the makeup of the students who pursue it. However, the onus is on faculty and other seasoned radiology professionals to spark interest and present a clearer picture of the field.

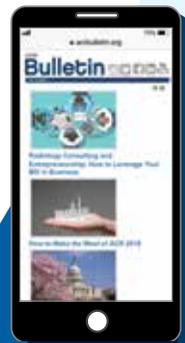


OUR MISSION: The *ACR Bulletin* supports the American College of Radiology's Core Purpose by covering topics relevant to the practice of radiology and by connecting the College with members, the wider specialty, and others. By empowering members to advance the practice, science, and professions of radiological care, the *Bulletin* aims to support high-quality patient-centered healthcare.



QUESTIONS? COMMENTS? Contact us at bulletin@acr.org
Archives of past issues are available at ACRBULLETIN.ORG

Check out the digital edition!
Read more at acrbulletin.org



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Katarzyna J. Macura,
MD, PhD, FACR

Guest Columnist

Embracing Diversity

We can move the needle on creating the specialty our patients deserve if we are willing to walk boldly toward the barriers that hold us back.

We've long known that radiology is one of the least diverse specialties — lagging behind much of medicine when it comes to participation by women and underrepresented minorities (URMs). But knowing this is not the same as doing something about it.

In 2012, the ACR BOC approved the creation of a new Commission for Women and Diversity to address the lack of diversity in our radiological professions. The Commission was to serve as an advisory group to the BOC on the status of women and other minorities and its goals were to:

- Conduct research, analyze economic and social trends, and provide education on women's and diversity issues in the radiology community
- Identify inequities in practices and procedures, and recommend and promote remedies, policies, and programs to enhance the working and learning environments in radiology
- Communicate with the ACR membership through publications in the *ACR Bulletin* and *JACR*[®]
- Participate in educational activities focused on mentorship and leadership development

At the 2013 ACR Annual Meeting and Chapter Leadership Conference in Washington, D.C., I joined the BOC as chair of the new Commission and wondered, "Where does radiology fit along the spectrum of the diversity movement?" Diversity 1.0 focused on the elimination of inequalities and injustices as a human right. Diversity 2.0 addressed how the implementation of diversity programs allows access and enables the success of racial and ethnic minorities. The Commission's above mentioned goals were part of the Diversity 2.0 strategy — with a vision to move the College and its membership to the Diversity 3.0 level. With Diversity 3.0, diversity and inclusion get to the center of the institutional mission as an integral ingredient for achieving excellence.¹

At ACR 2015, the Council voted to adopt Resolution 14, which affirmed the College's commitment to diversity and positioned it as a priority for the organization going forward.

The American College of Radiology affirms that diversity of our membership, and of the radiological professions in general, strengthens our organization and enhances our ability to achieve our mission. The American College of

Radiology affirms that diversity of our membership is a central objective and that opportunities to continually measure and assess our membership diversity should be promoted.

With the endorsement from the house of radiology acknowledging diversity as a core value and strategy, we opened the door to implementing the Diversity 3.0 paradigm — where diversity is considered "a strategic imperative."¹

In 2017 the ACR Intersociety Summer Conference took on the topic of diversity in radiology. The Intersociety Committee reviewed the current state of diversity among trainees and in our workplaces and addressed future strategies for fostering diversity through inclusion. A summary of the meeting was subsequently published in the *JACR*.

The ACR and the Commission are committed to policies and programs that address the shortage of women and URMs in the radiological profession. As chair of the Commission, I've realized that part of the solution lies in us acknowledging our biases and learning to "walk boldly toward them," as activist Vernā Myers puts it. Our Commission has embarked on projects that move the needle forward in recognizing existing barriers and building strategies to overcome them. We implemented a mentoring program for minority medical students — the Pipeline Initiative for the Enrichment of Radiology (PIER). We conducted a national survey of ACR members in which we queried physicians' attitudes about their work environment, relationships, and culture. We sought to determine if responses differed by gender or race/ethnicity, with a goal to identify potential impediments to building a diverse workforce in radiology professions.

Although we have made some headway, there remains a lot of work ahead of us. We need to create just and equitable work environments with policies, productivity targets, and incentives that are transparent and non-discriminatory. We will benefit from allowing flexibility in the workplace, offering family-friendly leave policies to encourage work/life integration, and promoting well-being — while addressing the causes of burnout. Fostering a culture of diversity and inclusivity will benefit not only our specialty but also the patients we serve. **B**

ENDNOTE

1. Nivet MA. Commentary: Diversity 3.0: a necessary systems upgrade. *Acad Med.* 2011;86(12):1487-9. Available at bit.ly/Nivet_Diversity3.



Read more about the Commission for Women and Diversity's efforts in the 2019 report, "Excellence through Diversity and Inclusion," at acr.org/Diversity-Report.

It's All About the Patient

ACR Grand Rounds brings radiologists, patients and patient advocates, referring physicians, and other guests to ACR offices with a goal of bringing staff closer to their workload and increasing understanding of how their tasks benefit the profession and patients. The March session emphasized the importance of patient- and family-centered care in radiology. Arun Krishnaraj, MD, MPH, vice chair of quality and safety at the University of Virginia Medical Center, argued radiologists can thrive — and, in fact, occupy an enviable position at the epicenter of healthcare — if they first earn their patients' trust. As co-chair of the Informatics Committee of the Commission on Patient- and Family-Centered Care, Krishnaraj stressed the importance of value as the new currency powering the transition away from volume-oriented, fee-for-service healthcare. "We have to deliver greater value," he said. "To do that, we must analyze, measure, and constantly improve the patient experience."

For more information about the session, visit bit.ly/GrandRounds_PCC.



The ACR Grand Rounds presentation by Arun Krishnaraj, MD, MPH, suggested that radiology could become extinct if radiologists do not assure that clinical encounters with patients about their medical imaging are thoughtful human-to-human interactions.

Breast Density Laws: Content Matters

According to a recent study published in the *American Journal of Public Health*, state breast density notification laws that advise women of supplemental screening options have led to an increase in breast US use and even a boost in cancer detection rates. Susan H. Busch, PhD, of Yale School of Public Health in New Haven, Conn., and her team of researchers conducted a study that determined these improved outcomes are, however, dependent on the content of the notification laws — which are not uniform across states. "Despite the relatively low uptake in supplemental US, we observed a significant increase in cancer detection in states with dense breast notification plus supplemental screening laws," the team wrote. "This finding suggests that the type of information delivered in the notification has an impact on utilization and potentially on clinical outcomes. Women in states with [these laws] may be more likely to approach their provider regarding supplemental testing or may perceive more benefits of supplemental testing."

For more information, visit bit.ly/BreastDensityLaws.

SBI Launches New Journal

In March, the Society of Breast Imaging launched its new publication, the *Journal of Breast Imaging (JBI)* — the first peer-reviewed journal to focus solely on breast imaging. *JBI* aims to provide high-quality, evidence-based content for the global breast imaging medical community and seeks to advance the field of breast imaging — with particular focus on improving patient care and outcomes. According to Editor-in-Chief Jennifer A. Harvey, MD, FACR, "The journal will provide a focused platform to disseminate scholarly work, as well as practical articles on breast cancer screening, clinical practice aspects of breast imaging, and educational opportunities, with the goal of advancing the global field of breast imaging for the betterment of patient care."

JBI will publish original research, as well as reviews of important scientific, educational, and clinical topics.

To read the inaugural issue of the journal, visit bit.ly/SBI_NewJournal.





The Chair Takes the Lead

ACR BOC Chair Geraldine B. McGinty, MD, MBA, FACR, participated in the newest edition of the Radiology Leadership Institute® Taking the Lead podcast series — where listeners gain insight into some of radiology's most pressing industry and leadership topics through interviews with top radiology and healthcare thought leaders. In the episode entitled, "Leading with Mindfulness and Inclusiveness," McGinty shares how her experiences in Ireland, at the University of Pittsburgh, and at Montefiore Medical Center put her on the leadership path. She also discusses what led her to pursue a graduate business degree, the importance of developing a strong network, her mission to make radiology more inclusive, and her vision for the ACR.

Listen to the podcast at bit.ly/RLI_TakingtheLead.



TMIST is one of a comparatively few large clinical trials that offers provider reimbursement for women who qualify for charity care at a participating site.

— Etta D. Pisano, MD, FACR, at bit.ly/TMIST_Trial

What Does More Consolidation Mean for Radiology?

A new Harvey L. Neiman Health Policy Institute® study found that the U.S. radiologist workforce has consolidated — leading to increased practice sizes and a substantial decline in the number of distinct practices, disproportionately affecting single-specialty radiology practices. According to the study authors, "Over the past decade, physicians have faced increasing pressures from government and private payers to prove quality improvement and cost control through adjustments being made to fee-for-service payment models. At the same time, they are being compelled to reduce fragmentation and advance care coordination for their patient populations. Such resource demands potentially threaten the ability of small practices to compete and may incentivize such practices to join with larger groups to survive and thrive." The ultimate impact of this consolidation on cost, quality, and patient access, the authors argue, merits further attention.

Read the full study in the *JACR*® at bit.ly/HPI_Consolidation.

CPI Releases New Module in Ultrasonography

Test your knowledge and improve your diagnostic imaging skills with the new CPI Ultrasonography Module 2019 from the ACR Continuous Professional Improvement™ (CPI) program.

Learn directly from the experts through their casework involving the gallbladder, kidneys, liver, scrotum, uterus, fetus, and more. Study over 100 grayscale, color Doppler, and triplex Doppler images.

Each CPI module includes at least 50 self-assessment questions and offers up to 8 CME/SA-CME. Choose between the print publication or the online examination and receive a free e-book copy. Members save \$35 per module when selecting six modules through a customized CPI Select Six Series.

Learn more at acr.org/cpi.

FDA Proposes Updates to MQSA

The U.S. Food and Drug Administration (FDA) has proposed a series of amendments to regulations issued under the Mammography Quality Standards Act of 1992. According to the FDA, the proposed changes, which were summarized in a March news release, will improve the quality of mammography services for millions of Americans. They include such items as mandatory breast density disclosure, requirements related to the release of patient records, and new record-keeping requirements.

"Screening technology, breast imaging practices and our knowledge of breast cancer biology have advanced over the years. It is understandable that the FDA would revisit these regulations," said Dana H. Smetherman, MD, FACR, chair of the ACR Commission on Breast Imaging. "The ACR supports providing patients and their doctors with accurate, actionable information to better diagnose and treat those in our care. We look forward to working with FDA through the details of this process to ensure that any updates to FDA regulation improve patient care and efficiency of care provided."

To view the proposed changes in full, visit bit.ly/MQSA_Changes.



Your Diversity Snapshot

Who are the professionals that make up the fabric of the College? Are we a diverse group? Do we accurately represent the field? The ACR Commission for Women and Diversity and the Commission on Membership and Communications are working to answer these questions. How can you help? Take some time to complete the diversity and practice information on your My ACR profile on the **My ACR tab** at acr.org. This confidential information will assist us in developing the appropriate programs and services for our members.

Imaging 3.0®: Save a Life



Since opening in 2011, the Bon Secours St. Francis Pearlle Harris Center for Breast Health has provided advanced breast imaging technology to patients in the Greenville, S.C., area.

At Bon Secours St. Francis Health System, radiologists, referring physicians, scheduling staff, and population health professionals teamed up to launch Save a Life — a campaign that increases access to mammography screening for women in the Greenville, S.C., area. Since the hospital system permanently adopted the campaign in March 2018, monthly mammogram orders have increased 39 percent year over year, contributing to the health system's 256 positive breast cancer diagnoses in 2018.

Read the Imaging 3.0® case study at acr.org/Save-A-Life.

The Time to Renew Is Now

Haven't renewed your membership for 2019? Did you know your grace period ends June 30? Act now before you lose access to your benefits, CME, and this award-winning publication.

As your advocate and partner, the ACR supports you every step of the way by:

- Protecting and growing your value in radiology
- Guiding you through economic change
- Helping you achieve quality care
- Connecting you to the radiology community

Retiring? Taking a sabbatical? Joining the U.S. military, Veterans Affairs, or Public Health Service Commissioned Corps? Your dues may be reduced or waived. Contact the membership department at membership@acr.org or call 1-800-347-7748.

Renew today at acr.org/renew to ensure continued access to the steadfast network that nurtures and empowers you every day.

GO2 Foundation for Lung Cancer Appoints New Board Member

The GO2 Foundation for Lung Cancer has appointed ACR Lung Cancer Screening 2.0 Subcommittee Chair Debra S. Dyer, MD, FACR, to its scientific leadership board. The Bonnie J. Addario Lung Cancer Foundation and Lung Cancer Alliance recently merged to form the new foundation — which serves and advocates for the needs of the lung cancer community. GO2 Foundation team members and partners from around the country connect to empower those locally and globally impacted by lung cancer.

"I'm thrilled to bring my experience, resources and commitment to educating patients, increasing screening and saving more lives," says Dyer, chair of the department of radiology at National Jewish Health. "Together, we can give patients hope, propel innovative research and open doors for patients to gain more control of their health and improve their quality of life."

For more information, visit bit.ly/GO2_LCSLBoard.

Advocacy allows us, as physicians, to educate the public and legislators in our area of expertise — a critical role that positively impacts the care of our patients in a complex healthcare environment.

— Georgia G. Spear, MD, chief of breast imaging at NorthShore University Health System, at bit.ly/RADvocacy

Battling Breast Cancer

Screening only women ages 50–74 every other year — as now recommended by the American College of Physicians (ACP) and the U.S. Preventive Services Task Force (USPSTF) — may result in up to 10,000 additional, and unnecessary, breast cancer deaths in the country each year. That approach would also likely result in thousands more women enduring extensive surgery, mastectomies, and chemotherapy for advanced cancers — and do little to nothing to address overdiagnosis or the harms of screening named in the ACP guidelines.

The American Cancer Society, USPSTF, ACR, and the Society of Breast Imaging (SBI) agree that the most lives are saved by annual screening starting at age 40. The ACR and SBI continue to recommend that women start getting annual mammograms at age 40 and continue as long as they are in good health. The ACR advises women to have a risk assessment by the age of 30 to see if earlier screening is right for them.

Read the full ACP statement at acr.org/New-Guidelines. For more information on mammography and breast cancer screening visit MammographySavesLives.org, RadiologyInfo.org, and sbi-online.org/endtheconfusion.

MGH Incubator Helps Radiologists Innovate

Marc D. Succi, MD, a radiologist at Massachusetts General Hospital, has created an innovation incubator that mentors physicians through the early stages of invention. The incubator and its related curriculum is helping radiologists and other physicians turn their ideas for technology solutions that improve patient care into reality. Participants have already secured five patents for solutions they've devised through the incubator. According to Succi, "Radiologists are at a unique intersection of clinical care and technology. Radiologists interact with every other specialty, and they have more experience with technology than most other specialties, so they really are in a prime position to innovate."

Read more about the incubator in the [Imaging 3.0® case study](#) acr.org/Innovation-Training.

Registry for Nuclear Medicine

The Society of Nuclear Medicine and Molecular Imaging (SNMMI) and the ACR have announced a new collaborative clinical data registry to support high-quality practice and patient care. The registry will allow collection and analysis of data on nuclear medicine procedures – supporting continuous improvement of patient care. According to Don C. Yoo, MD, FACR, chair of the ACR Commission on Nuclear Medicine and Molecular Imaging, "Intersociety collaboration between the SNMMI and the ACR will be key to the future of nuclear medicine and practice improvements in the U.S."

Initially, the collaborative effort will be a Dose Index Registry/ Nuclear Medicine module, with a pilot scheduled for early 2019. Initially, the registry will focus on PET/CT imaging data. At a future date, the collaborative registry may expand to include quality measures focused on therapeutic aspects of nuclear medicine services.

For more information about participating, visit nrdrsupport.acr.org.

Here's What You Missed



The *Bulletin* website is home to a wealth of content not featured in print. You'll find extra articles and other updated multimedia content at acrbulletin.org.

Opening Doors to Women Radiologists

A radiology resident discusses how her involvement in the American Association for Women Radiologists has translated into opportunities for leadership, networking and advocacy — and why other women should get involved. [Read more at bit.ly/AAWR_Beavers](#).

A #RadParent Tells All

Lauren P. Golding, MD, of Triad Radiology Associates in Winston-Salem, N.C., wants other radiologist parents to know that the work-family balance struggle is real, but they're doing a great job. [Read more at bit.ly/Radparents](#).

The Power of Communication

Carolynn M. DeBenedictis, MD, associate professor of radiology and radiology residency program director at the University of Massachusetts Medical School, explains why effective communication is paramount in the field at [bit.ly/PowerofCommunication](#).

CALENDAR

June

- 3–5 ACR-Dartmouth PET/CT, ACR Education Center, Reston, Va.
- 7–9 Coronary CT Angiography, ACR Education Center, Reston, Va.
- 8–12 Annual Meeting of the AMA House of Delegates, Hyatt Regency, Chicago
- 10–12 High-Resolution CT of the Chest, ACR Education Center, Reston, Va.
- 13–15 Breast Imaging Boot Camp With Tomosynthesis, ACR Education Center, Reston, Va.
- 17–19 Neuroradiology – Head and Neck, ACR Education Center, Reston, Va.
- 20–21 Prostate MR, ACR Education Center, Reston, Va.
- 28–30 Cardiac MR, ACR Education Center, Reston, Va.

July

- 12–14 Body and Pelvic MR, ACR Education Center, Reston, Va.
- 19–21 Musculoskeletal MR of Commonly Imaged Joints, ACR Education Center, Reston, Va.
- 29–
Aug. 23 American Institute for Radiologic Pathology Correlation Course, AFI Silver Theatre and Cultural Center, Silver Spring, Md.

August

- 12–15 AIRP® Categorical Course: Neuroradiology, AFI Silver Theatre and Cultural Center, Silver Spring, Md.
- 19–21 AIRP Categorical Course: Pediatric Imaging, AFI Silver Theatre and Cultural Center, Silver Spring, Md.

By 2020, we expect the routine use of AI in radiological practice will have begun.

— Bibb Allen Jr., MD, FACR, chief medical officer of the ACR Data Science Institute™, at bit.ly/DemocratizingAIforRad

How Did We Do in Year One?

The results are in for radiology-specific Quality Payment Program performance for 2017.

The first performance period of the CMS Quality Payment Program (QPP), affecting 2019 payments, took place in 2017. In February 2019, I wrote about broad multispecialty trends under the QPP from 2017 ([read more at bit.ly/QPP_Y1](http://bit.ly/QPP_Y1)). This included scoring and performance under the Merit-Based Incentive Payment System (MIPS). In that column, I communicated that the median score across all eligible clinicians was 89 and that 93 percent of eligible clinicians received some bonus payment.¹ Simply put, physicians performed well.

In this column, I will focus on the recently released CMS specialty and geographically specific data (see sidebar). I will comment on two of the performance categories used to determine our final MIPS score: Quality and Improvement Activities (IA).

Our final score in 2017 was mostly made up of the Quality Performance category. Success required the reporting of six quality measures, many of which are categorized within specialty measure sets, including diagnostic radiology (DR), IR, and radiation oncology (RO). For instance, the DR specialty set included Measure 145 (reporting fluoroscopy dose or time), the IR specialty set included Measure 265 (biopsy follow-up), and the RO specialty set included Measure 382 (dose limits to normal tissues). The data suggests that radiology reported a small percentage of our own measures, commonly choosing measures outside our specialty. Only 53 percent of DRs reported at least one measure within our set, RO was less than 25 percent, and IR was less than 1 percent (7 percent to be exact).

Why would we avoid our own measures in this manner? DRs in multispecialty groups are likely reporting measures across other specialties via the group reporting option. IRs and ROs may be doing the same or reporting DR measures.

This specialty-specific circumstance has negative consequences. First, the optics are not great. We continually argue for better measures and dedicate considerable resources to creating them. The task becomes more difficult when policymakers see our own specialists choosing not to participate in the performance and reporting of our own measures. Further, reporting experience is necessary for CMS to establish the benchmarks under which we are scored. Measures without reporting data, by definition, lack benchmarks. And measures for which

only the highest-performing sites report, generally, have very high benchmarks. This suggests that these measures have little potential for quality improvement, which may be true for those sites reporting but may not be the case for sites that do not report. We simply do not know.

Regardless of the cause, the response of CMS is to classify these high-performing measures as “topped out.” Measures that fall into either of these categories — with no benchmarks or as topped out — have their maximum potential points capped. For example, topped-out measures have a cap of 7 (out of 10), while measures with no benchmarks have a cap of 3. The solution is for us to report on all our measures, even if they are not our highest-performing ones. CMS chooses the six measures that yield the highest-quality score, so there is no downside to this action. Nationally, this establishes the benchmarks and reporting rates to show our engagement. Locally, it shows our associates that we are engaged and not simply relying on other specialties to carry us.

IA represented 15 percent of our final score in 2017. The three most commonly reported IAs by DRs were 24/7 access, formal quality improvement methods, and follow-up on patient experience — all of which reflect favorably on our profession. The 2017 QPP data suggest that radiology participated at a high rate and scored well. However, we stand to improve in the reporting of our own quality measures. **B**

ENDNOTE

1. 2017 QPP Experience Report Appendix. Accessed on April 6, 2019. Available at bit.ly/QPP_Experience.



The solution is for us to report on all our measures, even if they are not our highest-performing ones.

Specialty and Geographically Specific 2017 MIPS Performance Period Data

Top states by number of participants:

CA, NY, FL

Top states by percentage reporting:

VT, GA, MN

Overall participation by specialty

- DR – 97.2%
- IR – 97.7%
- Nuclear Medicine – 95.3%
- RO – 96.6%

Specialty measure set

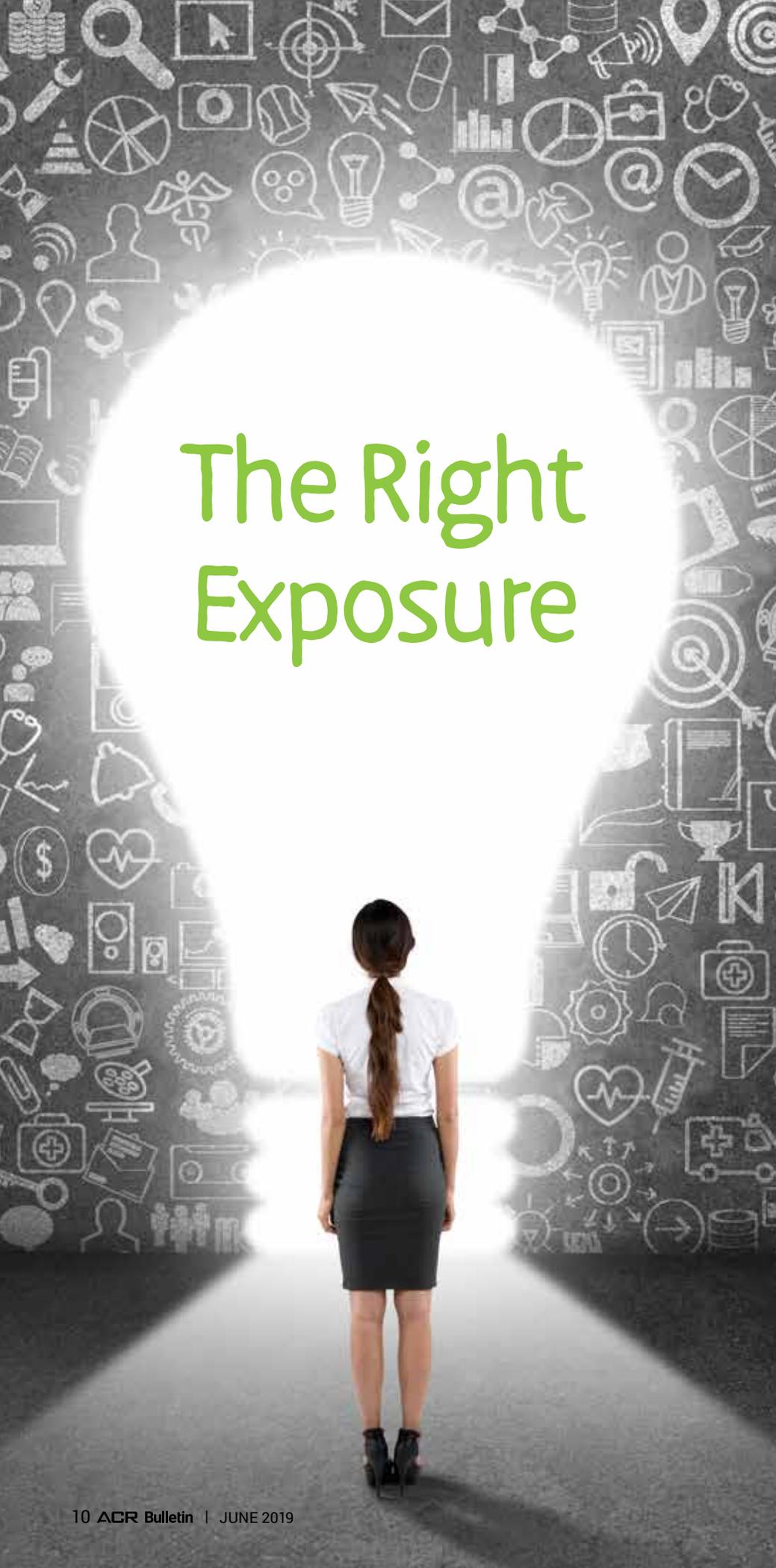
- DR – 52.99%
- IR – 0.34%

Eligible measures applicability success rate (test for ECs with less than 6 available measures): 5.81%

Top Improvement Activities for DR

- 24/7 access to medical record
- Formal quality improvement methods
- Follow-up on patient experience

DR – diagnostic radiology, IR – interventional radiology, RO – radiation oncology, EC – eligible clinician



The Right Exposure



Limited exposure for medical students could leave the specialty in the shadows.

There are plenty of jobs for radiologists, and the pay is good. AI looks more like a time-saving tool than a threat to the specialty. Plus, this year's radiology residency and fellowship match was stellar.¹ So why aren't more medical students getting excited about radiology?

It depends on who you ask regarding how students perceive the specialty — who radiologists are, what they actually do, etc. Still, no one argues that first- and second-year medical students have practically no exposure to the field. It pops up in their third year, is mainly an elective, can be boring, and usually includes limited hands-on experience.

According to Andrea A. Birch, MD, associate professor of clinical radiology and radiological sciences at Vanderbilt University School of Medicine, the need for radiologists is greater than ever. "Our roles in assessing and treating patients are unparalleled compared to the way they were even ten years ago," Birch says.

Residency and fellowship programs in both diagnostic and IR continue to see a high fill rate — based on preliminary numbers released in March by the National Resident Matching Program (NRMP). All IR program slots were filled, and only 10 diagnostic radiology programs in the country reported unfilled PGY-2 slots (the year following an intern year, but before residency begins).¹ With more medical students matching to their desired radiology residency programs, it would seem the pipeline of talent into the specialty is wide open.





PERFUNCTORY PERCEPTIONS

The problem is not that medical students aren't interested in radiology, but that the need for primary care providers — especially in underresourced and underserved areas — is so great that some medical schools leverage institutional priorities in their mission statements and encourage students to seek out primary care specialties, Birch says.

According to Birch, “When you compound that with the fact that there is a shortage of PCPs, it makes it hard for schools to promote radiology.” Unfortunately, there is a real need for medical students to understand that radiology is more than looking at images during group rounds. “That’s their perception because it is often the only way they interact with the radiology department,” Birch says.

“Diagnostic radiology is the one rotation in medical school where you don’t ‘do’ what the doctor does,” says Ann K. Jay, MD, program director of diagnostic radiology residency at MedStar Georgetown University Hospital. “That’s one of the benefits of the IR rotation,” Jay says. “With IR, students are actively participating in the duties of an interventionalist, where in DR rotations the students are watching others ‘do’ radiology. Engagement and interest can be difficult to sustain, which ultimately has an effect on students’ impressions of our field.”

Students may also get the impression that radiology interpretation can be performed by other types of physicians. “If chest X-rays are taught by pulmonologists and MSK studies are taught by orthopedists, it conveys the message to students that a level of expertise is not needed to be a radiologist,” Jay says.

Misconceptions about AI also contribute to some students’ reservations about choosing radiology as a specialty. With the help of the lay media, students might be inclined to think AI is going to displace the field, Jay says. “But radiologists are actually leading the efforts for the implementation of AI in imaging,” she says. “I tell students that using AI in daily clinical practice is a tool that radiologists want — as it will only help us in improving patient care.”

Driving other misconceptions is a lack of exposure to radiology in preclinical years — at least not in a robust or effective manner, Jay says. Research shows that students participating in a curriculum offering radiology in their first year believe the specialty has greater importance to the overall practice of medicine, are more likely to choose radiology as a clinical elective, and are more likely to consider it as a career track.² Add to that, most medical students at some point could become referring clinicians.

FOSTERING AWARENESS

It isn't fair to expect teaching institutions to unilaterally promote radiology at their own expense, Birch admits. The onus is on faculty and other seasoned radiology professionals to spark interest and present a clearer picture of the field.

For instance, misconceptions abound when it comes to

radiation, even among medical students. Radiologists can allay concerns by presenting the literature on exposure to medical scans and any associated risks. Students may also view radiology as lacking in opportunities for direct patient interaction. “That is far from the case for me as a breast imager,” Birch says. She tells students that she talks to patients daily — and that surgeons and other providers follow her recommendations to care for patients.

Connecting with students to present the appealing aspects of radiology can be a juggling act, Jay says. She organizes student lectures as often as possible — but they are largely given by fourth-year medical students or first-year residents. Jay notes that getting senior residents, fellows, and faculty involved in the conversation would have more impact. “But it’s a time commitment,” she says, “and there’s no compensation aside from educational credits. Some institutions don’t even offer that.”

Jay encourages students to shadow a radiologist for a day to get a feel for what imaging includes. This can be tough with scheduling, she admits, and with the workflow of breast imagers in particular. Students at some schools have started clubs revolving around a particular specialty. Faculty should encourage

GET STARTED

The ACR makes it a high priority to educate students about the field and its future. The goal is to introduce medical students to the field early — particularly those from backgrounds underrepresented in the specialty. The following resources provide insight into the field of radiology and encourage medical students to consider radiology as a career path.

- Gaining one-on-one access to practicing physicians can be a major obstacle for physicians-in-training. The ACR has made surmounting that obstacle easier by joining the American Medical Student Association’s Mentoring Program. These practicing physician mentors are available for private or group conversations on issues not normally covered in medical school. Find a mentor at acr.org/MedicalStudent.
- The RFS journal club, held every two months, lets trainees interact directly with ACR leaders and gain their unique perspectives on their areas of expertise. View upcoming webinars at acr.org/RFSJournalClub.
- The 2020 American Medical Student Association Convention & Exposition, being held in Washington, D.C. on April 16–19, is intended for anyone interested in the future of healthcare: students, residents, healthcare organizations, and professionals alike. Learn more at bit.ly/AMSA_Conference.

"MENTORING PLAYS A HUGE ROLE IN EARLY EXPOSURE TO THE SPECIALTY — AND OPENS DOORS TO MUCH NEEDED DIVERSITY AND INCLUSION AWARENESS."

— Andrea A. Birch, MD

students to form such groups, which provide great networking opportunities and a forum for asking candid questions.

There are more innovative ways to introduce radiology to medical students, Birch says. "Sharing vignettes that highlight a radiologist's role in assessing patients, for instance, instead of organ-based vignettes where an imaging study is occasionally included in a workshop." There are non-coursework ways to learn radiology. "Mentoring plays a huge role in early exposure to the specialty — and opens doors to much needed diversity and inclusion awareness."

MINDFUL OUTREACH

"We need a pipeline for women and underrepresented minorities in radiology," says Raymond B. Wynn, MD, FACR, vice chair of network operations in the department of radiation oncology at Loyola Medicine. Wynn was instrumental in forming the ACR Commission for Women and Diversity — established to encourage radiology groups to put in motion a diversity and inclusion strategy at all levels of training, practice, and leadership ([learn more at acr.org/Diversity-Report](http://acr.org/Diversity-Report)).

The commission offers hands-on clinical skills workshops, mentorship, research, career development guidance, and summer internship opportunities. Wynn is a huge advocate for the commission's Pipeline Initiative for Enrichment of Radiology (PIER) mentoring program to increase minority medical student exposure and preparation for radiology postgraduate training ([learn more at acr.org/PIER-Program](http://acr.org/PIER-Program)).

The PIER program to date has successfully paired 15 underrepresented minorities and female medical students with mentors in radiology and radiation oncology — offering up to eight weeks of exposure to the specialty, including research opportunities. This summer, new PIER interns visiting ACR headquarters will explore IR, gain exposure to radiation oncology, have a chance to

perform simulated biopsies, and participate in other learning opportunities.

To further medical student outreach, ACR formed the Medical Student Education and Outreach (MESO) group — an interdepartmental team that establishes medical student education and outreach as a priority for the College. "We want to inform all medical students about the importance of radiology as a critical component of patient care," says Jan Cox, PHR, SHRM-CP, ACR senior director of operations. "Through MESO, we're trying to increase the number and diversity of medical students who choose radiology as a career — or to make those choosing other specialties better physicians," she says.

The ACR RFS includes a medical student subcommittee that supports the work of the MESO team. Committee members include residents, fellows, and medical students. The subcommittee is working now to establish a database of radiology interest groups within medical schools across the country to expand outreach.

"A lot of radiologists are not used to sharing or advertising what they do," Wynn says. Mentoring medical students and connecting young talent with radiology leadership is vital to the future of the specialty, he says. Reaching out to students with backgrounds underrepresented in radiology, Wynn adds, should be at the heart of all outreach efforts.

Birch agrees. She believes radiology programs should strive to attract all people, not just certain people. "The future of radiology depends on the makeup of the students who pursue it," she says. To that end, it is incumbent upon educators and radiology leaders to show students the importance of what they do.

According to Jay, the best and brightest medical students who have yet to discover radiology may need a few lightbulb moments. "The best part of our job is when you are able to put together the pieces of a puzzle — when you have that "Aha!" moment and figure out what is going on with a patient," she says. "Many medical students just aren't getting that experience." **B**

By Chad Hudnall, senior writer, ACR Press

ENDNOTES

1. Thousands of Resident Applicants Celebrate NRMP Match Results. National Resident Matching Program. March 15, 2019. Accessed April 29, 2019. Available at bit.ly/2019_MatchResult.
2. Branstetter BF, Faix LE, Humphrey AL, et al. Preclinical medical school training in radiology: the effect of early exposure. *Am J Roentgenology*. 2007;188:W9-W14. Available at bit.ly/AJR_Exposure.

Foster the Future of Radiology

If you are interested in becoming a radiology mentor, contact Angelica Vergel de Dios at avergelddios@acr.org.

The Right Side

Pursuing a passion project can lead to a broader experience for radiologists at different stages of their careers.

Exploring a side talent or interest can lead to a broader experience — adding a spark to life and energy to one's work. That has been the experience of three radiologists at different stages of their careers.

According to Lawrence R. Muroff, MD, FACR, CEO and president of Imaging Consultants, Inc., in Tampa, Fla., developing diverse income streams gives radiologists flexibility in their work. Muroff started off with a second opinion consulting business. He later created high-quality educational experiences for physicians through Educational Symposia — a continuing medical education company he helped found. After years of juggling both clinical and side work, he gave up his position as director of MR, CT, and nuclear medicine at University Community Hospital in Tampa and founded his consulting business — which provides services to radiologists, hospitals, and corporations.

“Having side businesses enables me to do what I want to do when I want to do it,” says Muroff, who notes that he feels a sense of accomplishment from creating a successful business that meets a need or fills a gap and leads to positive interactions and feedback.

Stepping Into Side Businesses

Puneet Bhargava, MD, professor of radiology at the University of Washington, didn't realize he had started a business until he went to his accountant with his first IRS 1099 form from his work as an editor at the journal *Current Problems in Diagnostic Radiology*. With his accountant's help, he formed a limited liability company (LLC) that enabled him to take advantage of business deductions on his taxes and additional Solo 401K contributions. He slowly became involved in medical legal consulting work as an expert witness. Soon, he found he had a third line of work: paid speaking engagements on time management, faculty development, and business/leadership.

Bhargava admits he works more hours than some of his colleagues, but he says it's more than worth it. He notes that his experience as an expert witness made him a better radiologist as it raised his awareness of legal issues and ways to improve his practice, while his speaking engagements and consulting work introduced him to luminaries outside his specialty.

Barry D. Julius, MD, associate director of the radiology residency program at St. Barnabas Medical Center in Livingston, N.J., agrees. Julius started his blog,

Radresident.com, on a whim in 2016. The blog doles out valuable advice and information for residents — including career information, study tips, and information on how to avoid and handle lawsuits. Within the first few months of launching, the blog attracted about 2,000 visitors per month. Now, the blog garners about 16,000 page views and 10,000 visitors per month.

According to Julius, the hour or two he writes each evening, as well as on Sunday afternoons, provide a welcome break from his usual routine. While his hobby pays for itself — through some advertising revenues — he notes that he isn't in it for the money. He enjoys the interaction and the people he encounters through the blog, and it has turned out to be positive publicity for his hospital's residency program — which has gained him bonus points at work.



PHOTO: RSNA

Finding the Right Fit

According to Muroff, it's not easy to identify a side business that will work for young and early-career radiologists. Unique experience — such as computer science expertise or another advanced degree — can help, he says. Expert reads and second opinion consultations are good options, Muroff points out, since those parlay radiology training to broaden practice.

Before setting up a side business, Muroff advises radiologists to carefully check their employment or partnership agreements. He notes that some practices will claim a part of any earnings, except passive investment income. Bhargava adds that at his institution, faculty obtain pre-approval on a case-by-case basis from the department chair so there is no conflict of interest between

Puneet Bhargava, MD, is pictured speaking at a session on time management and personal productivity at RSNA 2018 in Chicago.

continued on page 21

Radiation Education, Live

The newest outreach effort from Image Wisely® takes on post-therapy safety concerns.

Recently, Image Wisely® has been hosting Facebook Live events to educate viewers on topics surrounding radiation safety. A March segment focused on radiation safety in crematoriums — in part to address misguided media coverage of a published *JAMA* research letter on the potential hazards of handling radiopharmaceuticals postmortem.¹ During the segment, Mahadevappa Mahesh, MS, PhD, FACR, chair of the ACR Commission on Medical Physics, emphasized the need for education, awareness, and cooperation between caregivers, radiation safety experts, and crematorium operators to avoid public misconceptions (bit.ly/Radiation-in-Crematoriums).

How did this Facebook Live event come about?

The ACR and the American Association of Physicists in Medicine (AAPM) released a statement clarifying that radioactive material is routinely used in medical treatments (bit.ly/IW_Contamination). The risk to the person operating a crematorium is so small that it cannot be measured. In addition, national and international groups dedicated to protecting the public from exposure to radiation have clear guidelines in place about how to deal with radioactivity in patient remains.

What is significant about this type of public message?

With the coverage of radiation in crematoriums — even though radiation levels were not measurable — there was media hype. I strongly believe that ACR treats imaging and radiation therapies as team efforts — including radiologists, radiation oncologists, nuclear medicine physicians, medical physicists, technologists, therapists, and dosimetrists. We all work together on patient and personnel safety, image quality, and for effective therapies — and to dispel harmful and misleading myths about radiation. Similarly, we need to let people know that the use of radiopharmaceuticals in healthcare is routine, has been proven safe, and remains safe.

What can physicians using radiation therapies do to better communicate potential risks to patients?

Patients are generally well informed by radiologists and

other physicians who treat them. Of course, physicians should tell patients about the effects of the treatment and any steps they should take to avoid contaminating their surroundings. They should answer any questions patients and their families have. It may not be obvious to the patients receiving treatment, but there is a large safety program behind the scenes, including criteria for releasing radioactive patients to their homes, work, and the public, which involves not only the diagnosing and treating physicians, but health physicists, medical physicists, and radiation safety officers and their delegates. These teams of healthcare and safety professionals work to ensure the therapies are safe during treatment and after discharge.

How can radiologists and other physicians learn more about safety procedures?

ACR has a helpful guide, created alongside AAPM, called the Radiation Safety Officer Resources (acr.org/RadSafeOff). It is for medical physicists and physicians serving as radiation safety officers at their medical facilities. It tells them all they need to know — it's sort of a crash course in being a radiation safety officer — and has links to federal requirements and resources, and sample forms and policies.

Does misinformation unnecessarily create anxiety over exposure to radiation?

Yes, and this could be a problem as the use of radiopharmaceuticals will likely increase with the approval of different types of cancer treatment. When headlines say, “radiation contamination in crematorium,” it can cause a big scare. We want to draw attention to the many safety procedures already in place, and avoid widespread worry about radiation contamination.

What is your message to anyone concerned about patient radiation exposure from a medical procedure?

Generally, the medical benefits of any imaging studies prescribed appropriately far outweigh any associated radiation risks. Concerns and fears are often rooted in a lack of awareness or understanding. Offering accurate information can alleviate unnecessary worries. Radiologists should direct patients to RadiologyInfo.org, which has information on radiation dose levels and associated risks related to medical imaging. **B**

ENDNOTE

1. Yu NY, Rule WG, Sio TT. Radiation contamination following cremation of a deceased patient treated with a radiopharmaceutical. *JAMA*. 2019;321(8):803–804. Available at bit.ly/Rad_Contamination.



Radiation Safety

The ACR provides recommendations and resources to help radiologists minimize risk during exposure to ionizing radiation. Learn more at acr.org/Radiation-Safety.

When Teachers Become Students

AIRP® instructors are gaining insight to improve learning outcomes.

At the American Institute for Radiologic Pathology (AIRP®) — which provides a unique training experience for radiology residents, fellows, and practicing radiologists from around the world — the faculty are also lifelong learners. Since January, AIRP instructors have been participating in a new EdTechTeacher faculty development program called Teaching for the 21st Century (T21). The year-long blended learning program — consisting of in-person workshops, monthly online modules, and synchronous webinars — aims to teach the instructors creative ways to leverage technology to engage their students more effectively.

“We are discovering new things about how students learn all the time,” says Avra Robinson, EdTechTeacher’s director of online learning. “Using a customized program, we are helping AIRP instructors discover ways to integrate new strategies and tools into their current teaching practices — as a way to motivate and help the residents in their program to engage more deeply with the material and better retain the concepts.”

Several AIRP faculty are already enthusiastically implementing newly acquired web-based education tools — such as Padlet and Mentimeter, which allow for students to interact with their instructors through smartphones, tablets, and laptops. The faculty have also been shown how videos can be embedded within these programs. Brandi T. Nicholson, MD, director of the breast imaging fellowship program at the University of Iowa, has long been interested in incorporating audience response and interactive learning into her lectures. According to Nicholson, “Standing there and just doing didactics is becoming less appealing to the audience. The T21 program has given me ideas of software programs to use — as well as pointers on how to make them successful.”

Benefits of the T21 program have started to reach beyond the walls of the American Film Institute Silver Theatre and Cultural Center in Silver Spring, Md., where AIRP courses are held, as faculty have started to apply their learnings back home. “A lot of the ideas I’ve been shown through this program, I’ve been able to implement at my institution,” says Nicholson. “I have residents who are at the University of Iowa for four years and I have continuous interactions with them. I can more easily use some of that asynchronous learning outside the classroom because I can follow up with them.”



PHOTO: CARLA BRINHWALTE

According to Robinson, student-teacher collaboration is a key piece of the T21 program. “We hope to explore ways to enhance communication and collaboration between instructors and learners,” she says. “We are encouraging faculty to think critically about what is working — and also what aspects might leave room for improvement.”

Nicholson agrees. “One of the benefits of this experience is that all of us can bounce ideas off each other,” says Nicholson. “We have to come up with creative ideas and then brainstorm within the group on how to implement them in a finite period of time.” Nicholson notes that part of the magic of the collaboration has been discussing obstacles as a group — reasons the faculty might be afraid to try something new or why they think an idea might not work. According to Nicholson, “If we share these ideas and get feedback, we’ll be more likely to actually attempt them or implement them in practice.”

Robinson notes that the value of programs such as T21 is that it provides radiologists with a variety of new ideas to choose from. “Radiologists have enough of their own content — knowledge and skills to keep abreast of — much less having to research best practices for teaching and learning,” she says. “We hope to provide these radiology instructors with a menu of sorts. We’re helping them to create their own arsenal of tools with which they can attack any barriers to learning that might exist.” **B**

By Cary Coryell, publications specialist, ACR Press

Tom Daccord, CEO of EdTechTeacher, facilitates a T21 workshop with several AIRP® faculty members at the Double Tree by Hilton Hotel in Silver Spring, Md.



Training That Transcends

The recipient of the 2018 ACR Foundation Global Humanitarian Award reflects on his efforts to improve radiological care in Tanzania.

The World Health Organization estimates that two-thirds of the planet does not have access to basic radiology services: simple X-rays and ultrasounds.¹ Improving that access to quality radiological services in low- and middle-income countries is important to the College. Each year, the ACR Foundation selects an outstanding radiologist, organization, or program for its Global Humanitarian Award. The *Bulletin* spoke with the 2018 recipient, Michael T. Nelson, MD, FACR, of Minnetonka, Minn., who has spent his 25-year career training assistant medical officers (AMOs) and radiology residents in Tanzania.

How did you first get involved in humanitarian work?

At the University of Minnesota, I had a professor named Helmut C. Diefenthal, MD, PhD, who was the originator of the radiology program at Kilimanjaro Christian Medical Center in Moshi, Tanzania. He taught me how to do biopsies. When he retired, he started a residency program in Moshi and asked me to give the radiology boards.

Diefenthal also had this vision to train AMOs — similar to physician assistants in the U.S.

The first time I went to Tanzania was in 1988. Every year, I return there to give the boards, provide lectures, and serve as a consultant. We've now trained close to 150 AMOs across the country. In Moshi, they now have X-ray and ultrasound capabilities and — in some of the bigger cities — CT scanners. Over the past 28 years, I've been to Tanzania 33 times.

How have radiological services changed in Tanzania throughout your work there?

There are many more services available in Tanzania now than there were in the 1980s and 1990s. The last trip we took was in January. We presented two workshops on breast and liver screening.

The nonprofits I work with just built an infusion center and are building a cancer ward next to it in Moshi. We'll be assessing and building radiation therapy services

Left to right: Larry Daugherty, MD, Tom Ladd, and Michael T. Nelson, MD, FACR, are pictured at the top of Mount Kilimanjaro as a Radiating Hope team.

Top row, second from left: Jake Hakkola, MD, an IR fellow at the University of Minnesota, is pictured with AMOs he lectured at KCMC.

A view of Mount Kilimanjaro from the KCMC entrance



Left to right: Nelson, Kevin Boegel, MD, and Jake Hakkola, present a new portable ultrasound to the KCMC staff.



Nelson presents portable ultrasounds for AMOs and medical school graduates to Dr. Columbo at KCMC.

Seeing our trainees become some of the most successful practitioners in the country has been incredible.

there. The cancer center will allow radiologists to see about 100 patients a day. The centers are funded by two nonprofits — the East Africa Medical Assistance Foundation and the Foundation for Cancer Care Boards in Tanzania.

What big challenges still exist in Tanzania?

Initially, the obstacles were that we didn't have much funding. We also had limited equipment and facilities — so just trying to train and optimize the radiology services was a big challenge when I began volunteering. Now, the biggest issue is trying to get patients to the clinic. We have a large area of 18 million people over a 300–500 mile radius, so usually the families accompany the patients via bus or truck. We tried to obtain some funding for travel so the patients could get there, but Tanzanian radiologists could only treat about 7 percent of the population. That's why we developed a second radiology center in Northern Tanzania.

However, it was the residency program and training that really made the difference in care in the country. Today, the local physicians have really taken it over. The

country's healthcare system has been rapidly expanding in the last five to ten years. They now have digital radiography, portable US, and PACS with digital reading.

Can you share any specific success stories?

Seeing our trainees become some of the most successful practitioners in the country has been incredible. Both the past and current chairs of the Kilimanjaro Christian Medical Center in Moshi were trainees in our program. Ahmed Jusabani, MD, was in our first graduating class of doctors and is now an all-star in Tanzanian radiology. He has developed a really nice department with CT, MRI, and IR labs at Aga Khan Hospital in Dar es Salaam. We're really proud that every graduate gets a portable US unit when they leave the program.

How has your volunteer work impacted you personally?

It's fulfilling to see the Tanzanians take this on as a project and continue it self-sufficiently. Now, they're training other residents to perform radiological services. It looks like the training program will transcend our group here in the United States because Tanzanians can now help train themselves. That doesn't mean we won't continue to help as consultants.. It's rewarding to see progress in Tanzania on several different cancers, such as liver and breast cancer. It's one of the few times you can actually see outcome changes on the work that you did. **B**

ENDNOTE

1. "Essential Diagnostic Imaging," World Health Organization. Accessed May 6, 2019. Available at bit.ly/WHOImaging.



Where will your travels take you?

Did you know that the ACR Foundation's Goldberg-Reeder Resident Travel Grant awards grants each year to qualified residents and fellows seeking to spend at least one month assisting healthcare in a developing country? Apply for the grant by June 30 at acr.org/Goldberg-Reeder.

Lights, Camera, X-ray

By incorporating patient photographs at the point of image acquisition, Emory radiologists reduce errors and increase clinical context for improved outcomes.



Tridandapani and his team outfitted the hospital's portable X-ray machines with small cameras, as the arrow indicates.

Eight years ago, Srinu Tridandapani, MD, MBA, PhD, at that time an assistant professor of radiology at Emory University, was looking at two X-rays that were supposed to be of the same patient, when he noticed something amiss: one image showed a fractured bone, but the other showed the same bone intact. Tridandapani quickly realized that one of the images had been mislabeled — they were of two different patients.

As Tridandapani discussed the error with one of his colleagues, his cell phone rang. When he looked down at his phone, he immediately knew it was his wife because her photo appeared on the screen. That's when Tridandapani began to wonder: Could photographs of patients help prevent wrong-patient errors at the hospital much the same way that photos on his phone alerted him to who was calling?

Tracking Errors

Patient identification errors like the one Tridandapani witnessed those years ago are not uncommon. In fact, a study that Tridandapani co-authored in 2015 showed that 67 near-miss patient identification errors (events detected and corrected before a patient is harmed) occurred over a 4.5-year period at two large academic hospitals.¹ The study also found that wrong-patient errors, particularly near-miss events, are underreported at a rate of about 1 in 10 events.

To reduce such errors, Tridandapani thought a system that attaches patient photographs to imaging studies would help radiologists identify radiographs in two ways: 1) if the photograph did not match a photograph from a prior study, or 2) if the patient photo did not match the photograph that the hospital has on file in the patient's EMR.

To start, Tridandapani decided to develop such a system for portable X-ray machines, which are used for

the most common imaging studies conducted at the hospital and are therefore the most likely to be involved in patient identification errors. "It made perfect sense to begin this program with X-rays, though we could certainly see a great potential to expand it to other modalities in the future," Tridandapani says.

Developing the System

Before seeking hospital leadership's approval for the project, Tridandapani got to work on a system prototype. Tridandapani partnered with a Georgia Tech engineering student to build a wireframe model of the system using a digital camera. They rigged the camera with a sensor that detects X-ray signals and then automatically takes a picture of the patient as the radiograph is captured. They tested the system in the lab before connecting it to an X-ray machine or the hospital's PACS.

Simultaneously, Tridandapani partnered with a medical student to see how radiologists would react to having photographs attached to imaging studies and to document the project's clinical value. "We injected patient identification errors into the system and had 45 radiologists look at the cases without the photos attached and another 45 radiologists with the photos attached," Tridandapani says. During the study, the proportion of errors that the radiologists detected increased from 31 percent to 77 percent when photographs accompanied radiographs.²

From there, Tridandapani began pitching his idea to photograph patients at the point of care to hospital administrators, RTs, nurses, and other radiologists around the country. He also shared the results of his error detection study but had trouble selling the idea based on the benefit of error reduction alone.

To overcome this, Tridandapani stressed that the photos would also provide clinical context to help radiologists deliver better patient care. "The photos show the patient's physical condition, which may help indicate specific illnesses or symptoms. This information can help radiologists develop more accurate, concise reports," he says.

Addressing Concerns

While the benefits of attaching photographs to imaging studies were clear, some Emory providers worried about obtaining consent to photograph patients and about violating patient privacy. Fortunately, hospital

administration felt that the existing photo permissions outlined in the care consent form that patients sign before undergoing treatment at the hospital addressed this concern. Tridandapani also worked with the hospital's IT team to ensure the photos would be stored securely on the PACS with patients' imaging studies.

"Patient privacy is essential, not only because it's the law but also because we care about our patients' personal information," notes Marta E. Heilbrun, MD, MS, vice chair for quality at Emory. "We, of course, wanted to make 100 percent certain that none of the photos were being passed to a different IT system that would put them at risk in any way."

Along with privacy, Heilbrun says, stakeholders had one other concern when it came to photographing patients at the point of care: respect. Inpatients are often at their most vulnerable, and many are intubated and unable to communicate. To preserve patients' dignity, the hospital's RTs are always sure to cover patients with blankets and to move any tubes before taking the photos.

"Patient privacy is essential, not only because it's the law but also because we care about our patients' personal information."

— Marta E. Heilbrun, MD, MS

Putting It All Together

Once they obtained support for the project, Tridandapani and Nabile Safdar, MD, MPH, vice chair for imaging informatics at Emory, spent six months working with Emory's IT team to integrate the system prototype into the hospital's PACS and portable X-ray machines. As part of this process, Tridandapani created his own company, Camerad™, which received funding through a National Science Foundation Small Business Innovative Research Grant to support this integration.

Now when an Emory inpatient undergoes a portable X-ray exam, the technologist positions the portable X-ray machine and the mounted camera with its wide-angle



Srini Tridandapani, MD, MBA, PhD, conceived the idea to include patient photographs with images after finding a patient identification error while reading X-rays.



Marta E. Heilbrun, MD, MS, vice chair for quality at Emory, wanted to ensure the automatic photograph system didn't interfere with patient privacy concerns.



Nabile M. Safdar, MD, MPH, vice chair for imaging informatics at Emory, worked with IT to integrate the prototype into the hospital's PACS.

lens directly at the patient. When the RT presses the button to capture the X-ray, the Wi-Fi-enabled camera simultaneously captures the photo. At that point, the system automatically sends the picture to the PACS folder where the patient's imaging study will also be stored. When the interpreting radiologist opens the study, he or she will see both the exam images and the patient photo, which open automatically.

Improving Clinical Interpretation

In the year since Emory implemented the system, it has prevented at least two patient identification errors. It has also helped validate diagnoses when the patient's physical condition visibly correlates with what the radiologist sees in a radiograph. Based on these positive results, Tridandapani envisions eventually integrating the system with CT machines, as well. He believes it could provide critical clinical context for conditions like stroke, where a photo can portray valuable information about a patient's physical condition to help focus the interpretation of a CT scan.

Reducing patient identification errors and improving clinical care are two goals that all radiologists should be working toward, and patient photos can help achieve these objectives. "We talk a lot about the value of providing a face to radiologists, who are often away from patients in the reading room," Tridandapani says. "We should provide that same value when it comes to patients and their care." **B**

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Pragmatic Enthusiasm for AI

By setting realistic project expectations, a small data science team found they could achieve measurable results.

As a radiologist, balancing the potential of AI with the current capabilities and practical considerations for implementing successful projects can be a struggle. However, once this balance is realized, there is real potential to find ways to create change within an institution. We started with a small team focusing on the right problems and with buy-in from leadership.

Developing a Program

Penn State Health is an academic radiology department with 50 radiologists subspecialized by division. Our residency programs graduate six diagnostic and one IR resident per year. As in many health systems, our hospital IT department controls much, if not all, of our institutional data. IT's goals are determined at the highest level of the organization, and its priorities are well-defined. These objectives include storing information about patient clinical encounters, maintaining efficient billing and processes for covering insurance and other business needs, and protecting all of the data. Until recently, IT priorities have not included making data available and enabling data analysis at the departmental level.

When we began our AI journey, we came to a critical realization: We needed to collaborate with IT to enable an easier and more flexible approach to data access and analysis. Since structures in our hospital were originally put in place to efficiently use and safeguard data — rather than for data analysis — gaining access to data for other purposes was no easy task. We faced hurdles including a lack of clarity in data governance, poor or insufficient underlying data structure, and a disconnect between physicians' data needs and IT's abilities and priorities. Despite these hurdles, the enormous potential benefit of using our data to extend Penn State Health's AI capabilities and resources made it worthwhile for radiologists to get involved in data science beyond their other duties.

Building a Team

Our team was named Division of Radiology Innovation and Value Enhancement (DRIVE) and was envisioned as a bridge between radiology and IT. Two radiologists

serve as the co-directors of DRIVE. One director is “operationally” focused and the other “research” focused. However, deliberate coordination between the two areas creates a tightly integrated team. DRIVE is also supported by three full-time data scientists (employed by the department of radiology) with varying skill sets, including full-stack programming and statistical analysis.

For practical reasons, such as the desire for short-term deliverables, we began by using data readily available to us for AI projects. At the same time, we worked to overcome longer-term institutional data governance and cybersecurity concerns. Our DRIVE team simultaneously began focusing on non-interpretive data analysis initiatives designed for automating manual processes, enhancing the patient experience, and streamlining operational efficiencies.

Defining Objectives

Time-consuming manual processes are a good starting point for new AI projects. Because our institution uses the traditional “resident coverage with subspecialist over-reading” model of overnight staffing, we were interested in assessing discrepancies between residents' preliminary interpretations and final staff's interpretations for adult trauma patients.¹ Previously, this was a manual analysis process of querying the trauma database to identify patients and followed by a manual review of radiology reports.

Using a rapid iterative process of development, we retrieved preliminary resident and final attending radiology reports for a specific time period and performed text analysis. The results: The time required for analysis of discrepancies between residents' and radiologists' interpretations dropped from several hours to 10 minutes per week. We were also able to demonstrate a low incidence of major discrepancies — those with the potential to change clinical management or incur patient harm.

With this more timely data analytics capability, we now can demonstrate the high quality of overnight resident interpretation, preserve this crucial educational experience, and maintain the value of subspecialty interpretation expertise.

Measuring Results

Technology can also enhance the patient experience, which was the goal of our second major automation initiative. We were able to use chatbot technology to improve patient education prior to them undergoing breast biopsy.

Our initial pilot phase showed that the chatbot enhanced patient understanding of the procedure in 86 percent of patients. By accessing analytical data developed as part of the chatbot, we also determined that patients wanted to access the chatbot outside of the



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hospital setting and via their smartphones. We are now launching a full clinical implementation of the chatbot — enhanced with pictures and video — to all visitors to our breast center.

On the operational front, we have begun using data analysis to guide the operational performance of our specialty divisions. These analyses include assessing the overall staffing needs of the department as well as daily staffing requirements to meet clinical needs. These tools are beginning to change the culture from a reactive, assumptive process to one that is proactive, predictive, and based on hard data.

While there are hurdles to overcome, IT departments are beginning to recognize the benefits of providing departmental users with easier access to data. As we continue to collaborate on additional data science projects, they can see the value of granting access to radiology departments to meet our business needs. At the same time, they can better see the important role of data analysts in increasing efficiency and improving the patient experience. **B**

By Michael M. Moore, MD, associate professor of radiology and pediatrics, and Nabeel I. Sarwani, MD, professor of radiology, at Penn State Health System

ENDNOTE

1. Bruno M, Duncan J, Bierhals A, Tappouni R. Overnight Resident versus 24-hour Attending Radiologist Coverage in Academic Medical Centers. *Radiology*. 2018; 289(3). Available at bit.ly/Overnight_Rad.

The Right Side

continued from page 13

the work performed and that of the employer.

According to Bhargava, depending on the type of side business, some physicians may also want to investigate whether they need additional insurance or if their current professional liability insurance covers their work. Bhargava reports that while insurance exists for his side businesses, he has opted not to add this coverage.

Extra income — especially income reported on a 1099 form, instead of the more familiar W-2 — should also precipitate consultation with an accountant to discuss tax implications, notes Bhargava. Radiologists should consider setting up an LLC, which requires filing additional federal business taxes and quarterly income reports/taxes with the state, he says. He also found several tax advantages. According to Bhargava, jointly owning your LLC with your spouse can potentially help increase your tax deferred contributions to a Solo 401k, SEP IRA, or a SIMPLE IRA (depending on how your LLC is set up) — which have higher contribution limits. The IRS small business tax code is written to support small businesses, he says.

But extra income is just the icing on the cake in many ways. Although Muroff, Bhargava, and Julius didn't actively set out to start businesses separate from their radiology practices, pursuing a side interest has led to work that energizes them and keeps them engaged. "My blog is just the latest incarnation of my pursuit of interests outside my medical practice," says Julius. "It makes me more excited about what I do on a daily basis. I never know what's going to come up next." **B**

By Emily Paulsen, freelance writer, ACR Press



JOB LISTINGS

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Indiana – Radiology Inc., a 35-member independent private practice group serving the northern Indiana/Michigan area, is seeking neuroradiology and/or MSK imaging specialists for a partnership track position. This position offers a competitive compensation and vacation/benefit packages in Granger, Ind., near the University of Notre Dame and within a short driving distance to Chicago. No IR/mammography is required. Overnight teleradiology coverage is provided.

Contact: Email CVs to switous@rad-inc.com.

Pennsylvania – Radiology Associates of Wyoming Valley, a hospital-based private practice in Wilkes Barre, Pa., is seeking a board certified/board eligible IR to work seven days on/off. The practice is offering a full-time, part-time, or independent contractor position. The candidate must be skilled in angiography, vascular, minor procedures and general radiology. The position is located two hours from Philadelphia and New York City and offers a competitive compensation package and team environment. The employer is open to other alternative schedules.

Contact: Email inquiries and resumes to raww.com.

Washington – Vancouver Radiologists, P.C., has a body imaging opportunity. The candidate must be fellowship-trained in body imaging, with strong general radiology skills. A mammography proficiency is desired. The position will function between two physician-owned imaging centers and a local hospital. There are some rotational call and weekend days involved with this partnership track position.

Contact: Email cover letters and CVs to HR@vanrad.com.

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“We can increase awareness of disparities that exist and their significant impact on health outcomes, conduct outreach to diverse patients and stakeholders to identify social, cultural, and economic barriers to access, partner with communities most negatively impacted by social determinants of health for actionable solutions, and promote health policies that support evidence-based appropriate use of imaging.”

– Texas Radiological Society President Elect Karla A. Sepulveda, MD

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– ACR BOC Member-at-Large Richard Strax, MD, FACR



“I love to be inspired and to inspire, so I have initiated the discussion of developing a curriculum with Baylor’s radiology program director to rouse novel and innovative ideas centered on health equity and population health – particularly within our next generation of radiologists.”

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