

Bulletin



The
Right
Direction



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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.

Digital edition and archives of past issues are available at ACR.ORG/BULLETIN.



Population Health and Radiology

Expanding our focus to population health will support our practices and enable us to reach out to a broader patient base and offer new and important services.

In 2004, W. Chan Kim and Renée Mauborgne wrote the seminal book *Blue Ocean Strategy*. In short, a blue ocean strategy is an analytical framework for creating and capturing unexplored markets.¹

This concept of a blue ocean strategy is certainly relevant to radiology. Throughout our history, we have built upon our successful foundations through new techniques, more modalities, expanded applications, and advanced innovation. We have thrived by continuing to explore the limits of medical imaging for the benefit of patient care.

Certainly, population health and its multiple extensions fit into the concept of a blue ocean for radiology. While population health has become commonplace in other subsets of medicine, particularly primary care, it is just now becoming more popular in our specialty — as it should. Given our expertise in scale, population health applications and processes are prime to be adapted to and expanded by radiology practices.²

Even the term “population health” itself is used in different contexts. In 2003, it was proposed that the definition of population health be “the health outcomes of a group of individuals, including the distribution of such outcomes within the group.”³ The overarching concept of population health is to approach healthcare from a group or population perspective and serve as complementary to the individual approach that has been the basis for much of our history.

Radiology is already solidly embedded in several programs based in population health. Perhaps the most pervasive is breast imaging. Advocating for broad-based screening programs to impact the morbidity and mortality of breast cancer has long been a rallying call for radiology. The overwhelming majority of experts recognize the benefits of population screening for breast cancer. Mammography programs established and promoted by radiology have saved the lives of countless patients.

Similarly, lung cancer screening (LCS) has the potential to intervene in the malignancy cycle earlier to

decrease mortality from the deadly disease. Although several factors have delayed widespread adoption, the College — through its partnerships across organized medicine — is determined to expand this lifesaving tool for those at risk.

In addition to breast imaging and low-dose CT for LCS is CT colonography. Shown to be as effective as optical colonoscopy in detecting significant polyps and early colon cancer, this application is another example of population health where radiology can be a major provider to benefit a large demographic. The ACR continues to advocate for Medicare reimbursement of this vital service.


Radiology is already solidly embedded in several programs based in population health. Perhaps the most pervasive is breast imaging. Advocating for broad-based screening programs to impact the morbidity and mortality of breast cancer has long been a rallying call for radiology.

Other modalities and applications are at our fingertips, such as US for abdominal aortic aneurysms, fast scans for whole-body MRI, cardiac CT for calcium scoring, and dual-energy X-ray absorptiometry for bone density measurement. There is no doubt that unleashing the imagination of our research community will result in new and innovative applications. Many applications can be applied to the data that we already acquire. For example, in a 2021 paper in *RadioGraphics*, Perry J. Pickhardt, MD, professor of radiology and chief of gastrointestinal imaging at the University of Wisconsin, eloquently demonstrated the utility of opportunistic screening during abdominal CT.⁴

Population health may be a relatively new concept in radiology but the intersections with well-established initiatives are clear. Several centers (such as Michigan Medicine, Beth Israel Deaconess Medical Center, and Stanford University) are already leading the way.⁵

Within the ACR, virtually all of our specialty and operational commissions identify with the call to apply

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View the 2021 ACR Virtual Quality and Safety Conference presentation on the role of radiology in population health management by Syed F. Zaidi, MD, MBA, at acr.org/2021Q-S. During his presentation, Zaidi noted that incentives are lining up for primary care physicians and specialists like radiologists to team up in managing the costs of care.

ACS Commission on Cancer Celebrates 100 Years



Commission on Cancer | 1922-2022

The Commission on Cancer (CoC) has launched a year-long campaign to celebrate its 100-year anniversary. Established by the American College of Surgeons in 1922, the CoC is a consortium of professional organizations dedicated to establishing standards to ensure quality, multidisciplinary, and comprehensive cancer care. Since its founding, the CoC has expanded its mission to improve survival and quality of life for cancer patients through standard-setting, prevention, research, education, and the monitoring of comprehensive quality care through compliance standards, data collection, and analysis.

“The longstanding commitment of the ACR to the development of quality standards in radiologic practice and their application through the accreditation process dovetails perfectly with the efforts of the CoC’s accreditation programs,” says Alan C. Hartford, MD, PhD, FACR, professor of radiation oncology at Geisel School of Medicine at Dartmouth and president-elect of the ACR Council of Affiliated Regional Radiation Oncology Societies. “Quality metrics for diagnostic imaging and radiation therapy must be fundamental to the CoC’s development of quality standards in cancer diagnosis and treatment. Given its longstanding traditions within the CoC and its many years of organizational experience, the ACR’s quality standards and accreditation activities are a natural bedrock for the CoC’s efforts in quality assessment and improvement.”

Individuals and representatives of more than 50 cancer-related organizations comprise the membership of the CoC and contribute to the development of the CoC standards and accreditation program. Today, there are more than 1,500 CoC-accredited cancer programs in the U.S. and Puerto Rico.

To learn more about the CoC and receive updates on the 100-year anniversary events, visit facs.org/quality-programs/cancer/coc.

Become an ACR DSI Fellow



DATA SCIENCE
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The ACR Data Science Institute® (DSI) is positioning diagnostic and IRs and radiation oncologists for success in a future where humans and machines work together to deliver enhanced patient care. The DSI is currently accepting applications for its Informatics Fellowship, which provides a radiology resident or early-career professional with hands-on experience in the field of informatics, including one-on-one mentoring. The fellow will be introduced to initiatives of the ACR’s AI-LAB™ and other ACR Informatics projects as part of a three-part program. Applications for the 2022 fellowship will be accepted from Feb. 1 through March 31, 2022. [Learn more and apply at \[acrdsi.org\]\(https://acrdsi.org\).](https://acrdsi.org)

NEWS FROM THE JACR



Check Out the JACR Health Equity Special Issue

The January special issue of the *JACR*® connects radiology with the global conversation about access to affordable, quality healthcare. “This *JACR* special issue on health equity brings together a diversity of topics and authors that will serve as a foundational pillar that showcases the equity work being done across the specialty,” explain editors Melissa A. Davis, MD, MBA, assistant professor at Emory University School of Medicine; Efrén J. Flores, MD, officer of radiology community health improvement and equity at Massachusetts General Hospital; and Ruth C. Carlos, MD, MS, FACR, professor of radiology and assistant chair for clinical research at the University of Michigan and editor-in-chief of the *JACR*.

Did you know the articles in this special issue are freely available and not behind a paywall? Share with a colleague outside of radiology. Who do you know is looking for ways to spark change?

[Read the special issue at JACR.org.](https://www.jacr.org)



Join Us for the JACR Journal Club

The *JACR*® online journal club is kicking off the year with its Jan. 27 gathering. The session will be livestreamed on the *JACR* YouTube channel with real-time participation. Each session of the journal club brings together experts to discuss a topic of interest to radiologists at all career stages. The recording will also be available afterward. [Head to \[jacr.org\]\(https://www.jacr.org\) for more information.](https://www.jacr.org)



What Are You Looking Forward to in 2022?

Do you have any professional resolutions or goals that you'd like to share with your colleagues? If you know or work with medical students, have they decided to go into radiology? If so, tell us what drew them to radiology and the ACR. Will you be starting a new fellowship that you're excited about? We want to know! You can either upload a video or a short-written piece with an image.

Visit [acr.org/WeAreACR](https://www.acr.org/WeAreACR) and tell us your ACR story.

Radiology education, for the most part, has cleverly adapted to the new virtual world.

— NEIL K. JAIN, DO, IR/DR RESIDENT AT MEDSTAR GEORGETOWN UNIVERSITY HOSPITAL AND CHAIR OF THE ACR MEDICAL STUDENT SUBCOMMITTEE



CPI Releases New Module in Pediatric Radiology

Co-chaired by Jennifer E. Lim-Dunham, MD, FACR, and Vijetha V. Maller, MD, the new Continuous Professional Improvement™ (CPI) Pediatric Radiology Module 2021 includes:

- Anatomy from head to toe, encompassing the neurological, respiratory, cardiovascular, GI, GU, and MSK systems
- Pathology in a variety of patient ages, ranging from the fetal life and infancy to adolescence and young adulthood
- Multimodality images, including plain radiography, fluoroscopy, US, CT, nuclear medicine, and interventional imaging

Each CPI module is designed to be a comprehensive learning experience broad enough to meet the educational needs of general diagnostic radiologists, subspecialists, and residents. Test your knowledge in 50 self-assessment questions and earn 8 SA-CME. Choose your format (print or online) and download the free e-book copy. Members save \$35 per module when bundling six modules via a CPI Select Six.

Learn more at [acr.org/cpi](https://www.acr.org/cpi).

Radiology Health Equity Coalition to Address Healthcare Disparities

Eight major radiology organizations are collaborating in the formation of a Radiology Health Equity Coalition to positively impact healthcare equity in the radiology arena and beyond.

The coalition, convened by the ACR, includes the ABR, the Radiology Section Council of the AMA, the Association of University Radiologists, the Section on Radiology and Radiation Oncology for the National Medical Association, the RSNA, the Society of Chairs of Academic Radiology Departments, and the Society of Interventional Radiology, with specialty and state radiology organizations already joining the initiative.

“The members of the Radiology Health Equity Coalition are committed to addressing health disparities and improving health outcomes for the underserved,” says Jacqueline A. Bello, MD, FACR, chair of the Radiology Health Equity Coalition and vice chair of the ACR BOC. “Our collaborative framework empowers radiologists to work across healthcare to serve patients. I strongly urge other medical societies to join this effort.”

The Coalition welcomes other healthcare and advocacy organizations — including other medical specialty societies — to join in the critical initiative to measurably change health outcomes in underserved populations. Email info@radhealthequity.org for more information.

Providers and practices can commit to the cause at [radhealthequity.org](https://www.radhealthequity.org).



O-RADS for Ultrasound: Webinar Series

A new three-part on-demand webinar series discusses the implementation of the Ovarian-Adnexal Imaging Reporting & Data System (O-RADS™) Ultrasound concepts. The first video summarizes how to use an algorithmic approach to streamline adnexal lesion categorization and management and includes a general overview of the governing concepts, lexicon terminology, and suggestions for reporting. The second webinar presents cases of varying degrees of difficulty that illustrate use of the lexicon and risk management system, including technical considerations and tips. The third video addresses FAQs regarding O-RADS Ultrasound to enhance the user's understanding and application of the system.

Access the full webinar series at bit.ly/ORADS-webinar.

ACR Expels College Member for Ethics Violations

The ACR expelled Tirath Y. Patel, MD, in May 2021 for violating the ACR Code of Ethics.

A November Tradition

The release of the Medicare fee schedules may be an annual event, but in reality, the work is a year-round endeavor.

Everyone has annual traditions. For the ACR Commission on Economics, one of those November traditions is the end of CMS' rulemaking cycle — culminating in the release of the Medicare fee schedule. Much like the commonly celebrated holiday it closely follows, this tradition typically brings both trills and treats. The 2022 Medicare Physician Fee Schedule (MPFS), the Quality Payment Program (QPP), and the Hospital Outpatient Prospective Payment System (HOPPS) rules continued the annual tradition with plenty of both.

The MPFS Final Rule estimates a -1% impact to diagnostic radiology reimbursement due to changes in relative value units and adjustments to clinical labor pricing across the budget-neutral fee schedule. The good news is — thanks to advocacy efforts of a multi-specialty coalition, including the ACR — the impact is less than the 2% reduction in the Proposed Rule and will be phased in over four years. The bad news is that IR still faces a formidable reduction of 5% (reduced from 9%). The worse-than-bad news is that additional cuts threaten radiology via reductions in the conversion factor (CF). Last year, Congress allocated an additional \$3 billion to the MPFS to mitigate draconian cuts to physicians caused by revaluation of Evaluation and Management (E/M) codes. This one-time cash infusion buffered the CF by 3.75% in 2021. Unless Congress legislates another payment to the fee schedule, the CF will come back to haunt us with a 3.75% decrease in 2022. Additional reductions of 4% and 2% may result from Pay-As-You-Go (frequently referred to as "PAYGO") and Medicare sequestration, respectively — in the absence of legislative intervention before the end of the year.

Past rules have placed radiology in the crosshairs of payment reduction via nomination of specific CPT® codes as potentially misvalued. Fortunately, no radiology codes were nominated by CMS or public stakeholders in the 2022 MPFS rule. However, we continue to face further reductions to the CF as the remaining families of E/M codes are revalued in a budget-neutral system.

The 2022 QPP rule details updates to the Merit-Based Incentive Payment System (MIPS) and plans to

transition away from MIPS toward MIPS Value Pathways (MVPs). CMS finalizes the seven initial MVPs that will be available, beginning with the 2023 performance year, and maintains that additional MVPs will be added as they are developed. It remains unclear how radiology and other specialties whose care is not episode-based will participate in MVPs. As for MIPS, the difficulty of the program escalates, and radiologists encounter a particular disadvantage. The performance threshold (below which clinicians receive a financial penalty) increases to 75 points, and the exceptional performer bonus (above which clinicians are eligible for a bonus outside of budget neutrality) increases to 89 points. The data completeness threshold, proposed to increase to 80%, will remain at 70%.

While the bar gets higher to achieve a positive payment adjustment in MIPS, the road gets harder for radiologists due to a paucity of available quality measures. Two radiology measures were finalized for removal: Stenosis Measurement in Carotid Imaging Reports and Reminder System for Screening Mammography. Due to scoring caps on topped-out measures, radiologists simply do not have enough quality measures available to score highly in the Quality category without using Qualified Clinical Data Registry (QCDR) measures. Perhaps the most devastating blow in the 2022 QPP rule is the removal of bonus points, previously awarded for submitting additional high-priority measures or submitting measures using end-to-end electronic reporting. In the early years of MIPS, radiologists have been able to make up for the scoring deficit due to capped measures with bonus points. With the removal of bonus points, even radiologists who perform perfectly on six measures submitted in the Quality category will not be able to score well. CMS will continue to award small practices an additional six bonus points to their score in the Quality category.

The 2022 HOPPS rule brought a solid win to radiology, with a long-awaited increase in the technical component payment for low-dose CT for lung cancer screening performed in the facility setting. This code was reassigned to the second-tier ambulatory payment classification, with a reimbursement rate of \$111.19. The HOPPS final rule also included finalized changes to the Radiation Oncology Alternative Payment Model, which is slated to begin Jan. 1, 2022. While CMS made small concessions to the proposed framework of the model, the ACR and other stakeholders remain concerned about the fairness and feasibility for our radiation oncology colleagues. We continue to pursue a legislative solution — another example of ongoing efforts by the ACR's economics and government relations teams. **B**



The Right Direction

The ACR is engaging, mentoring, and educating medical students to keep the specialty moving forward.

“A huge part of how we teach and train medical students comes down to engagement,” says Lori A. Deitte, MD, FACR, chair of the ACR Commission on Publications and Lifelong Learning. “We want to give medical students the opportunity to engage in educational activities that could influence their career path — using a longitudinal curriculum to allow medical students the opportunity to select diagnostic radiology, IR, or radiation oncology early enough as their career preference and be able to match successfully into the corresponding residency program.”

The ACR’s Task Force on Medical Student Education has been investigating avenues for introducing all medical students to diagnostic radiology, IR, and radiation oncology taught by radiologists and radiation oncologists throughout their first through third years. “We think integrating radiology taught by radiologists into an existing curriculum will be the most successful approach,” Deitte says. This allows those seeking a career in other areas of medicine to understand radiology’s central role, she adds.

At ACR 2021, Deitte reported on the Task Force’s recommendations, which align with the Commission on Publications and Lifelong Learning’s goals around medical student education. These include providing educational resources to close gaps in radiologic practice performance and producing educational resources for a broad audience — counting medical students, residents, radiology professionals, inter-disciplinary team members, and patients.



Medical student education and engagement are important parts of the ACR's mission. The ACR, in collaboration with the Association of University Radiologists and the Alliance of Medical Student Educators in Radiology, is offering the medical student community a host of educational content in radiology and clinical decision support, free of charge (learn more at bit.ly/MSprogs).

TARGETING RESOURCES

"The ACR offers incredible resources to the medical student community," says Patricia Balthazar, MD, assistant professor of radiology and imaging sciences at Emory University. These include the Standardized Tool for the Assessment of Radiology Students (STARS), a collaborative effort of the Alliance of Medical Student Educators in Radiology and the ACR that provides medical schools with a national, web-based question-item database and exam-taking system to use in assessing students throughout their radiology courses. Another tool, Radiology-TEACHES™, simulates the process of ordering an imaging exam based on the ACR Appropriateness Criteria®. Radiology-TEACHES addresses the gap in curricula on the Appropriateness Criteria through case vignettes to mirror the process of ordering imaging studies. Learners receive evidence-based feedback to better understand appropriate imaging utilization and reduce waste. More than 58% of medical schools now participate in Radiology-TEACHES, according to Deitte. In addition, medical students are now authoring cases through the program with the assistance of radiology mentors — and health equity modules are now available.

On a higher-level scale, the ACR's medical student curriculum allows students to access a large radiologic education library. The free resource is intended to educate medical students on radiology and provide medical educators with resources to build a radiology curriculum. The medical student curriculum has been popular — with already 1,600 unique page views.

"The curriculum resource is vital, as many medical students are not exposed to radiology until very late in their training — and sometimes not at all," Balthazar says. "Some medical schools do not offer a dedicated radiology clerkship, and some don't have a radiologist involved in the pre-clinical curriculum."

The Task Force's findings bear this out, pointing to no national standard regarding imaging education for graduating medical students at accredited schools. In addition, medical student education lacks an evidence-based framework for radiologist-led education.

Medical students may also miss out on interactions with radiologists during the early years of training, the Task Force concluded. Other findings include a need for increased availability and preparation of radiologists for teaching roles — paired with recommendations to decrease instances of non-radiologists as primary teachers of medical imaging.

"Radiology can be introduced in the pre-clinical years by including the specialty in anatomy and pathology courses," Balthazar says. "As students progress to the clinical years, radiology can be integrated into other clerkships."

This could include recognizing basic surgical findings such as classic appendicitis on CT during surgery or appropriate use criteria for ordering imaging exams, she says.

INTRODUCING RADIOLOGY

"Whether students are looking to gain a better understanding of a topic within radiology, contribute to educational projects, or find a mentor to support their career goals, the ACR has many resources available for students," says Sydney Rubin, a fourth-year medical student at Michigan State University and an aspiring radiologist. "I was fortunate because I had early exposure to radiology in my pre-clerkship curriculum, as well as a required core clerkship course — which allowed me to make an informed decision to pursue a career in this specialty."

The ACR provides medical students with opportunities to actively contribute to projects. "I am passionate about medical student education and the ACR allowed me to develop case vignettes for Radiology-TEACHES," says Rubin. "Through participation as a medical student author, I was also connected with a mentor, Arnold C. Friedman, MD, who has supported my pursuit of a career in radiology beyond the completion of our project."

"I believe most students approach the later years of their education with an open mind, but many already have a sense of what specialty they will likely choose," Rubin says. "Because radiology is such a diverse specialty, with many career options, it is really important that medical students are introduced to the field early in their training and meet mentors to gain a sense of the breadth within the specialty."

"The lack of role models, mentorship, and exposure to radiology are barriers for recruitment in medical school," Balthazar says. "Even when we review the residency applications of students who ended up finding their best fit in radiology, we often see students making a last-minute decision in their fourth year due to the late exposure." This is due in no small part to misinformation about the current state and future of the field, she adds.

"I would like to dispel the myth that radiologists don't have patient contact," Balthazar says. "Many radiology subspecialties have direct patient contact for procedures — for

Attend the 2022 Medical Student Symposium

Registration is now open for the 2022 Medical Student Symposium, taking place Jan. 22, 2022, from noon–5:00 p.m. ET. Take part in a one-day virtual experience, organized by fellow medical students, where you will hear from a diverse group of speakers on topics ranging from diagnostic radiology, IR, women and diversity, and matching into radiology. Throughout the day, you will explore the rapidly evolving field of radiology, learn from your peers during the case competition, and take part in an escape room.

For more information on the symposium and to register, visit bit.ly/2022MedStudentSymposium.

example, IRs, breast imagers, and some MSK and abdominal imagers. Radiology is a wonderful career choice that allows you to make a direct impact on the care of multiple patients in a single day. Your interpretation of the imaging findings can completely change the course of someone's condition."

DEFINING WORK

"In my experience, medical education is changing for the better when it comes to connecting students with radiology," says Neil K. Jain, DO, IR resident at MedStar Georgetown University Hospital and chair of the ACR Medical Student Subcommittee. "Why would you not want to be on the frontline of medicine?"

"This year, we aim to form additional subcommittees within the RFS that will be a part of the ACR's overall mission," Jain says. "One example would be the recently launched bioethics subcommittee. The idea came actually from a medical student who is very passionate about bioethics." The subcommittee looks at the interconnection of ethics and radiology, a topic vital to radiologists at all career stages but particularly important for physicians-in-training, Jain says.

The Medical Student Subcommittee is part of the ACR RFS and by extension, the Commission on Membership and Communications. Subcommittee members work to develop resources for medical students and provide input to ACR committees on issues related to membership retention and medical student outreach.

The RFS also facilitates two journal clubs — one on the topic of AI and one on economics. The journal clubs let trainees interact directly with ACR leaders to gain their unique perspectives. The RFS AI Journal Club also has its own YouTube channel (learn more at acr.org/Member-Resources/rfs/Journal-Club).

"Medical students must understand that AI and machine learning are here to stay but not here to necessarily take away jobs from radiologists," Jain says. "Instead, new technologies will complement our workload so radiologists can focus more on interesting cases." Another myth is that radiologists do not perform procedures, Jain says. "There are so many different specialties within radiology that provide procedural experience,

interventional radiology being at the extreme. You definitely leave the dark room and interact with patients, colleagues, and other clinical staff," he says.

Jain adds, "I like to think about radiology this way — you are at the center of disease management. Your findings dictate a patient's care management or treatment plan. When you throw radiology at medical students in their third year without a proper introduction in the preclinical years, they don't have the time to truly consider and appreciate the specialty."

"When it comes to patient-centered care, many students believe that radiology isn't involved. However, some can argue that radiology is at the center of it," Jain says. "And if radiology was taught during the pre-clinical years, there would be an opportunity to show how interconnected radiology is to their other coursework."

PUSHING FORWARD

"I would strongly suggest that medical students who are interested in radiology take the initiative to get involved with the ACR early," Rubin says. "There are many diverse opportunities to engage by contributing to Case in Point®, getting involved with an ACR state chapter, or participating in one of the ACR's programs."

"When we put the Task Force together, it was formed with an intentionally diverse representation," Deitte says. The group includes a dean of a medical school, medical students, a radiation oncologist, members of the RFS and YPS, and so on, she notes. This is critical to achieving next steps based on Task Force findings, representing all voices.

Current goals of the Task Force include early engagement of radiologists with medical students through teaching, mentoring, and outreach programs. The Task Force plans to conduct a needs assessment of faculty and medical students and then share best practices for radiologist-led imaging education that is integrated into schools' curricula.

The Task Force also wants to develop a graduation standard, which would include a curriculum of core topics (imaging utilization, safety, etc.) that is expected of all graduating medical students. The group plans to collect case studies on value-added, radiologist-led activities, such as teaching, tumor boards, and workshops.

"We want to increase the use of social media and employ other online platforms to engage medical students," Deitte says. "And we will engage with the Society of Chairs of Academic Radiology Departments to identify a faculty leader in individual medical school departments to lead the charge and act as a liaison between medical schools and radiology educators." This will facilitate inclusion of the radiologist on undergraduate curriculum committees, Deitte asserts. The Task Force also plans to build a network of educators using a webinar series designed for faculty teaching.

"There is nothing more rewarding than mentoring, educating, and developing our future leaders," Deitte says. "We are developing our pipeline of future members — and we've got to engage, mentor, and educate to keep the specialty moving in the right direction." **B**

By Chad Hudnall, senior writer, ACR Press

Call for Case Studies on Medical Student Education

The CSC passed Resolution 34 at ACR 2020 and the Task Force on Medical Student Education was formed. The 22-member Task Force completed its work with a report provided to the CSC at ACR 2021. In line with one of the nine Task Force recommendations, the ACR is seeking case studies where value add is demonstrated by radiology-led teaching integrated into the medical school curriculum.

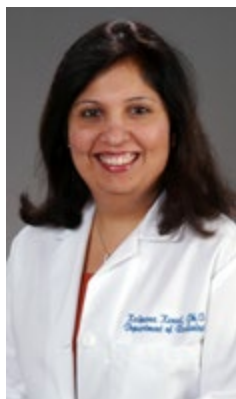
Each case study should include actionable steps that can be followed for educators to implement similar initiatives at their institutions. Have a suggestion for a case study?

Please share your idea at acr.org/Suggest-a-Case-Study.

New Pediatric CT Dose Benchmarks

The ACR DIR benchmarks are a step forward for pediatric dose optimization.

Comprehensive benchmarks for pediatric CT protocols have been lacking in the radiology space for a long time. That changed in October 2021 with the publication of the new ACR Dose Index Registry® (DIR) benchmarks in *Radiology* — a working document to guide radiology facilities in adjusting pediatric CT protocols and resultant doses for their patients (available at bit.ly/DIR_Rad).



“We now have benchmarks for the top 10 pediatric CT exams in the U.S., and hopefully this will help sites to optimize radiation dose as a function of patient size and age.”

— KALPANA M. KANAL, PHD

“This is the first paper of its kind,” says Kalpana M. Kanal, PhD, past chair of the ACR DIR and professor and section chief of diagnostic physics in the department of radiology at the University of Washington. “We now have benchmarks for the top 10 pediatric CT exams in the U.S., and hopefully this will help sites to optimize radiation dosage as a function of patient size and age.”

The process of compiling these benchmarks was a years-long endeavor, Kanal says. The DIR supplied investigators with approximately 1.5 million CT examinations as a function of patient age and size from a wide range of facilities with different characteristics, such as community clinics, urban hospitals, and academic sites. The publication’s authors analyzed DIR data from 2016 to 2020 to develop the diagnostic reference levels (DRLs) that radiology personnel can reference in their day-to-day work.

In the report, both DRLs and achievable doses (ADs) are provided so facilities are encouraged to compare their doses to this national benchmark and optimize their radiation dose delivery as needed. DRLs should be used to determine if a local facility’s CT dose indices are unusually high or low, but not be used as target doses. DRLs and ADs are not intended to be used for comparisons with dose indices for individual patients but rather for the whole patient population. Facilities now can analyze and compare their size and age-grouped dose indices with the respective size or age-grouped ADs and DRLs, as appropriate.

“This information is current and comprehensive,” says Donald P. Frush, MD, FACR, professor of radiology and chair of the Image Gently® Alliance. “Our analysis indicated that much more

than 90% of CT scans are going to be included in that set of 10 most common pediatric CT exams.”

As described in the publication, prior to these long-awaited benchmarks, little data existed on pediatric dose indices. The data set that was available was often “outdated, lacked data from diverse imaging settings and scanner manufacturers, or had limited statistical power.”¹

“We are constantly trying to balance this equation of what is acceptable image quality and what is the minimum detriment of radiation,” says Frush. “Radiation exposure in any patient is something we should be mindful of, and it has been recognized that growing children are more susceptible to radiation effects than someone who is fully grown.”

According to Frush, these benchmarks help take the guesswork out of radiation doses for populations of pediatric patients and allow radiologists, RTs, and medical physicists to work together under well-researched guidelines that will keep their patients safe and ensure image quality. It is challenging, he says, for small radiology practices where pediatric scanning is very infrequent to analyze DRLs and proper dosing, so these benchmarks are especially helpful in that setting.



“We are constantly trying to balance this equation of what is acceptable image quality and what is the minimum detriment of radiation.”

— DONALD P. FRUSH, MD, FACR

continued on page 22

New Radiation DRLs for Top 10 Pediatric CT Exams

The DIR DRLs for common pediatric CT examinations help imaging facilities and providers optimize radiation dose used in children’s imaging. Based on the volume of exams in the DIR, the following are the 10 most common pediatric CT exams:

- Head Without IV Contrast
- Sinuses Without IV Contrast
- Maxillofacial Without IV Contrast
- Neck Soft Tissue With IV Contrast
- C-Spine Without IV Contrast
- Chest Without IV Contrast
- Chest With IV Contrast
- Abdomen/Pelvis Without IV Contrast
- Abdomen/Pelvis With IV Contrast
- Chest/Abdomen/Pelvis With IV Contrast

Learn more at bit.ly/DIR_Rad.

AI Transparency

Should we label algorithms like food products?



Deep learning typically results in the development of “black box” algorithms. The algorithm takes millions of data points as inputs and correlates specific data features to produce an output. But can doctors trust black box algorithms? Questions like this inevitably spark lively debate. On one hand, there are plenty of commonly used healthcare black boxes — for example, the mechanism of action for lithium, standard first-line treatment for bipolar disorder, remains mysterious. Despite the complex and opaque inner workings of many medical innovations, physicians are motivated to understand the tools of the trade, asking, “What’s inside the package?”

Understanding the Black Box

Collaborations between Duke University healthcare professionals and the Duke Institute for Health Innovation have resulted in dozens of machine learning and AI technologies being developed and integrated into clinical care. These include well-validated expert heuristics that are integrated into clinical decision support as well as difficult-to-interpret deep-learning systems that run in realtime to enhance safety and quality in clinical decision making.

As projects approach clinical integration, we develop and disseminate training materials, meet with stakeholders (especially end users), and establish governance processes to ensure that AI innovations are adopted in a safe and responsible manner. Our process is participatory and grounded in human-centered design.

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User input and feedback are incorporated throughout the AI development, evaluation, integration, and maintenance process.

Early on, we focused on building capabilities and understanding among clinical project leaders. We held ELI5 (explain it like I’m 5) workshops where statistics faculty and graduate students simplify neural networks, train/test splits, and other machine learning nuances in plain English.

Along the way, we fielded all sorts of questions from physicians about “what’s inside the black box?” But as more clinical end users interacted with the AI tools we built, we quickly realized we needed something much simpler than even an ELI5 workshop. We needed more basic AI transparency — something akin to food packaging labels.

Looking at Product Labels and Instruction Manuals

There were two immediate problems we needed to solve. First, the hype around AI often led clinical end users to believe the tools we built were more powerful than they actually were. For example, we trained a sepsis model exclusively on structured vital sign, medication, analyte, and comorbidity data. When asked how the sepsis model works, one end user responded that the model reads all the notes looking for signs of sepsis. Hence, we needed to simply present the list of model inputs and its outputs. Second, we found that as clinical end users developed experience using an AI tool for one use, they began considering it for additional potential uses. They did not have a clear understanding of how narrowly AI tools are developed and validated. AI is typically validated for

AI is typically validated for a specific decision point in a specific population of patients in a specific setting at a specific point in time. Outside those parameters, we needed to clearly warn users not to try to apply a tool beyond its intended use.

a specific decision point in a specific population of patients in a specific setting at a specific point in time. Outside those parameters, we needed to clearly warn users not to try to apply a tool beyond its intended use.

At the time we sat down to design our first label, during the summer of 2019, we were breaking new ground. AI product labels seemed obvious. Google had just published “Model Cards for Model Reporting” and, the prior year, IDx-DR requested *de novo* classification. Despite this progress, we could not identify a single AI product label for a healthcare tool not regulated as a device. So, we got to work mocking up designs and gathering feedback from clinical stakeholders and former regulatory officials.

We ultimately built consensus around a one-page document and published examples in *Nature Digital Medicine* and *JAMA Network Open*. Now, every AI tool we build is accompanied with a “Model Facts” label with sections for summary, mechanism of action, validation and performance, uses and directions, warnings, and other information. Over time, we found that some physicians wanted more than what we could fit on the label. So, we wrote our first instruction manual for our AI mortality models.

Opening the Black Box

In the time since we published our first “Model Facts” sheet, research into AI transparency and interpretability has proliferated. Complex methods are developed to discern how neural networks work, what sections of images are most salient to predictions, and how human-recognizable features are used by algorithms. Calls for regulatory intervention have similarly heightened. Clinical and

machine learning experts confidently claim that physicians should not be asked to use black box tools.

But most conversations about transparency neglect the basics. When physicians ask, “What’s in the black box?,” the first thing they need is a label. And physicians who want additional information beyond the label should be able to access an instruction manual. Both should be in plain English text with standard, recognizable sections. We need physicians to understand at a high level how these tools work, how they were developed, the characteristics of the training data, how they perform, how they should be used, when they should not be used, and the limitations of the tool. If we don’t standardize labels and instruction manuals, it won’t matter how sophisticated our explanatory techniques get. We will leave clinical end users wondering what’s inside the black box and risk eroding trust in the tool and the field of AI.

Eluding Progress

Two years after embarking on our AI transparency initiative, the situation hasn’t changed. Most AI products still don’t have product labels or instruction manuals. Numerous health systems and AI product developers have reached out to us at Duke to discuss adopting the practice internally. Industry news outlets, like *STAT*, featured the practice in articles. But it still seems complex approaches to transparency are more mesmerizing than labels and instruction manuals.

For now, responding to physicians asking, “What’s in the black box?” falls on the individual health system teams that lead AI product procurement, integration, and lifecycle management. So next time someone tries to sell you an AI product or asks you to use an AI product, start by asking “Where are the product labels and instruction manuals?” before going any further. **B**

By Mark P. Sendak, MD, data science and population health lead at the Duke Institute for Health Innovation; Christopher J. Roth, MD, vice chair of radiology, clinical informatics, and information technology at Duke University, director of imaging informatics strategy with Duke Health, and associate professor of radiology; and Suresh Balu, MS, MBA, director of the Duke Institute for Health Innovation and associate dean for innovation and partnerships at Duke University School of Medicine

Participate in AI-LAB™ Federated Learning



Radiologists can now register their practices to take part in the next-generation ACR DSI AI federated learning program hosted on the AI-LAB™ platform. This free, vendor-neutral toolset allows users to test drive, develop, and train AI algorithms at their institutions using local patient data. With federated learning, registered sites soon can participate in multi-site algorithm creation, while allowing their data to remain safely on their own servers. These sites will have access to both the community-created models and anonymized performance benchmarks so that they can understand performance of the algorithm produced by the greater clinical community. This process will help them tune their own AI implementations to meet clinical needs. Get more information on taking part in AI-LAB™ federated learning at acrdsi.org.



The Future of Prostate Cancer

The ACR's research efforts are paving the way for precision in prostate cancer diagnosis and treatment.

Prostate cancer makes up one-fifth of all diagnosed cancers in American men; it is both the second most common malignancy and the second leading cause of cancer death.¹ One in eight men will be diagnosed with prostate cancer, and one in 41 men will die from it.² A significant challenge in optimizing diagnosis and treatment in prostate cancer is the heterogeneity of the disease, and thus a wide range of possible management options.

Screening via prostate specific antigen (PSA) testing has significantly reduced prostate cancer mortality through earlier detection of localized disease. However, over one-third of newly diagnosed cases are low risk and may never progress without any treatment. While active surveillance is appropriate for many low-risk cases, the introduction of improved treatments with fewer side effects has dramatically increased the number of men of all ages who elect curative intervention for a localized cancer.³

To define the best course of action for a patient, precision diagnosis and risk assessment are the critical first steps. Biopsy with US guidance has been the standard for diagnoses — a process of taking multiple random samples of prostate tissue. However, this approach too often results in diagnostic uncertainty

including failure to detect clinically significant cancer, imprecise tumor risk stratification, or detection of low-risk, clinically insignificant cancers that can unnecessarily subject patients to repeat biopsies, delayed detection of significant disease, or over-treatment.⁴ ACR research is studying how to improve diagnostic efficiency and accuracy including the use of patients' genetic data to help determine the best course of treatment.

Precision Diagnosis

An important advancement in the effective and efficient diagnosis of prostate cancer was the introduction of prostate MRI examination for men with elevated PSA. The use of MRI can identify cases in which biopsy is unnecessary and can target regions for a subsequent biopsy to increase the likelihood of correctly identifying clinically meaningful prostate cancer.

Ensuring that biopsies are conducted in the correct patients and lead to the correct diagnosis the first time is critical — not just to reduce the costs to patients, but also the cost to the broader healthcare system. A study published in *JAMA Network Open* in November 2021 by the Harvey L. Neiman Health Policy Institute® (NHPI) found that only 3% of nearly 800,000 privately insured men with elevated PSA levels underwent prostate MRI within six months.⁵ Furthermore, the data revealed significant racial and ethnic disparities in MRI utilization. Black patients with elevated PSA were 24% less likely to undergo a subsequent MRI, and this disparity was even greater (35% less likely) at the higher PSA threshold of

10 ng/mL. This finding is important given that incidence is higher in Black men, who have about twice the mortality of White men.⁶

The NHPI study also found that Hispanic and Asian American men were similarly less likely to undergo prostate MRI. “These large racial and ethnic disparities highlight the need for additional research to better understand and mitigate clinical decision-making biases and other potential sources of these disparities — as well as clear guidelines for decision making,” says lead author Danny R. Hughes, PhD, director of the NHPI’s Health Economics & Analytics Lab at Georgia Tech.

Personalized Treatment

Once a diagnosis is confirmed for a patient, there is still a wide range of treatment options, depending on the patient’s risk of cancer progression and spread. For men with intermediate risk, which is further subcategorized as favorable or unfavorable — the decision centers around whether to add androgen deprivation therapy (ADT) to the standard radiation therapy. A genomic test can determine which cancers are more or less aggressive — classified via a risk score — to inform personalized treatment decisions.

This genomic scoring is now the foundation of two major NRG Oncology and National Cancer Institute phase III clinical trials with the ACR Center for Research and Innovation™ that are investigating different intensities of treatment based on these scores. Illustrating the importance of this genome-based scoring, a registry study found that among men originally classified at unfavorable intermediate risk, 69% had a low-risk genomic score.⁷ None of these patients developed metastatic disease, despite being treated with radiation alone. “Now we have the precision genetics to further refine prognosis and identify men such as these with no need for ADT and the associated side effects and reduced quality of life,” says Felix Y. Feng, MD, professor at University of California San Francisco and chair of NRG Oncology’s Genitourinary Cancer Committee. In another study, genomic testing changed treatment recommendations for 39% of patients, resulting in improved biochemical endpoints, without jeopardizing outcomes.⁸

The Guidance Study, NRG-GU010, selects unfavorable intermediate risk patients based on genomics scores. Patients with low scores are randomized to either radiation therapy plus ADT (the standard of care) or a de-escalated treatment with radiation alone.

PRIMEd for the Future

The Harvey L. Neiman Health Policy Institute® (NHPI) center at the Feinstein Institutes for Medical Research has a new name. The NHPI is excited to announce the NHPI Policy Research and Imaging Effectiveness (PRIME) Center. Led by Pina C. Sanelli, MD, MPH, FACR, professor of radiology at Northwell Health, the NHPI PRIME Center will continue to focus research on evidence-based imaging recommendations to inform health policy that improves patient outcomes and population health. Learn more at neimanhpi.org/neiman-centers.

“These large racial and ethnic disparities highlight the need for additional research to better understand and mitigate clinical decision-making biases and other potential sources of these disparities — as well as clear guidelines for decision making.”

— DANNY R. HUGHES, PHD



On the other hand, patients with intermediate or high scores are enrolled in a treatment escalation study, where they are randomized to radiation and short-term ADT, with or without the addition of the next-generation anti-androgen drug darolutamide. The primary endpoint of these studies is metastasis-free survival.

According to Pamela K. Woodard, MD, chair of the ACR Commission on Research, “This research is contributing to greater precision in prostate cancer diagnosis and treatment that has the potential to reduce the overall impact on patients — not only outcomes of the cancer itself but also the side effects of the treatment that can have a negative impact on quality of life.” **B**

By Elizabeth Y. Rula, PhD, executive director of the Harvey L. Neiman Health Policy Institute®

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Educating Strong Leaders

For ten years, the ACR has been putting business skills within reach of all radiologists — with custom educational programming through the RLI.

The only constant in life is change, according to Greek philosopher Heraclitus. That philosophy can apply to all areas of life but is acutely relevant to the practice and business of medicine.

Radiologists who want to hold their own among the ever-shifting healthcare landscape must deepen their knowledge of business and leadership practices. Medical school prepares physicians with the clinical and interpretive skills to provide quality patient care — but numerous non-interpretive skills are necessary to succeed in today's healthcare institutions and practice settings.

The ACR recognized this need more than a decade ago, and in 2012 launched the Radiology Leadership Institute® (RLI) — the specialty's first program dedicated to professional development and leadership training for radiologists. While some physicians choose to pursue an MBA to gain business and leadership skills, the ACR aimed to put that knowledge within reach of all radiologists — with custom educational programming that was designed by radiologists for radiologists.

Since 2012, more than 9,000 radiologists from across the U.S. have participated in the numerous RLI programs, gaining the essential, non-clinical skills to survive and thrive in today's complex and ever-changing healthcare landscape. In the second of a four-part series commemorating the RLI's 10-year anniversary, the *Bulletin* delves into the topics and skills the programs cover, and why this knowledge is critical to advancing the careers of future radiology leaders.

Seeking Relevant and Timely Information

Providing quality patient care is the leading tenet of radiology but providing quality care within a complex practice environment requires a range of non-clinical skills that aren't taught in medical school. Even radiologists without a formal leadership title can benefit from developing a leadership mindset. Interpersonal and business skills are important steppingstones to advancing and spearheading change within an organization.

In addition to reading and interpreting images, radiologists must coordinate and collaborate with various stakeholders throughout their careers. Leading and managing teams is one of those essential, non-interpretive skills that can make a difference in how radiologists progress in their own careers and in how they care for their patients.

"Physicians are not necessarily taught in a way that enables us to lead in teams effectively," notes Geraldine B. McGinty, MD, MBA, FACR, RLI faculty member, senior associate dean for clinical affairs at Weill Cornell Medicine, and past chair of the ACR BOC. "Often, we're taught that as physicians we have to be the lone decision-makers, and that we must present as the smartest

person in the room. Modern-day leadership challenges require us to engage and empower our teams to perform effectively."

Learning Change Management

Never-ending change is another challenge that radiologists will certainly encounter but might feel unequipped to manage. The RLI offers many programs that focus on the topic of leading and managing change. Scott B. Harter, MD, FACR, associate professor at the University of Arkansas, attended the first RLI Summit where he learned about change management — a transformational process that follows key stages to build change over time.

It was one of several skills Harter says he has learned through the RLI that helped him make specific improvements within his former private practice. "Change is hard, and you often see it fail more than it succeeds," Harter explains. "Convincing the group to change was smoother and easier because we followed the change management steps, got the right people together, and paid strict attention to the details."

Understanding Finance and Economics

Learning the craft of medicine can be isolating, and it's easy to get distracted or underappreciate the importance of typical business-related topics, such as finance and economics, explains Kurt A. Schoppe, MD, an RLI faculty member and member of the ACR Commission on Economics. Avoiding these topics can leave radiologists at a disadvantage within their organization and throughout their career, Schoppe adds.

The economics side of healthcare refers to the external environment in which radiologists are providing services. That environment dictates how radiologists and medical organizations get reimbursed, and is affected by local and national policies. Much of the healthcare finance world revolves around things like the Medicare Physician Fee Schedule Conversion Factor and relative value units. Becoming familiar with these concepts can allow radiologists to more accurately calculate relative risk and reward. "Understanding the nuances of how payer contracts are written with respect to risk and Medicare requires you to be familiar with the larger economics and health policy spectrum," Schoppe says. "You don't have to get into the nitty-gritty details, but you need to understand how those larger economic winds and trends will affect your local business contracts."

Understanding the basics of personal finance protects radiologists' interests and gives them the confidence to have challenging conversations about financial arrangements. The RLI programs highlight the various types of financial skills — such as accounting, management, revenues, debts, and investments — that radiologists will find useful at every stage of their career.

Gaining Emotional Intelligence

Navigating complex healthcare organizations requires a deeper understanding of relationships and human behavior. Emotional intelligence is one such skill that is critical for radiologists because "a lot of what we do is about connection — connecting with your

staff, patients, and colleagues to build those relationships,” explains RLI faculty Melissa A. Davis, MD, MBA, assistant professor and medical director of quality in radiology at Emory University.

Many RLI programs emphasize the importance of emotional intelligence, but the sooner a radiologist can gain that competency, the better. “When you’re in an early career stage, leveraging emotional intelligence can help you figure out what’s happening around you,” Davis notes. “Every health system and practice has its own personality and ways to get things done. Spend some time learning how to be effective wherever you work. Emotional intelligence allows you to learn how to be effective wherever you work.”

“As radiologists, we need to get this kind of out-of-the-box leadership training so that we can get more involved and try to influence everything that’s happening in the world around us.”

— JOSEPH D. CALANDRA, MD, FACR

Gaining Essential and Practical Resources

The RLI maxim that “leadership is for everyone” guides the state-of-the-art program offerings that target radiologists at all career levels. The RLI team keeps a close eye on current and emerging challenges and regularly develops new programs to address any deficits or gaps that arise.

The RLI strives to be a lifelong resource for personal and professional development and provide a relevant and flexible educational experience that benefits radiologists at all levels of their career — from residents and fellows to executive-level leaders.

In modern healthcare, no one knows what the future holds — but taking steps to shore up your team’s operations and adapt your leadership approach to new practice demands is the surest path to future practice sustainability. That’s where the annual RLI Summit comes in. Designed in collaboration with business school experts, the Summit helps radiologists at all career stages gain new insight into where radiology is headed and receive focused training that will help guide how their practices adapt in the future. Equally important, it provides radiologists with an unparalleled opportunity to network with the specialty’s best and brightest.

Subject matter experts apply a radiology lens to the latest business models and tools to help attendees learn how to improve both patient care and the practice of radiology. The sessions are created to give radiologists a deeper understanding of some of the biggest issues facing the specialty and offer insights and solutions to transform challenges into opportunities.

“The RLI Summit is critical because of the speed and size of change we are facing,” says attendee Joseph D. Calandra, MD, FACR, former clinical professor of radiology at the University of Illinois. “As radiologists, we need to get this kind of out-of-the-box leadership training so that we can get more involved and try to influence everything that’s happening in the world around us.”

Radiologists can also learn important leadership and business skills from the RLI Power Hour Webinar Series, bi-monthly webinars that provide expert analysis, tips, and information on radiology’s most pressing leadership and healthcare topics. Aimed at radiologists of all career stages, each webinar is supported by data and practical tools that participants can use to promote better team workflow and improved service quality. Webinar topics have included presentations on quality improvement, mergers and consolidations, crisis management, health equity, and more.

For radiologists assuming or aspiring to their first leadership role, the RLI offers the Maximize Your Influence and Impact course. Participants learn critical skills to help with building a thriving practice and driving foundational change within a health-care organization, as well as soft skills including team building and conflict management. This virtual program teaches participants how to align radiology with the hospital boardroom to better steward the organization’s operations, finances, and relationships. “I’ll never forget walking into my first meeting with other health system leaders and being completely lost in the spreadsheets, data, politics, and relationships,” recalls Geoffrey D. Rubin, MD, MBA, FACR, professor and chair of the department of medical imaging at the University of Arizona. “The Maximize courses aim to help radiologists hold their own in the hospital boardroom and collaborate with their peers in other departments.”

Underscoring the importance of teams, the annual ACR-RBMA Practice Leaders Forum is a collaboration with the ACR’s RLI and the Radiology Business Management Association that brings together clinical leaders and practice leaders to discuss the critical issues facing their practices. Attendees come together in a highly collaborative environment to discuss today’s most critical practice management topics. In a hands-on learning environment, attendees discover practical solutions to boost practice performance, align business operations with new healthcare models, and promote a value-based mindset within their teams. Above all else, participants gain real-world solutions that they can take back to their practices and apply to make an immediate impact. According to Howard B. Fleishon, MD, MMM, FACR, chair of the ACR BOC, the RLI’s success over the past decade can be attributed to providing innovative and relevant learning opportunities for radiologists to develop, lead, and succeed in radiologist-led teams. “The business of radiology is complex,” says Fleishon. “While our medical training focuses on image interpretation and interventional skills, the RLI gives radiologists the tools to lead across the entire medical imaging delivery paradigm.” **B**

By Meredith Kleeman, freelance writer, ACR Press

With programming for radiologists who are leading change at all levels, the RLI can help you advance your career and master the challenges ahead. Explore all of the leadership training opportunities on the RLI website at acr.org/RLI. To learn more about RLI resident programming, see page 20.



Improving Pay Equity

A new payment system based on salary benchmarks along with a revised incentive system closes the gender pay gap at Emory Radiology.

When Carolyn C. Meltzer, MD, FACR, became chair of radiology and imaging sciences at Emory School of Medicine in 2007, she uncovered stunning findings while researching the department's structure and salaries. In particular, she found the considerable compensation gaps between male and female faculty members astounding.

"I tried to piece together the differences in faculty salaries and found a significant gap between the compensation of men and women assistant professors — with male faculty members averaging \$20,000 more than female faculty members," says Meltzer. "It was so glaring that I knew it had to be addressed immediately."

While the finding was disappointing, it wasn't entirely surprising. Research shows that inequities in salaries, incentives, resources, and awards proliferate throughout medicine, Meltzer says. These inequities are based on gender, race, and ethnicity. The Association of American Medical Colleges (AAMC) Group on Women in Medicine and Science reports that gender is a main driver of salary inequity. Such inequities can negatively affect the department, leading faculty to feel undervalued and ultimately resulting in disengagement and poor department morale. It can further hinder a department through retention and recruitment costs and productivity losses.¹

Reflecting on RVUs

In the past, the radiology department compensated radiologists based largely on the number of relative value units (RVUs)

they generated. "But RVUs are not true value markers," says Jamlik-Omari Johnson, MD, vice chair for diversity, equity, and inclusion in the radiology department at Emory. "They are not precise, and they rarely take into account other performance factors, such as teaching and interacting with patients." Given that female faculty members generally have larger service and teaching loads, RVU-based formulas can introduce gender inequity into the compensation structure, Meltzer adds.²

Plus, Johnson says, the way RVUs are valued opens the door to potential conflicts. For example, focusing on RVU metrics can lead people to do things like cherry-pick high-RVU studies while leaving lower-RVU examinations for others to interpret. Meltzer adds, "The emphasis on doing as many high-RVU activities as possible does not promote a collaborative workforce."

For these reasons, Meltzer knew that the department needed to redesign its compensation structure to move away from RVUs. She convened a group of department leaders to examine the best way to make salaries more equitable for all radiologists. As a starting point, they elected to align base salaries with the AAMC's academic rank benchmarks. Then, the peer faculty committee developed an incentive plan framework that valued teaching, research, service, quality work, and overall clinical effort.

Realigning base salaries meant that those who had significantly higher salaries than their peers would remain at that pay rate while the others caught up. This was difficult news for some of faculty members to hear, but Meltzer says that being transparent from the beginning was key to getting them on board. "I told them right off the bat that their salaries were higher than the benchmarks we were using and that they wouldn't be able to get a raise until others caught up," she says.

Emphasizing Value

Once the base salaries were set, the leadership team focused on emphasizing the value of collaboration within the department. To

that end, they created a monetary incentive to encourage faculty members to dedicate time to non-RVU generating activities, such as answering questions from referring physicians and interacting with patients. They categorized this work under four pillars:

- Divisional clinical productivity/quality
- Individual clinical/quality
- Academic (research and teaching)
- Service/citizenship

Each pillar was based on the values and vision identified in the department's strategic plan. From there, a faculty workgroup developed the metrics and point values that correlate with each pillar. For instance, if a faculty member participates on a committee (whether at the department or national level), they gain a certain number of points in the service/citizenship pillar. Similarly, a faculty member could do something as simple as volunteering for extra clinical duty and also receive credit in that pillar. Each activity counts as a single point. The resulting incentive payment is based on cumulative points. An individual can receive a maximum of 10 points in each pillar.

Faculty members track their points through several methods. Members track and self-report activities, such as lectures, committee participation, and manuscripts published, through a templated spreadsheet. Administration staff assists by tracking participation in activities such as RADPEER®, resident conferences given, and attendance at grand rounds and faculty meetings. "With this system, we don't weigh divisional RVU performance above individual RVU performance because we don't want to use this singular measure to suggest the importance of one faculty member versus another," Meltzer explains. "If one person is reading MRIs and another is doing chest radiographs, they're still doing the same work even though one test generates more RVUs than the other."

Closing the Gap

At the time, departments were fairly autonomous at Emory, so transitioning to the new compensation model required the leadership team to foster intradepartmental discussions that ensured that the plan and the process were as transparent as possible. This was largely done by including faculty members in the workgroup that created the incentive system.

"Faculty members helped create the system based on their own values, which achieved much more buy-in than a top-down approach," explains Meltzer, who also ensured that everyone in the department was kept up to date as decisions were made. "Everyone knew what was happening every step of the way, so nothing was a surprise."


As the radiology department instituted the new payment system, it tracked the point distribution across the faculty. Leaders oriented faculty members with the new system during faculty meetings. The department also embedded guidelines within the spreadsheet itself so that faculty members could refer to them when needed. Department directors reviewed each spreadsheet to ensure they were completed correctly.

Within two years into Meltzer's tenure as chair, the team eliminated the pay gap. Plotted on a graph, the incentive points formed a bell-shaped curve with no systematic gender effect, suggesting that bias had been mitigated. "I was relieved when everything came together," Meltzer says. "It was difficult for me as

a new chair to confront my faculty with the revelation that some in the department (predominantly women) were being underpaid compared to some of their colleagues with the same experience and position. Our department really appreciated the transparency, though, and wanted to correct the problem."

Seeing an Impact

Closing the pay gap between men and women at Emory has not only improved morale, but it has also promoted a larger culture of collaboration among faculty members. "Without a focus on RVUs, we don't have individuals competing to get the high-RVU driven exams. Instead, faculty are incentivized based on their strengths and work responsibilities," Meltzer says, adding that including faculty in the creation of the plan and being transparent throughout the process strengthened faculty members' overall support of leadership.

For other radiology groups looking to address similar inequities in their systems, Meltzer says that the most important thing to do is to get started. "Without a system in place that specifically ensures equity along gender, race, and ethnicity, you'll likely have some kind of gap somewhere. The first step is examining the data and being transparent about what it shows. The hard work to reveal and then address inequities is often the first step in the journey toward a truly inclusive work climate." 

By Meghan Edwards, freelance writer, ACR Press

ENDNOTES

1. American Association of Medical Colleges. "Understanding and Addressing Faculty Salary Equity Toolkit." American Association of Medical Colleges. 2019.
2. Guarino, CM, Borden, VMH. Faculty Service Loads and Gender: Are Women Taking Care of the Academic Family? *Res High Educ.* 2017;58:672–694.

Now It's Your Turn

Follow these steps to begin examining compensation in your practice, and tell us about it at imaging3@acr.org or on Twitter with the hashtag #imaging3:



- 1) Examine the payment and incentive data in your department or practice. Look at compensation, start-up packages, space allocation, honors and awards, and teaching and other subjective performance evaluations.



- 2) Take a look at established standards, such as the Association of American Medical Colleges' academic rank benchmarks. How does your data compare with the benchmarks? Are salaries and other incentives equal among faculty based on experience and rank?



- 3) Compile your findings and present them to your team. Begin brainstorming together about how to create a collaborative process that seeks to change inequities.

Leadership Training for Residents

The Radiology Leadership Institute® is positioning residents to succeed and enter the workforce with confidence.

“Leadership begins at all levels,” says Harprit S. Bedi, MD, vice chair for education in radiology at Boston Medical Center. “We hope and expect residents to be emerging leaders but seldom provide them with formal leadership training. We can do better. Leadership education should complement clinical education to create future well-rounded residents.”

The ACR’s commitment to invest in the leadership education of residents and fellows has guided the development of a significant portfolio of programs and other resources to equip residents with the foundational, non-interpretive leadership skills that will help them maximize early-career success. The RLI offers residents and fellows an array of live and online courses for comprehensive training in professional development, leadership, and career management.

Building Emerging Leaders

The RLI Resident & Young Physician Leadership Program, an annual event held in conjunction with the RLI Summit, serves as an accessible and efficient introduction to the fundamentals of leadership for early-stage radiologists. Kerri L. Vincenti, MD, then a chief radiology resident at Pennsylvania Hospital, attended the 2018 meeting on a scholarship provided by the Pennsylvania Radiological Society and was awed by the supportive environment. “My voice was not drowned out by perspectives from ‘the good old days’ but rather echoed and magnified by the collaborative spirit of the conference attendees,” Vincenti recalls. “Our conversations focused on how to redefine opportunities and develop strategies to innovate within our own environments.”

Vinenti returned to Pennsylvania Hospital inspired to share new insights with her own residents and create opportunities for meaningful conversations. “I felt more connected to the residents because of that knowledge, and I understand another principle that I learned at the 2021 Summit: leadership equals relationships, not results.”

Providing residents with an opportunity to attend the RLI Summit is an important part of the RLI mission. The RLI Emerging Leader Award (formerly the RLI Resident Scholarship Program) provides exposure to expert business and radiology faculty in a business school setting. Residents can apply for a scholarship in early 2022. In addition, several ACR chapters offer scholarships for their members to participate in RLI activities.

Launching Careers

The Kickstart Your Career Workshop is another program aimed at supporting new radiologists. The virtual event arms radiology residents and fellows with hands-on practice to prepare for job interviews, evaluate job offers, and negotiate effectively. Raffi Ourfalian, DO, then a chief diagnostic radiology resident at Kaiser Permanente, Los Angeles Medical Center, found the mock interview feature of

the workshop to be especially helpful. “During my actual fellowship interviews, I had a more thoughtful and confident answer to the ‘where do you see yourself in five years?’ question,” Ourfalian says. “My interviewers were impressed with how much thought I’d put into it. I plan on retaking the course before my job interviews to give me the best edge to land the right job for me.”

The RLI Leadership Essentials program equips residents and fellows with noninterpretive skills to maximize their potential during and post-residency — including topics such as effective communications, social and emotional intelligence, mentorship, making yourself indispensable, and many more.

Residency programs must provide their residents with a comprehensive understanding of key healthcare economics concepts, and the RLI helps programs through its RLI Resident Milestones Program: Economics and the Physician Role in Health Care Systems. The program, developed by the RLI in concert with healthcare economics experts and residency program directors, brings together nationally recognized professionals and seasoned practitioners to provide residents with a state-of-the-art educational experience. According to Bedi, the program is designed with modern learning theory, where lectures are combined with interactive components (learn more in the August 2021 *Bulletin* at bit.ly/RLIResident-Milestones).

“You can read and listen but now you’re required to gather data and reinforce your knowledge by applying it within your practice setting.”

— HARPRIT S. BEDI, MD

“The whole point of the program is to learn by doing,” says Bedi. “You can read and listen but now you’re required to gather data and reinforce your knowledge by applying it within your practice setting.”

According to Anne Marie Pascoe, senior director of the RLI, whether you’re a resident looking for the career essentials that will prepare you for your first years in practice or a program director looking to close the gaps in your resident career training curriculum, the RLI offers affordable programs that deliver a self-paced and immersive learning experience. “With the RLI’s focused leadership training, residents gain access to the best and brightest radiology educators and thought leaders,” says Pascoe. “They will be empowered with skills for real impact, as well as the knowledge to succeed in today’s competitive healthcare landscape.” **B**

By Meredith Kleeman, freelance writer, ACR Press

The RLI offers a vast array of leadership training that positions residents for the greatest opportunity to succeed and helps them enter the workforce with confidence. Start your leadership journey today by exploring all of the RLI resident leadership programs at acr.org/RLIResidents.

How can the specialty work to educate students about the field and its future?

“Radiologists must interface with medical schools at the highest level to engage schools in understanding the essential need for exposure to radiology for all medical students. Mandatory radiology rotations benefit all fields of medicine as students entering medical or surgical fields must understand imaging appropriateness, cost, and radiation concerns. For students interested in radiology as a career, rotations will assist in debunking commonly circulated myths such as the inevitable replacement of radiologists by advances in AI.”

Tara M. Catanzano, MD, professor and vice chair of academic affairs in the department of radiology, residency program director, and associate director of academic career development at UMass Chan-Baystate



“Radiology can continue to grow by attracting a dedicated and diverse group of medical students to the field. We can do so by engaging students early in their training, involving them in impactful research, and demonstrating how our clinical efforts improve patient outcomes and impact population health. We need to redesign clinical rotations to improve interactivity and ensure that they include the scope of a radiology practice.”

Farouk Dako, MD, MPH, assistant professor of radiology in the cardiothoracic imaging division at the Perelman School of Medicine



CT DOSE BENCHMARKS

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Frush notes, however, that it is important to remember that nothing in radiology is one-size-fits-all. Each case is different and each patient's unique needs should always come first. DRLs are meant to be used to determine if a local facility's dose indices are unusually high or low, rather than being used as target doses in all cases. DRLs and achievable doses are intended to compare a patient population as a whole, he says.

"People ought not to look at this paper as a measure of enforcement at all," says Frush. "These benchmarks are provided as a tool for people to review and say, 'We now know how we compare with a very large pool of data of how others do this.' I think many practices today will find their imaging protocols are entirely harmonious with these DRLs, and there is a level of satisfaction and comfort to be able to reassure the pediatric patients and families they take care of."

"Radiologists, RTs, and medical physicists all play a role in taking care of the patient and have to be committed to open communication and constant collaboration," says Kanal. "The image quality has to be adequate to give radiologists confidence in their diagnosis and that they are not missing something on the CT scan. RTs are on the front lines, scanning the patient in real-time and communicating any limitations to the radiologist and the medical physicist. Lastly, the medical physicist provides the technical knowledge that will guide the radiologist and RTs in adjusting CT protocols. Regular protocol assessments ensure that nothing is missed, and all the different parts are moving together as one." **B**

By Ivana Rihter, freelance writer, ACR Press

ENDNOTE available in the digital edition at acr.org/bulletin.

POPULATION HEALTH

continued from page 4

their skillsets towards population-based care. The Population Health Management Committee, chaired by Syed F. Zaidi, MD, MBA, falls under the direction of the ACR's Commission on Patient- and Family-Centered Care and is led by its chair Arun Krishnaraj, MD, MPH — along with contributions from others throughout the College. A robust population health resource center has already been established at acr.org/PHM.

By launching the Radiology Health Equity Coalition, our community has committed to addressing uneven outcomes for different demographics. Although concepts such as Imaging 3.0[®] and patient- and family-centered care have typically been associated with a personalized focus, they are expanding to consider population-wide impact. Through the work of the ACR Data Science Institute[®], we will be able to provide more screening information that radiologists can leverage to bring more services to our communities. As a strong component of our new strategic plan, look for more population health information and research to be coming from other areas of the ACR, such as the Harvey L. Neiman Health Policy Institute[®] and Quality and Safety.

Expanding our focus to population health will also support our practices. We will reach out to a broader patient base and offer new and important services. Operationalizing our models for scale and screening not only makes business sense but is the right thing to do. Population health models within radiology have become exemplars in the transitions from volume- to value-based payment models.⁶ We look forward to population health being promoted and enhanced by other radiology societies, academic centers, and practices. Together, we can make a difference and have radiology recognized as not only a follower but a leader in population health. **B**

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