

# Bulletin



THE WOLF  
at THE DOOR

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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](mailto:bulletin@acr.org).

Digital edition and archives of past issues are available at [ACR.ORG/BULLETIN](http://ACR.ORG/BULLETIN).



# The Radiology Labor Shortage

The College is committed to optimizing our workforce as we continue to bring vital and innovative medical care to our patients.

In any industry, the ability to deliver goods and services is dependent on its workforce. Especially during the ongoing COVID-19 pandemic, workforce issues have been front and center — with employee shortages impacting service industries particularly hard.<sup>1</sup>

Radiology has not been immune to these shortages. Due to a variety of factors — some unique to our profession — practices are feeling the pressure to provide more services while battling a lack of staff to accommodate the demands.

Multiple sources have projected that the demand for medical imaging will continue to rise. In 2018, research and consulting firm Frost & Sullivan looked at utilization controls versus the growing Medicare population, which tends to have higher rates of medical imaging. They predicted that, at least in the intermediate term, the demand for services would continue to grow.<sup>2</sup> Other sources documented the temporary decrease in services during the initial COVID-19 peak with a rapid bounce back after restrictions were lifted.<sup>3</sup>

The demographics of our workforce need to be considered when looking at future needs. The current radiologist population is skewed toward seasoned professionals who may be looking at retirement. Of the 20,970 radiologists engaged in active patient care, 82% are age 45 and over, while 53% are age 55 and over.<sup>4</sup>

Our practices and departments have been dealing with the issue of radiologist burnout for several years. Much has been researched and publicized about its impact. According to a recent study published in *Mayo Clinic Proceedings*, radiologists ranked fifth out of more than 23 surveyed specialties in their reported burnout rate. Increasing rates of burnout have been reported over several years.<sup>5</sup> A 2020 *Journal of Breast Imaging* study found a high prevalence of burnout among breast imagers, particularly early-career professionals.<sup>6</sup>

The ACR has developed resources through its Radiology Well-Being Program (available at [acr.org/well-being](https://www.acr.org/well-being)) to address the problem of burnout in the profession. Members of the ACR's Well-Being Committee have created tools for individual radiologists as well

as case studies for health system leaders who must change the systemic issues that can contribute to burnout (learn more in the Feb. 2022 *Imaging 3.0® In Practice* at [bit.ly/InPractice\\_Burnout](https://bit.ly/InPractice_Burnout)).

Many practices have turned to alternative staffing models, including non-physician radiology providers (NPRPs) such as nurse practitioners, physician assistants, and registered radiologist assistants. While these NPRPs provide vital functions, the use of physician extenders has become very controversial within the College's membership. Many concerns have been voiced about the quality of the services they provide and the potential for radiologist job displacement. The national organizations that advocate on behalf of the nurse practitioners have been aggressively lobbying for independent practice. The American Academy of Physician Assistants is looking to change physician assistants' titles to "associates." The ACR is aggressively addressing scope of practice (SOP) challenges with its SOP fund and is looking at the feasibility of developing radiology-specific SOP guidelines.

**Due to a variety of factors — some unique to our profession — practices are feeling the pressure to provide more services, while battling a lack of staff to accommodate the demands.**

Another tactic has been to turn to teleradiology. Originally, the term *teleradiology* was most frequently identified with outsourcing evening/night work. More practices are now "internalizing" teleradiology for employees, partners, and faculty — the radiology equivalent of working from home. Although abandoning on-site presence certainly risks commoditization, utilizing teleradiology as a supplement to help decompress volume is an effective recruiting tool.<sup>7</sup>

At our Fall 2021 BOC meeting, Immediate Past Vice President of the ACR and Immediate Past President of the Society of Chairs of Academic Radiology Departments (SCARD), Alexander M. Norbash, MD, MS, FACR, presented data concerning the growing

*continued on page 22*



## Earn the FACR Credential

Becoming a Fellow may improve your chances of a promotion and increase your hiring potential in today's evolving radiology job market. Here are steps that you can take this year to jumpstart your pathway to FACR:

- Reach out to your chapter's fellowship chair for guidance.
- Begin volunteering in leadership roles to strengthen your candidacy.
- Seek a current Fellow to serve as a potential endorser.
- Contact the ACR about application content and submission deadlines.

If you are currently a Fellow, consider mentoring and offering guidance to prospective Fellows. Recommend a member to serve on a committee or commission. Consider writing endorsement letters for candidates and attest to their professional accomplishments.

Your chapter and the College are prepared to support you in your pursuit of becoming an ACR Fellow. Seek guidance as an early-career member on the pathway to FACR or a currently eligible member who is ready to apply.

Visit [acr.org/FACR](http://acr.org/FACR) or email [FACR@acr.org](mailto:FACR@acr.org) to navigate your professional journey toward achieving the ACR's highest level of membership.

## New Approaches in Breast Imaging

Register today for the 2022 SBI/ACR Breast Imaging Hybrid Symposium, which will take place May 16–19. This meeting will offer more than 60 live sessions across all breast imaging modalities, access to ePoster abstracts, and the chance to connect with vendors in the exhibit hall. For those who can't make the trip to Savannah for the on-site meeting, the hybrid format provides the option to attend virtually.

To register, visit [eventscribe.net/2022/SBIACR2022](http://eventscribe.net/2022/SBIACR2022).



## Free Research Course for Residents

The Comparative Effectiveness Research (CER) virtual course introduces residents to key concepts in health policy research, comparative effectiveness research, and big data analytics from leading researchers in the field.

This free course, offered by the ACR Institute for Radiologic Pathology™ (AIRP) and the Harvey L. Neiman Health Policy Institute®, features nine on-demand sessions and one live session. Sessions are available during the 2022 AIRP four-week radiologic-pathologic correlation course, March 14–April 8, July 25–Aug. 19, Sept. 12–Oct. 7, and Oct. 17–Nov. 11. Residents do not need to be registered for the AIRP courses to access the CER course.

Learn more at [neimanhpi.org/airp-cer-course](http://neimanhpi.org/airp-cer-course).



## Register for RLI's Power Hour Webinar Series

The Radiology Leadership Institute® (RLI) offers free Power Hour webinars on timely topics impacting radiologists. The next topic will address "Pandemic Impact on the Workforce" on March 30, 7–8 p.m. ET. Register for the upcoming webinars at [acr.org/powerhour](http://acr.org/powerhour). The RLI also records these webinars and posts them at [acr.org/Power-HourRecord](http://acr.org/Power-HourRecord).

## Register for the SPR 2022 Annual Meeting & Postgraduate Course



The Society for Pediatric Radiology looks forward to gathering in-person in Denver for the 65th Annual Meeting & Postgraduate Course, taking place April 27–May 1. The meeting will bring the pediatric radiology community together to learn more about state-of-the-art pediatric imaging and its positive impact on the children that pediatric radiologists serve.

For program details, visit [pedrad.org](http://pedrad.org).

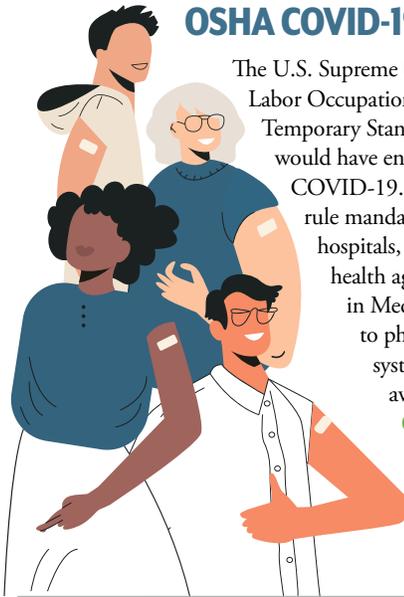


## Lung Cancer Screening Podcast Series Debuts

The ACR Lung Cancer Screening Steering (LCS) Committee has partnered with the National Lung Cancer Roundtable to create a new podcast: *Pleural Space: Conversations in Lung Cancer*. Each limited-series episode will highlight collaborations between patients, primary care, pulmonology, radiology, and health equity experts — and how they are taking LCS, diagnosis, and treatment into the future.

Listen to the podcast series at [acr.org/LCS-Podcast](http://acr.org/LCS-Podcast).

## OSHA COVID-19 Vaccine Requirement Blocked



The U.S. Supreme Court recently blocked a U.S. Department of Labor Occupational Safety and Health Administration Emergency Temporary Standard to employers with 100 or more employees that would have ensured each worker is fully vaccinated or is tested for COVID-19. The court let stand a separate CMS interim final rule mandating that healthcare workers be fully vaccinated at hospitals, ambulatory surgical centers, dialysis facilities, home health agencies, and long-term care facilities that participate in Medicare/Medicaid. The CMS regulation does not apply to physician offices (unless they are part of an affected system). More information about the court ruling is available on the Supreme Court website at [bit.ly/OSHA\\_Rule](https://bit.ly/OSHA_Rule).

For more information, contact Gloria Romanelli, JD, senior director of legislative and regulatory relations, at [gromanelli@acr.org](mailto:gromanelli@acr.org).

## Register for ACR 2022

The 2022 ACR Annual Meeting will take place at the Washington Hilton, April 24–27, 2022. We look forward to seeing you in person but are also providing an option for virtual attendance. Please note that while virtual participation is possible, in-person attendance is required to receive Council credentials to vote in ACR elections and on Council business. The deadline to register and reserve hotels is April 1, 2022. The ACR requires proof of vaccination against COVID-19, including a booster if eligible, to attend the in-person meeting; this requirement extends to meeting attendees and any guests that will attend ACR events. Badges will be required for entry into ACR events.

Learn more and register at [acr.org/Annual-Meeting](https://acr.org/Annual-Meeting).

**ACR2022**  
WASHINGTON, DC  
April 24–27

## RLI PODCAST: Leading Healthcare

In the newest Radiology Leadership Institute® (RLI) *Taking the Lead* podcast episode, host Geoffrey Rubin, MD, MBA, FACR, speaks with Robert I. Grossman, MD, CEO of New York University (NYU) Langone Health and dean of the NYU School of Medicine, which was renamed in his honor as the NYU Grossman School of Medicine in 2019. In this role, Grossman oversees more than 45,000 employees, students, and faculty across six inpatient locations and over 300 sites throughout the New York region and Florida.

As dean, Grossman led the initiative to provide tuition-free medical education for all current and future students in the school's medical degree program. He curated a new approach to medical education, called Curriculum for the 21st Century, which emphasizes clinical training from the beginning of medical school and includes a revolutionary three-year medical degree program for select candidates. In 2018, Grossman was named to *Time's* inaugural list of the 50 most influential leaders who changed the state of healthcare in America.

Listen to Grossman's inspiring leadership journey at [acr.org/RLIPodcast](https://acr.org/RLIPodcast).

“Research plays a central role in the advancement of radiology practice. Discoveries and innovation fuel our ability to provide high-quality care to our patients.”

— PAMELA K. WOODARD, MD, FACR,  
CHAIR OF THE ACR COMMISSION ON  
RESEARCH

## Renew Your Membership Before March 31

Have you renewed your 2022 membership? If not, your membership is currently in a grace period. Keep your free CME activities and other benefits by remitting your dues before March 31. Benefits of ACR membership include:

- **Advocacy** — Members will save more than \$1 billion through 2023 due to successful advocacy efforts, such as thwarting multiple Medicare physician payment cuts. The College will continue to advocate for permanent Medicare reimbursement reform and pursue additional legislative priorities in 2022.
- **Daily Case in Point®** — Members can complete challenging clinical cases worth up to 65 CME credits.
- **Industry-Leading Publications** — Members can keep up with current trends and best-practice management skills, plus earn CME, with the *JACR*®.
- **Online Resources** — Members can attend ACR webinars, virtual conferences, and other informative events.

Renew online at [acr.org/renew](https://acr.org/renew) or call 1-800-347-7748 (8:30 a.m.–5 p.m.) today.

If you have already renewed your 2022 membership, thank you!

# A No-Win Situation

We can escape the problems of the current health system by rapidly rewriting our story and reinventing how we provide care.

Annually, the ACR Commission on Economics sets forth goals and strategic initiatives that are important to the economic interests of ACR members. Part of this process involves sharing a framework with the broader membership for transparency and feedback. It is an honor to represent our vast constituency on these vital issues, which ultimately enable all of us to provide high-quality, equitable patient care.

The first set of goals and initiatives are seemingly consumed every year by maintaining adequate reimbursement within the static budget-neutral Medicare Physician Fee Schedule. This challenge has evolved rapidly. Over the last decade, our focus was centered on maintaining the value of imaging services in front of the AMA Relative Value Scale Update Committee — the Committee with deep influence on how Medicare ultimately values our services. Most of our core patient services have now been valued, but the reimbursement cuts have escalated as the fixed allocation of money inside the fee schedule is now being distributed to services radiologists don't typically provide.

The only course of action for our organization is to partner with myriad other specialties also facing the same challenges. As a group, we can more strongly advocate that Congress add new funds to negate the reimbursement cuts in the budget-neutral environment. This task is predominantly handled by the ACR Government Relations (GR) team, with support from the Commission. Our team of volunteers will continue to bring firsthand information to our GR team about additional pending revaluations occurring inside the fee schedule so that action and coalition-building happens without delay. Foreseeable challenges include revaluations of multiple additional evaluation and management code families, expansion of telehealth and telecommunication services, and rapidly growing AI applications — each vying for dollars in the fee schedule.

The Commission's priority is fostering and supporting innovation inside our profession. The creation of new value is the key to our success, and likely the only long-term strategy for the mitigation of reimbursement decline. Our teams constantly interact with researchers, practice leaders, and the broader imaging industry. We will continue to look at new ways in which radiologists can

add value to the healthcare continuum by concentrating resources on payment for value-based care-coordination activities, payments for already existing activities not adequately reimbursed under the current fee schedules, and innovation around payments for promoting health equity. Our CPT® team is working diligently on these opportunities and is always open to member feedback.

The Commission will maintain active vigilance and a firm stance against aggressive tactics by commercial payers who only measure radiologist's value by cost. Steerage based on cost alone is harmful to our healthcare system, forcing practices to the lowest common denominator. These tactics disincentivize groups from maintaining robust quality assurance processes that are vital to high-quality patient care, replacing them instead with factory-like relative value unit measures. They also discourage the upgrade of equipment and hamper innovation that is vital to advancing healthcare into the future. Much of imaging has been labeled as "low value" by payers and policymakers — yet we know our clinical colleagues value radiology and radiologists. As proof, one only has to consider their relentless requesting of our services and demand for immediate image interpretation. This disconnect between policy and reality is counterproductive, and our Commission will continue to educate all payers about these harmful policies.

This advocacy is now even more imperative considering the No Surprises Act and subsequent regulatory language written by the U.S. Department of Health and Human Services (read more at [bit.ly/surprise-billing](https://bit.ly/surprise-billing)). Inordinate leverage has been granted to commercial payers to unilaterally act in their own best interests. We have already seen the consequences of these rules through documented threatening letters to in-network, high-quality radiology groups in the state of North Carolina to reduce costs immediately or have their contracts cancelled. Not one of these letters mentions quality, access, or value of care.<sup>1</sup>

A host of other issues are on our radar for the coming year. However, it is clear that the current healthcare system is a no-win situation for radiology. Much of the value we provide is either unrecognized or unpaid, leading to less-than-optimal outcomes. The old adage of when there is a care gap, it is often because of a payment gap rings true throughout our profession — as it has for years for our primary care colleagues. The Commission is dedicated to the process of reinvention using all the resources we have at our disposal — including the expertise of our staff and volunteers, work groups, consultants, coalitions outside our specialty, members, and our patients. **B**

ENDNOTE available in the digital edition at [acr.org/bulletin](https://acr.org/bulletin)



# THE WOLF at THE DOOR

Weathering a cyber attack depends on a fast, cohesive reaction.

“We can no longer live by the old adage that an ounce of prevention is worth a pound of cure,” says Howard (Po-Hao) Chen, MD, MBA, chief imaging informatics officer for the Cleveland Clinic and chair of the ACR’s Informatics Advisory Council. “During a cyber attack, prevention cannot be your only line of defense. It is no longer enough to say that we’re going to try to avoid malicious emails. What will you do if (and when) a cyber attack breaches your defenses?”

And a potential breach is becoming more and more likely, according to the CyberPeace Institute, which released new data on cyberattacks on the healthcare industry. The report turned up 295 cyber attacks on the healthcare sector in the 18 months between June 2, 2020, and Dec. 3, 2021.<sup>1</sup>

During most attacks, cyber criminals have two primary goals: either to disrupt and disable the information in your network’s data management system or to steal it outright. Ransomware has seemingly become the weapon of choice for cyber criminals, Chen says. This form of malware involves malicious software designed to block access to a computer system or computer files until a sum of money is paid. Most ransomware involves accessing a computer system, encrypting files to make them inaccessible, and demanding a payment for an encryption key to unlock files and restore access.

Ransomware is often the result of human error — and is almost always engineered to get money. A ransomware attack in a healthcare system can have catastrophic patient care consequences. The usual downtime processes in place at an institution might not address the breadth of such a disruption and timelines for recovery.<sup>2</sup>

If your system is the target of an attack, Chen notes that what you do during the first 48 hours following a cyber attack are the most important. During a cyber attack, everybody on your staff needs to know what is going on, what to do next, and what your capacity is to bring a network back.

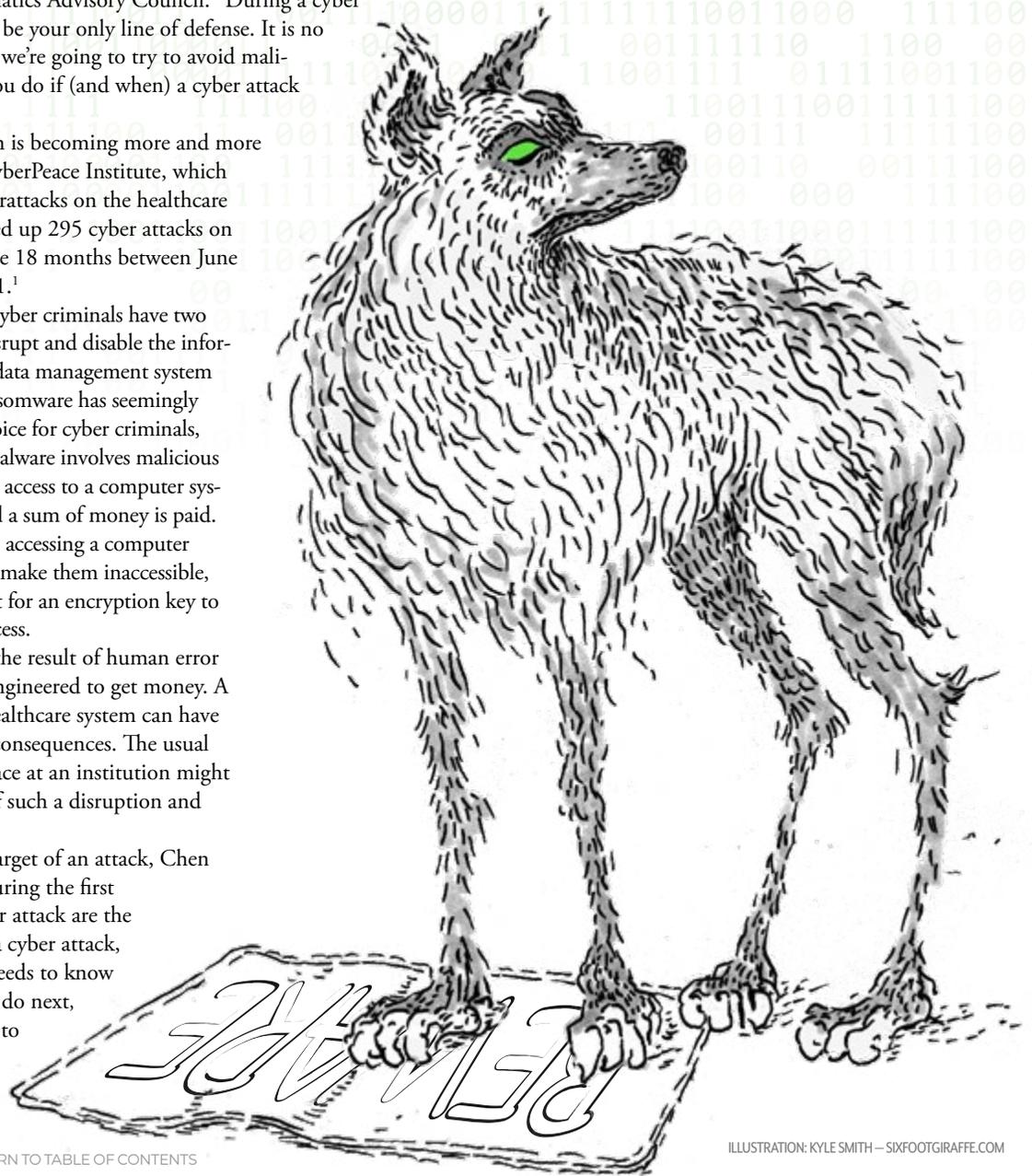


ILLUSTRATION: KYLE SMITH — SIXFOOTGIRAFFE.COM

## PLAN FOR THE WORST

Cleveland Clinic affiliate Ashtabula County Medical Center reported a system outage in September of 2020 that lasted for more than 24 hours. The county hospital took several months to recover as a result of the ransomware attack before a full come-back, Chen says.

There are simple things you can do to stave off an attack — like not opening suspicious emails, says Namita Sharma-Gandhi, MD, MSChI, associate professor in radiology at Cleveland Clinic and co-author of a paper with Chen and another colleague in the *Journal of Digital Imaging*.<sup>2</sup> “You can also ensure that all equipment has updated systems. Outdated systems are more accessible to hackers. Talk to your vendors about having the latest safeguards in place for your scanners,” Gandhi says.

“We were so dependent on our electronic systems that we could not maintain a workflow without them. We had to come up with new processes on the go — and everything had to go on paper,” Gandhi says. “Following the attack, we decided we needed a formal disaster recovery plan from ransomware — not just a standard downtime plan or more prevention awareness. These attacks are potentially life-threatening to patients.”

The paper’s authors discuss a plan to maintain radiology business continuity in the event of a catastrophic ransomware attack. The response and recovery plan is broken into what needs to happen in the short term (in the first 48 hours and the following three weeks) and in the longer term (rebuilding infrastructure and reconciling imaging data and reports with patients’ information in the EMR). The first two parts of the plan rely more heavily on the radiology operations and less on hospital IT because IT won’t know how to keep radiology’s operations running — they’d be busy figuring out what’s been disabled and what’s still running.<sup>1</sup>

“You should assume you’ll be faced with a worst-case scenario in which you have little to no technology available,” Chen says. “You are back to paper.”

In the event of a ransomware attack, do you have paper-based workflows to keep business going? Would you be forced to shut down operations until the issue is resolved? And keep in mind, paying the ransom is rarely the end of the crisis. “While the criminals might give you the password to unlock your data, they aren’t going to provide you PACS IT support to get everything going again,” Chen says. “They also aren’t going to help you eradicate the virus or malware that has infiltrated your systems.”

## CHOOSE A RESPONSE

When it comes to security breaches such as with ransomware, both prevention efforts and a response plan in place are important, says Benoit Desjardins, MD, PhD, FACR, professor of radiology at the Hospital of the University of Pennsylvania. Cyber defense has multiple elements: maintenance of computer systems and medical devices, proper off-site data backup, use of software tools like anti-malware and multi-factor authentication, and user training to recognize phishing and cyber attacks.

Still, no medical center can stop all breaches, and they are increasing in frequency. When an attack happens, the quality of your system backups and your response plan will become equally important, Desjardins says.

“Cybercriminals want to maximize their profits. Ransomware can lead to multi-million-dollar payoffs for one cyber attack, potentially much higher than selling stolen medical records on the dark web,” Desjardins says. “Although paying ever-increasing ransoms can be costly for medical centers, refusing to pay them can lead to even bigger losses.”

“Ransomware (sometimes referred to as crypto-locking) is a vector for cybercriminals because it is profitable,” says Matt Jordan, ACR’s senior director of IT infrastructure. “Rather than steal data and attempt to commit fraud, ransomware can have an immediate payoff. If the victim does not pay immediately, cyber criminals can release the medical data to others who will pay.” Attacks are becoming more sophisticated, the impact greater, and the payments larger, he says.

Cyber attacks on a hospital or healthcare group’s information management and operations systems can bring an entire network to an abrupt halt. The more recent ransomware attacks are often combined with breaches of confidentiality, with threats of releasing medical records into the wild if the ransom is not paid. “This provides an additional incentive for hospitals to pay,” says Desjardins.

## RECOGNIZE YOUR ROLE

“Cybercrime is big business in healthcare. While some malicious groups are out for disruption and recognition, the vast majority are in it for money,” says Daniel Reardon, MPA, CHPC, chief compliance officer for the ACR. “Given the technology and digital sharing in imaging, radiology departments and practices should recognize that they are at risk.”

“I would advocate for anyone that has the passion and time to champion cyber security and/or incident response best practices at their organization to do so,” Reardon says. “Progress is certainly needed, and you could be the one to initiate a ‘first follower’ response at your organization. What you want to avoid is the double whammy of missing the basic preventative technical aspects and having no plan to respond to an incident.”

“Radiologists should integrate and work with the larger hospital plan for both defense and for incident response plans,” Jordan says. “Radiologists are subject matter experts in their areas, and they know the criticality of the data and their content management systems. They must work with their hospital network during an all-hands-on-deck event.”

While radiologists may not be involved in cybersecurity matters at every institution, all hospital staff have a role to play in keeping their patients safe, Desjardins says. “Everyone should be educated at recognizing phishing attempts, the usual cause of an initial breach leading to a ransomware attack. And, of course, they should constantly maintain proper cyber-hygiene, such as using encrypted laptops and VPNs,” he says.

## RANSOMWARE READINESS

Ransomware is a form of malware designed to encrypt files on a device, rendering any files and the systems that rely on them unusable. Malicious actors then demand ransom in exchange for decryption. [StopRansomware.gov](https://www.stopransomware.gov) is the U.S. Government’s official one-stop location for resources to tackle ransomware more effectively.

The IT security staff of a hospital needs the assistance of the radiology department when it comes to the identification and classification of the systems and the business impact analysis. Radiologists are also critical to contingency planning and recovery aspects, just as they would be in the event of a disaster, Jordan says. If they are not presently engaged, they should reach out — teamwork will lead to stronger and more robust recovery programs, he says.

## HAVE A PLAYBOOK

“Incident response playbooks are mostly administrative in nature and can be accomplished with relatively fewer resources than it would take to implement technical or physical controls,” Reardon says. “Your response plan depends largely on your organization, and cyber security may be out of the direct hands of radiologists working at larger institutions, whereas smaller practices may be wholly responsible for security efforts.”

If a small practice handles its own imaging data, a looming attack should be top of mind. Some small clinics have been forced to permanently shut down after a ransomware attack. Practices that align with hospitals most likely rely on their hospital to maintain imaging and health information data — and to periodically back up these systems, Chen says.

**“Copying data regularly means you won’t have to rely on cyber criminals to give it back — you would be able to restore your data from the copy while negotiations with the bad actors continue.”**

*HOWARD (PO-HAO) CHEN, MD, MBA*

“Copying data regularly means you won’t have to rely on cyber criminals to give it back — you would be able to restore your data from the copy while negotiations with the bad actors continue,” Chen says. “It should be a full copy of data that is isolated from the main network but can be activated and accessed locally when necessary.”

“As a radiologist, you cannot pass cybersecurity off to IT and hope they will take care of it,” Chen says. “Your IT department consists of soldiers at the door, if you will. Once the enemy is in, soldiers have limited effect.”

It literally can come down to office supplies, Chen says. It may have to last you weeks or months. “You might run out of CDs or DVDs or pens or toner. These things are part of a recovery effort that needs to happen before an attack.”

Two levels of documentation can be helpful. One is a process guide designed for you and other departments that use radiology. This document should outline which services will no longer be available. Some services might be disabled by the ransomware, but other services might be electively shut down by the hospital or radiology practice to make capacity for the emergent studies that still have to happen. Remember in a ransomware scenario, you’d need more people to do the work for a radiology study, work that used to be done by computers.

Then there is the more granular downtime playbook for use within your radiology department. This outlines what you should do by the hour — especially zero through two hours following a breach, Chen says. This playbook consists of checklists of things you need to do beyond 24 and 48 hours as well. The checklists should be written out by modality. “We have built those into each of our imaging sites since our attack. When something goes wrong, you might not have the Internet to quickly determine what you should be doing,” Chen says.

## NEGOTIATE TO RESTORE

Once a cyber breach becomes public knowledge, communicating and visually managing the situation is critical. A quick reference guide from the FBI’s Internet Crime Complaint Center outlines what to do in the event of a ransomware attack ([bit.ly/Ransomware\\_FactSheet](https://bit.ly/Ransomware_FactSheet)).

What happens next can vary, Chen says. Insurance companies, for instance, are beginning to get into the ransomware/malware space to mediate the response process, he says.

And not all data breaches need to be immediately reported to the federal government. In fact, even breaches affecting more than 500 patients only require reporting to the government no more than 60 days from discovery of the breach.<sup>3</sup>

“You may be able to get insurance for an attack — after which the insurance company would negotiate with the cyber criminals on your behalf for the release of data,” Chen says. Essentially you would file a claim, and the insurance company arrives at a rate it will pay out. “This is not an uncommon process,” he says.

“Criminals only have control of the key that unlocks your data,” Chen says. Getting that key, a password to unlock your system, is not the end of the game, he stresses. “Cyber criminals don’t provide tech support. They won’t come to your site to help undo the ransomware they released into your system. You are still going to be stuck with the fallout from the attack.”

“It was surprising how much effort it took to recover and the impact it had,” Gandhi says. “It was different than usual downtimes — when you can recover things much faster because you have a plan around those things you can rely on and those systems that may be unavailable to you.”

“I let everyone know that the threat is real, and that it impacts lives,” Gandhi says. “Everybody should be aware of it and be taking steps to mitigate it in the first place. Beyond that, you must have a detailed recovery plan in place.” **B**

By Chad E. Hudnall, senior content specialist, ACR Press

ENDNOTES available in the digital edition at [acr.org/bulletin](https://acr.org/bulletin)

## UNDERSTANDING CYBERSECURITY

Cybersecurity threats in the healthcare sector are increasing globally due to the rising value of sensitive health information and availability of digitalized personal health records. The ACR Commission on Informatics will host an educational session, “Cybersecurity Primer for Practicing Radiologists” at ACR 2022 on April 24 from noon–2:00 p.m. Register at [acr.org/annual-meeting](https://acr.org/annual-meeting).

# Leading the Field

The College will recognize leaders in the imaging community at ACR 2022.

Each year, the College awards individuals whose work and dedication advances and strengthens the specialty. Spanning continents and subspecialties, this year's recipients include individuals from across the community of imaging intervention, and therapy. Commendations will be awarded at the ACR Annual Meeting, taking place in April.

## GOLD MEDAL



The Gold Medal is awarded by the BOC to an individual for distinguished and extraordinary service to the ACR or to radiology. View the list of past recipients at [acr.org/GoldMedal](https://acr.org/GoldMedal).



**CHRISTOPHER G. ULLRICH, MD, FACR (POSTHUMOUSLY)**

Christopher G. Ullrich, MD, FACR, began his career at the State University of New York (SUNY) Upstate Medical Center in Syracuse, New York, where he earned his medical degree. He completed his residency at SUNY in diagnostic radiology and went on to complete a two-year fellowship in neuroradiology at Johns Hopkins

University. Ullrich subsequently relocated to Charlotte, North Carolina, where he practiced for 38 years.

Ullrich's contributions have been multiple at the state, national, and international levels. He earned recognition as a national figure in neuroradiology and radiology advocacy. In 1993, he was actively involved in developing state-level radiology political action committees (PACs) centered in regional radiology practices. When the ACR formed a federal PAC known as RADPAC®, he worked with others to encourage practices to contribute.

During the span of his career, Ullrich was very active with the ACR, the North Carolina Radiology Society (NCRS), the Cervical Spine Research Society, and the Southeastern Neuroradiology Society, where he received many awards and medals for his work and publications. He has served on numerous ACR committees, including being an elected member of the ACR CSC for six years, chairing the ACR Utilization Management Committee and the ACR State Government Relations Committee. Additionally, he served as a representative of radiology to the American Health Insurance Plans, acting again as an advocate to improve patient care. He was a major advocate for mammography starting at age 40, arguing on behalf of women to maintain yearly studies. In 2016, he received the William T.

Thorwarth Jr., MD, Economics Award “for 20 years of ACR efforts in economics and advocacy” — particularly as it applied to private payer relationships.

As a writer and author, Ullrich contributed immensely to the neuroradiology literature. Notably, he was a pioneer of the “video display” of the CT scanner to determine normal values for lumbar spine, AP diameters, pedicle measurement, cross-sectional assessment, determination of lumbar stenosis, and other factors.

Ullrich also received multiple other awards and recognition, including the NCRS Silver Medal Award. As a volunteer, he participated in more than 90 positions at the state and national levels. He was appointed by the governor to the North Carolina State Health Coordinating Council, where he served for nine years, becoming chair in 2014. In 2016, he was inducted into the prestigious Order of the Long Leaf Pine, an honor presented by the governor of North Carolina as a gesture of friendship and goodwill to people with a proven record of service to the state. Ullrich also served on the board of Hospice and Palliative Care of Charlotte.

“I think Dr. Ullrich is one of a select few who has had a very meaningful and unique impact on our profession on both a state level, as well as on the national stage, positively influencing our organization and its members and benefitting our patients,” says Arl Van Moore, Jr., MD, FACR, past chair of the ACR BOC and past ACR president. “His efforts have benefitted our ability to provide better medical and imaging care to all our patients and to the positive benefit of our communities.” Ullrich passed away on Aug. 8, 2021, and will be fondly remembered by all who knew and worked with him.



**KATARZYNA J. MACURA, MD, PHD, FACR, FSABI, FAWR**

Katarzyna J. Macura, MD, PhD, FACR, FSABI, FAWR, is a professor of radiology, urology, and oncology in the School of Medicine of the Johns Hopkins University in Baltimore. She is assistant director of the imaging translational program of the Johns Hopkins University Institute for Clinical and Translational Research.

She served as president of the Maryland Radiological Society from 2013 to 2015 and on the ACR BOC, culminating in her term as vice president of the ACR from 2019 to 2020.

Macura has been involved in advocacy and program-building to support the career development of women in radiology for over 25 years. She served as president of the American Association for Women in Radiology (AAWR) in 2005, promoting opportunities for professional empowerment for women radiologists by providing education, networking, and mentorship. During her term, the AAWR received the 2005 Association of American Medical Colleges (AAMC) Women in Medicine Leadership

Development Award. The AAWR granted its highest honor, the Marie Skłodowska-Curie Award, to Macura in 2016.

Macura served as the inaugural chair of the ACR Commission for Women and Diversity from 2013 to 2019 and oversaw the foundational work of the Commission, which is summarized in the 2019 Diversity Report (available at [acr.org/diversity-report](http://acr.org/diversity-report)). The Commission adopted its first Strategic Plan in 2014 — defining the Commission’s vision, mission, and goals. Under Macura’s leadership, the Commission undertook initiatives in five major domains: advocacy, visibility, mentoring, education, and research. Since its inception, the Commission has worked to increase awareness and recognition of the value created by diversity and to make the radiological professions welcoming and inclusive while improving career and leadership opportunities for women and minorities who are underrepresented in medicine.

Macura’s clinical expertise is in genitourinary radiology, oncologic imaging, MRI, and image-guided diagnostic and interventional procedures. She established a clinical and research prostate imaging program at Johns Hopkins, with a focus on MRI, and is a member of the Johns Hopkins Precision Medicine Center of Excellence for Prostate Cancer. Her research is centered on functional multiparametric MRI, as well as on clinical translation of investigational devices for MR-guided diagnostic and therapeutic interventions in oncologic patients. Macura is developing diagnostic models to predict the risk of cancer development and progression by integrating and correlating MRI parameters with other biomarkers using radiomics and AI deep learning for better risk assessment and improved selection of treatment strategies.

Macura engaged with the ACR’s research programs early in her academic career by participating in the ACR Imaging Network (ACRIN) Genitourinary, Abdominal, and Informatics Committees, and as a co-investigator in the prospective multi-center trial evaluating MR imaging for the detection and localization of prostate cancer. She was involved in the ACR Digital Imaging and Communication (DICOM®) Standards Committee and the Commission on Clinical Research and Information Technology.

In addition to participating in the ACR Prostate Imaging Reporting Data System (PI-RADS®) Steering Committee and the Advanced Prostate Imaging and Targeted Therapy Committee, Macura is involved in several of the ACR’s educational offerings. She directs the Prostate MRI course at the ACR Education Center and has co-authored several ACR educational activities, such as a virtual micro-course and an online tutorial for prostate MRI.

She has twice been recognized with the RSNA Honored Educator Award. She received the Outstanding Faculty Teacher of the Year award in 2005 and in 2021 from Hopkins Radiology residents, and the “Diamond” Jim Brady Urology Residents Teaching Award in 2016. She received the Resident Mentoring Award in 2018 and the Faculty Educator of the Year Award from Hopkins cross-sectional body imaging fellows in 2021. She is a fellow of the ACR, the Society for Advanced Body Imaging, and the AAWR. She has to her credit more than 150 publications and over 200 national and international presentations.

While Macura is an accomplished radiologist, researcher, and educator, she says she is most proud of her advocacy work

on behalf of women and other underrepresented minorities in radiology. According to Macura, “The ACR Commission for Women and Diversity played a pivotal role, as the first-of-its-kind among radiology societies, in placing diversity and inclusion at the center of the ACR’s mission to provide excellent and equitable patient care.”



**ANNE C. ROBERTS, MD, FACR**

Anne C. Roberts, MD, FACR, has been described by colleagues as a visionary leader, a generous and active mentor, an outstanding physician, and an extraordinary ambassador for the ACR. Roberts, a professor of radiology at the University of California (UC) San Diego, is well-known for her work in the field of radiology, particularly in IR, both nationally and internationally.

Roberts’ interest in the field of radiology began when she was in her second year as a medical student at UC San Diego. When a group of radiologists came to her anatomy class to give lectures about their roles in analyzing the human body, their enthusiasm and passion for what they did made a lasting impression on her. After spending a year as an intern in OB-GYN, she decided to make radiology her specialty. During her radiology residency, she discovered IR and she never looked back.

Following her fellowship, she returned to UCSD. Just two years later, Roberts was appointed chief of radiology at the Thornton Hospital of UC San Diego. She began to have roles in leadership and responsibility in several organizations. She was elected president of the Society of Interventional Radiology (SIR) in 1996. Her many years of service to the SIR earned her the Society’s Gold Medal in 2015.

There have been many notable milestones in Roberts’ long and successful career, but she believes her involvement in IR becoming its own specialty is one of her proudest accomplishments. She feels the impact IR has had on the field of radiology cannot be overstated. Her involvement in IR becoming its own specialty dates back to the first proposal to the American Board of Medical Specialties in 2008. Over the next four years, she presented at and attended numerous meetings advocating for an IR primary certificate. Finally, in 2012, she worked with the ACR leadership to officially support the primary certificate for IR.

The ACR was an important resource for Roberts throughout her career. She credits two mentors, Arthur C. Waltman, MD, and George R. Leopold, MD, for fostering her involvement with the ACR. Waltman, a former professor of Roberts, was an IR who was very active in the ACR and helped her get involved with committees and projects in the ACR. Leopold, a former ACR gold medalist and chair at UC San Diego, held a number of positions in the ACR and felt strongly that radiologists should get involved with organized radiology. According to Roberts, the ACR led to her involvement in numerous other organizations such as the SIR and the ABR. Roberts continues to participate in professional radiology societies.

Roberts has been involved with the ACR since 1995 and has held numerous roles within the organization, leading to her tenure on the BOC. These roles have included secretary/treasurer from 2011 to 2016 and vice president from 2016 to 2017. Currently, Roberts remains involved with the ACR by holding a position on the College's Interventional Practice Guidelines Committee. "It is a huge honor to receive the ACR Gold Medal," says Roberts. "There are many people who are deserving; many people who have done really great things. To be chosen is an enormous honor."

## HONORARY FELLOWSHIP



The Honorary Fellowship award recognizes the contributions to radiology by individuals who are ineligible for ACR Fellowship.

View the list of past recipients at [acr.org/HonoraryFellow](http://acr.org/HonoraryFellow).



**ANCA-LIGIA GROSU, MD**  
Germany

Anca-Ligia Grosu, MD, is medical director and chair of the Department of Radiation Oncology in the Medical Center – University of Freiburg, Germany. At the University of Freiburg, she has been vice dean of the faculty of medicine, member of the senate, and is currently member of the university council. She participates in the advisory

board of German Cancer Aid (Deutsche Krebshilfe) on national initiatives for the treatment of cancer.

Grosu has been a member of the prestigious German National Academy of Sciences Leopoldina since 2018 and serves as deputy senator of its radiology section. For her scientific work on the integration of biological imaging into radiation therapy planning, Grosu was awarded the Alfred Breit Award of the German Society of Radiation Oncology in 2020.

Her path to becoming a world-renowned radiation oncologist is truly international in scope. After finishing medical school in Cluj-Napoca, Romania, she moved to Germany to complete her residency at the Technical University of Munich — first in radiology, then in radiation oncology, with a focus on imaging for radiation-treatment planning and monitoring.

Building on this work, she completed a fellowship in radiation oncology at Harvard Medical School before ultimately returning to Germany as chair of the Freiburg department of radiation oncology. Despite her studies and subsequent career having taken her around the world, Grosu maintains close ties with the radiation oncology department at the Institute of Oncology in Cluj-Napoca, Romania, where her interest in medicine first began.

Due to major developments in recent decades, technological progress in radiation oncology has facilitated precise dose application. As a result, radiation therapy has emerged as an important pillar in the treatment of cancer patients, enabling curative results in many cases, while limiting adjacent organ injury. In this context of optimized precision treatment,

advanced imaging plays an essential role, making it the focus of Grosu's research.

Her innovative approach has contributed to the implementation of high-precision radiation therapy in clinical practice, and the optimization of radiotherapy planning with advanced biological imaging. These advances and others have facilitated the application of increasingly precise radiation doses, resulting in a commensurate improvement in outcomes for cancer patients.

Looking toward the future, Grosu believes that in time, radiation oncology treatment will become more personalized. Tumor and normal tissue biology will one day likely dictate the precise radiation dose distribution for each patient, along with the best-suited systemic treatment to complement the irradiation. To achieve this goal, Grosu foresees a role for the integration of complex biological imaging methods in radiation planning.

Grosu is conducting major international clinical trials on the treatment of brain tumors, head and neck tumors, lung cancer, and prostate cancer, evaluating the role of multiparametric MRI and PET for target volume delineation for radiation treatment planning. The goal of Grosu's team is the extraction of specific bio-imaging markers for both tumor and healthy tissue using AI, which will lead to more individualized radiation treatment.

In the academic realm, Grosu cites having made the radiation oncology department at the University of Freiburg one of the leading institutions in the field among her proudest achievements.



**JANET ELIZABETH SIAREY HUSBAND, DBE, FRCR, FMedSci**  
England

For Janet Elizabeth Siarey Husband, DBE, FRCR, FMedSci, receiving ACR honorary fellowship is the perfect bookend to a global career. "Meeting colleagues in the U.S. early on introduced me to radiologists across the world. It was a club of intellect, ideas, and friendships that has lasted through-

out my career. So this honor is the most wonderful final accolade I could wish for as my career winds down."

Husband began her medical training at Guy's Hospital in London, where she initially pursued general medicine. After adjusting her focus to radiology, she began research on the prototype of the world's first CT body scanner at Northwick Park Hospital. She was a pioneer of whole-body CT and the first person to perform a CT-guided biopsy in the UK. She also championed the use of MRI in oncology.

In the early years of radiology, she recalls being one of very few women in the field. "It was very much a man's world in medicine then," she says. "As a woman, you had to get used to fighting one's corner."

She has contributed more than 300 publications, including 82 book chapters, more than 200 articles, and 6 books, including the *Imaging in Oncology* textbook, which became a standard text in oncologic imaging. She also served as co-editor-in-chief of the journal *Cancer Imaging*.

Training the next generation of physicians has been a great honor in Husband's career. "I'm most proud of all those junior colleagues who came through our department and have gone on to make huge contributions to radiology," she says. "That's been a very special part of my career. Having lit the flame for others, that I'm most proud of."

As her career progressed, she rose to the rank of professor of diagnostic radiology at the University of London Institute of Cancer Research, where she is now professor emerita. The majority of her career was spent at Royal Marsden NHS Foundation Trust and Institute of Cancer Research, where she also served as the medical director of the hospital. She also founded the International Cancer Imaging Society and served as president of both the British Institute of Radiology and the Royal College of Radiologists. Among her

many honors was the 2007 award of Dame Commander of the Most Excellent Order of the British Empire for her services to medicine.

"Looking back over 50 years, the extraordinary advances that have taken place over my career have seldom been matched in the whole history of medicine," says Husband. "Looking ahead at the next 50 years, goodness! Where will radiology be? Technological advancement is really key to a radiologists' life and the way they work. What an exciting specialty to be in."

Looking back on her career, Husband notes, "My advice always has been: Follow your star. If you're exploring a new opportunity, it's got to be fun, it's got to be exciting. And even if you can't see where it's going, go for it. The rest will work itself out." **B**

Interviews by Lyndsee Cordes, Chad Hudnall, Alex Utano, and Chris Hobson, ACR Press

## Nominees for 2022 Positions

At ACR 2022, the ACR Council will vote on the following slate of candidates recommended by the College Nominating Committee.

### Officers

Howard B. Fleishon, MD, MMM, FACR, of Phoenix, for president

Frank J. Lexa, MD, MBA, FACR, of Wynnewood, Pa., for vice president

### Board of Chancellors

The CNC recommends the following members be considered for election to the BOC:

- Mark D. Alson, MD, FACR, of Fresno, Calif., Eric B. Friedberg, MD, FACR, of Johns Creek, Ga., and Agnieszka Solberg, MD, of Bismarck, N.D., have been recommended to run for a first three-year term to chair the Commission on General, Small, Emergency and Rural Practices.
- William Small Jr., MD, FACR, of Maywood, Ill., has been recommended to run for a second three-year term to chair the Commission on Radiation Oncology and serve concurrently as the American Society for Radiation Oncology representative for a second three-year term.

• Sharon D'Souza, MD, MPH, of Tulsa, Okla., Johnson B. Lightfoote, MD, FACR, of San Dimas, Calif., and Sabala R. Mandava, BS, MB, of Bloomfield Hills, Mich., have been recommended to run for a three-year term to chair the Commission for Women and Diversity.

• Timothy L. Swan, MD, FACR, of Marshfield, Wis., has been recommended to run for a second three-year term as Member At-Large.

• Taj Kattapuram, MD, of West Salem, Wis., and Daniel Ortiz, MD, of Marietta, Ga., have been recommended to run for a two-year term as YPS representative.

### Council Steering Committee

Of the following five candidates, four are to be elected in a contested election by the Council to serve a two-year term on the CSC:

- Rachel Gerson, MD, of Seattle
- Atul K. Gupta, MD, FACR, of Pittsford, N.Y.
- Nolan J. Kagetsu, MD, FACR, of New York City

- Andrew K. Moriarity, MD, of Grand Rapids, Mich.
- Derrick Siebert, MD, of Wausau, Wis.

### College Nominating Committee

Of the following eight candidates, three are to be elected in a contested election by the Council to serve a two-year term on the CNC:

- Harris L. Cohen, MD, FACR, of Memphis, Tenn.
- Betsy Jacobs, MD, of New Hyde Park, N.Y.
- Neil U. Lall, MD, of Atlanta
- Christopher R. McAdams, MD, of Atlanta
- Tanya W. Moseley, MD, of Houston
- Christopher M. Mutter, DO, of Scarborough, Maine
- Ali Noor, MD, of Dix Hills, N.Y.
- Victor J. Scarmato, MD, MBA, FACR, of Glen Cove, N.Y.

### Private Practice Representative

Arne E. Michalson, MD, FACR, of Coeur d'Alene, Idaho, was selected for one two-year term as a private-practice representative to the Intersociety Summer Conference, effective in July 2022.

The election manual, featuring detailed information on the candidates, will be available to all councilors prior to ACR 2022 at [acr.org/Annual-Meeting](https://acr.org/Annual-Meeting).

# The Power of Registry Data

The National Radiology Data Registry is a valuable tool for quality improvement. Its large data sets can also help researchers looking to advance health equity.

The National Radiology Data Registry (NRDR)<sup>®</sup> is a collection of registries related to a range of radiological procedures and their quality and safety. The data in these registries help organizations with many tasks, such as accurately assessing their performance and marking areas of opportunity for quality improvement. This data can also enable research, including in health equity and disparities where small or incomplete data sets are considerable barriers.<sup>1</sup> The *Bulletin* spoke with Michael Simanowith, MD, director of ACR Quality Registries, about how NRDR's vast quantities of data can help researchers measure and understand inequities, as well as the equity studies that are already underway.

## Why is it especially important right now to advance health equity and examine equity/disparity issues?

The COVID-19 pandemic has brought health equity and disparities front and center. The pandemic has stretched financial and human resources to critical levels, which in turn delays everyday care. We have seen evidence from the data in our cancer screening registries that as waves/variants of the pandemic spread, “less critical” tests such as screenings are delayed and possibly skipped altogether.<sup>2</sup> Making sure disadvantaged populations that may already be challenged in getting usual care are not lost to follow-up is likely to be a major challenge. We need to start assessing the impact on these patients now so we can potentially intervene and minimize any long-term consequences.

## Why is it important for the ACR to have to resources and partnerships like NRDR that advance health equity through research?

The ACR's mission is to serve patients and society by advancing the practice and science of radiological care. This is meant to apply to all patients, regardless of background, so advancing health equity is clearly within our mission. NRDR data offers a unique opportunity to explore questions of equity by using our robust data to identify care gaps that should be targeted to reduce disparities. The sheer volume of available data in NRDR — more than 100 million exam records from 5,000 facilities over ten years — can facilitate progress in these population groups that are often small and for whom other data sources aren't as readily available or in a large enough sample size. NRDR data also contains valuable clinical detail that can be used to do more advanced analysis (such as risk adjustment) that other sources, such as claims data, often do not.

## How can researchers use NRDR data fields to look at health equity issues?

Although the primary intent of the registries is for quality improvement at participating hospitals, NRDR registries capture key demographic information, such as patient race/ethnicity, age, gender, and education level. This data can be used to explore disparities, such as exams performed, adherence to screening recommendations, key population health metrics (such as colon, breast, lung cancer detection and stage at detection) and more.

Some demographic fields are optional for participating sites to include, so the ACR quality and safety team works with researchers to determine the most appropriate and complete variables in a registry to achieve their research aims. To that end, we have recently released an online report with counts for each available variable that allows researchers to determine the viability of using the NRDR data for their investigation ([available at \*acr.org/Registry-Counts\*](https://acr.org/Registry-Counts)). This report is currently available for the Lung Cancer Screening Registry (LCSR); the National Mammography Database (NMD) report was made available in February and will be followed by other registry reports in the future.

## Are there any studies you're excited about?

One recent study that is poised to have an important impact, and really highlights the power of the NRDR data was recently published in *Radiology*. Using five years of data from the Dose Index Registry, researchers developed radiologic diagnostic reference levels (DRLs) and achievable doses (ADs) for the top ten most commonly performed pediatric CT exams. This represents over 1,500 facilities and 1.5 million cases. It is one of the first papers to report DRLs and ADs in a pediatric population and can help guide CT facilities in adjusting pediatric CT protocols and resultant doses (read more at [bit.ly/DIR\\_Rad](https://bit.ly/DIR_Rad)).

## How can researchers get involved with NRDR?

We are very interested in exploring research topics with any investigator. You don't need to be a registry participant to submit a request — though we do give preference to participants in the event that multiple requests are made for a similar topic. There is an online portal available to make a submission at [acr.org/data-access](https://acr.org/data-access).

Each registry has a committee that evaluates all requests to ensure the research has merit and there is no conflict with other projects. If the topic is approved, we will assign an analyst to work with you. We have a highly qualified team who will perform the actual data analysis and provide summary tables/figures to the investigator. We do not share raw- or row-level data externally. In general, there is currently no fee to conduct a research project with NRDR and typical projects take about six to nine months to complete, depending on the level of complexity. **B**

Interview by Meghan Edwards, freelance writer, ACR Press

ENDNOTES available in the digital edition at [acr.org/bulletin](https://acr.org/bulletin)

# Early Exposure

By introducing the field of radiology to medical students early on in their careers, students gain an understanding of what being a radiologist truly entails.

**A**mbitious. Curious. Empathetic. These adjectives describe medical students as they don their new white coats and begin a lifelong journey into the world of medicine. Throughout the formative years of medical school, students spend a significant amount of time memorizing complex biochemical pathways, understanding the nuances of pathologies, and mastering anatomy. As they transition into clerkship years, they begin practicing the art of medicine. In being exposed to fields such as surgery, pediatrics, and OB-GYN, and family medicine, students form opinions as to what practicing medicine means to them. More importantly, it is through experiencing these specialties that students develop an affinity for the one domain of medicine they may choose to pursue as their future careers.

Conventionally, most medical students have minimal exposure to the field of radiology. Currently, there is no formally required clerkship in radiology, and being exposed to radiology in pre-clinical years is quite rare. Simultaneously, as medical students navigate the complexities of the healthcare system and find their joy in a particular field, there is a growing angst about the future of radiology. Will AI overtake the future of radiology? Will the field dynamically change due to encroachment? By introducing the field of radiology to medical students early on in their careers, students gain a fair understanding of what being a radiologist truly entails. Furthermore, a deeper appreciation for the nuances surrounding the field is afforded to students, thereby empowering them to make the best career choice for themselves.



## Supporting Students

Did you match into radiology? Please complete a brief survey at [bit.ly/MedicalMatch](https://bit.ly/MedicalMatch) by April 2 to let us know what your plans are after you graduate from medical school. We'll use this information to provide you the content and resources most valuable to you during residency.

## Understanding the AI Hype

The advent of AI in healthcare has catalyzed a transformation within the field of precision medicine, diagnostics, and informatics. Perhaps more than any other field in medicine, radiology has embraced the introduction of AI into clinical practice. To medical students without exposure to radiology in a clinical setting, AI may be viewed as a potential threat to the future of the job market. A medical student with early exposure to radiology will appreciate that advances in machine learning will only augment their capabilities as a future radiologist. Through early education in radiology, AI transforms from a foe to an ally.

## Studying the Nuances

Beyond the fear of AI negatively impacting the future job market of radiologists, medical students may also stray away from pursuing radiology due to potential interprofessional encroachment issues within the field. However, by educating themselves as to the nuances involved in other healthcare professionals' contributions to the field, medical students can better decide for themselves whether this threat is substantiated. More importantly, by educating medical students about the economics of these issues, it may inspire them to pursue research careers in health policy within radiology.

## Learning the Varying Career Paths

A common misperception within the medical student community is that radiology is a field confined to the reading room. By involving medical students in radiology-based research projects, students may quickly learn how imperative radiology is to the vitality of the hospital system and patient outcomes. Most students are unaware that radiologists can enter the industry to work on health system improvements, informatics, AI development, and clinical operations management. Furthermore, within radiology, many subspecialties afford opportunities for direct patient contact. 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.

## Getting Engaged

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. The ACR provides medical students with opportunities to engage, such as contributing to Case in Point®, getting involved with an ACR state chapter, or participating in one of the ACR's programs.

Radiology continues to attract the best and brightest of medicine. There is a unique blend within radiology that may not exist in other fields of medicine: the synthesis of engineering, technology, and medicine coming to life daily to improve the lives of patients. Early introduction of students to radiology's role within the healthcare system, and its immediate impact on patient care, may inspire students to pursue a career in this specialty. **B**

Ayden Jacob, BA, MSc, is the AI in Medicine Lead with the ACR Medical Student Subcommittee. He would like to acknowledge the roles of Gregg I. Khodorov, MD, MBA, IR/diagnostic radiology medical resident at Thomas Jefferson University Hospitals, and Varun Danda, BS, at Thomas Jefferson University, in the development of this column.

# What Do Noncompete Clauses Mean to My Practice?

Restrictive clauses in employment contracts can lead to tense negotiations. ACR Legal experts weigh in on how to approach these agreements, as both a radiologist and as a practice.

**Y**ou're ready to begin offering quality patient care after completing residency and fellowship. You consider a promising offer from a private practice, an academic department in a health system, or multispecialty group. However, you discover that the contract from your prospective employer contains a restrictive covenant, or noncompete clause. If you decide to leave the employer for another opportunity, the noncompete precludes you from practicing for a specific time within a certain geographic area. Otherwise, you might risk your employer suing you for breaching your contract — and you incurring harm to your reputation.

In another scenario, you serve as chair or other senior member of a radiology or radiation oncology practice. A top partner or associate shares that they have received an offer to join another group or health system in the region. You've mentored this individual and appreciate this recognition of them. Yet, as a practice leader, you may have to advise your colleague that they have a noncompete clause in the contract and might well invoke the provision should they join the competing entity. Sometimes, a radiology group's contract with the hospital might require the group to include a noncompete clause in all contracts with their members.

What to do? In this second part of our series on noncompetes, we'll discuss their impact on ACR members who are on each side of an employment or contractual matter (read the first part at [acr.org/RADLAW-Noncompetes](http://acr.org/RADLAW-Noncompetes)). We'll then recommend tips for addressing these provisions.

Members' perspective will vary dramatically based on their side of the bargaining table. The noncompete reasonably may safeguard a hospital or practice's considerable investment in a member as part of a group. With no clause, a group may lack bargaining power with a hospital system because the latter could lure away some people to start a new team.<sup>1</sup> But radiologists negotiating contracts with initial, or new, practices will regard this provision unfavorably if they eventually wish to seek a more appealing position or need to leave for personal reasons.<sup>2</sup>

On either side, members must consider these key legal steps:

- Analyze a noncompete under each jurisdiction's law. Check the governing or applicable law of your state and city. Tele-radiology contracts pose special challenges.
- Determine whether you could show a court why a non-compete either is — or is not — enforceable. For example, a practice that attempts to enforce a noncompete against

one of its radiologists or radiation oncologists likely must demonstrate particular harm to the group. A judge might not accept an employer's allegations of "risk of harm to customer goodwill stated in general, conclusory terms," as noted in a recent case.<sup>3</sup>

- Be aware that noncompetes might, but don't always, transfer to an entity that acquires or merges with a group or health system. In some cases, courts have ruled that noncompetes are enforceable in mergers, rather than asset purchases, because the surviving entity assumes the contractual rights and liabilities of the merged entity.<sup>4</sup>
- Keep in mind that a practice cannot waive a noncompete clause in a member's contract when that clause is required in the group's contract with the hospital. Only the hospital can waive that requirement, and, even if the hospital was willing to waive it, the group may not want to waive the requirement to prevent a radiologist from becoming an employee of the hospital.
- It's possible the group may waive the noncompete clause if there is no hospital contract requiring it. Whether the practice would agree to waive the provision is uncertain. The member might be able to negotiate out of the noncompete by convincing the practice to shorten its duration or scope, in return for paying money to the group.

We recommend these pointers for all members who confront noncompete provisions:

- Negotiate as fairly and candidly as possible with an employer or prospective employee. Consult a qualified lawyer when evaluating the noncompete.
- If you lead your practice or negotiate contracts for them, consider advising the prospective employee that circumstances may change. For instance, another group or hospital system may merge with or acquire the practice. The challenge to sharing any information occurs when the group may have signed a nondisclosure agreement and cannot reveal even the existence of that agreement, let alone a potential deal.
- If you apply to join a practice, ask about its current and future status. For instance, you should ask whether the practice might merge with, acquire, or be acquired by another entity or entities. Be prepared to get a noncommittal, or even terse "no comment" response.

The ACR has addressed this volatile issue through its governance. Members debated at last May's Council meeting a resolution on partnership track associates in practice equity transactions. Resolution sponsors maintained that associates in groups agreed to noncompete clauses in contracts because they understood they would be considered for a potential equity partnership. However, these associates apparently were unaware that the practices might change their structure, such as engaging in an equity transaction.

*continued on page 22*

# Introducing Medical Students to Appropriateness Criteria

A medical school offered a self-directed ACR Appropriateness Criteria® course in lieu of clinical rotations during the COVID-19 shutdown.

When the COVID-19 pandemic sent the nation into lockdown, Tyler Pease was completing his third year at Rutgers Robert Wood Johnson Medical School (RWJMS). As universities across the country pivoted to online learning, it soon became clear that regular clinical rotations — during which medical students often receive the greatest exposure to radiology — would be unavailable to most medical students.

In March of 2020, Judith K. Amorosa, MD, FACR, vice chair for faculty development and academic affairs at RWJMS and radiologist partner with University Radiology, received an urgent email from the dean's office requesting ideas to address the necessary changes in educational instruction. After thinking about how radiology could rise to the challenge, she conceived a proposal to virtually introduce medical students to radiology and appropriate imaging ordering practices.

Drawing from her experience developing a hybrid class for students who were interested in radiology but unable to attend lectures, Amorosa created a self-directed radiology course to educate medical students about the ACR Appropriateness Criteria® (AC). The ACR developed the AC to help referring physicians make appropriate image ordering decisions. This elective has allowed students to focus on the AC most relevant to their own subspecialty interests and receive credit for clinical hours during the pandemic.

Amorosa developed a remote radiology course to introduce medical students to the ACR AC. Twenty students have completed the requirements and gained considerable knowledge about the AC since the course began in April of 2020.

## Addressing a Need

The idea for the elective grew from a previous program that predated COVID-19. “I received many calls from medical students asking me about radiology,” says Amorosa. “Many medical students couldn't take the courses we offered because their schedules were too demanding. Instead, they would send scribes to take notes on lectures so that they could learn the material on their own. This gave me the idea to create a hybrid course that encouraged independent and self-directed learning.”

The original program, named Radiology on the Interview Trail, combined clinical experience with online instruction to educate busy medical students about imaging methodologies and basic radiology procedures. “It worked well because students

were able to take advantage of radiology resources while also navigating specialty interviews and other demands on their time,” Amorosa says.

When the dean's message went out about ways to pivot to virtual learning, Amorosa saw this existing virtual program as an opportunity to expand on an already successful course model. She immediately knew she wanted to incorporate the AC to help expand its use. She also added the AC project to Radiology on the Interview Trail, exposing more than 80 additional students to the AC guidelines.

Meigra M. Chin, MD, associate professor and assistant program director of emergency medicine at RWJMS, chaired the curriculum committee that approved the Remote Radiology course. “I realized shortly after starting my first job as a radiologist that referring doctors often do not know which imaging modality is best for a clinical condition,” Amorosa says. “I still feel from my daily experience with many practitioners that they are not using the AC as much as they should, so when the call came to do something to teach medical students — our future practitioners — online, the AC came to mind.”

## Leveraging the Guidelines

As Amorosa recognized, even though the ACR introduced the AC in 1993 to help minimize inappropriate image ordering, many ordering providers still do not rely on or even know about the resource. In 2009, she was part of a team that led a study to determine how often physicians use the AC. Of the 126 physicians surveyed, only three reported using the AC when ordering image studies.<sup>1</sup>

Amorosa, who has served on panels to develop the chest thoracic AC, has seen firsthand how much time, effort, and care go into developing the guidelines. She knows how valuable this resource could be for medical students and the radiologists who work with them.

## Developing the Course

In March of 2020, Amorosa presented the proposed elective to the curriculum committee, which is chaired by Dr. Chin. After several conversations about the course structure and how its objectives would provide effective substitutes for clinical hours, the committee approved it for the 2020 spring and summer terms.

“It was clear that students were going to need opportunities to progress in their education in this time without patient contact,” Chin says. “The committee was completely supportive of Dr. Amorosa's elective course because we all recognize that radiology is an area in which students do not always receive guided and specific education.”

In less than a week, 20 students enrolled in the new Remote Radiology elective for April and May 2020. “It was a desperate time,” says Amorosa, “but there was great enthusiasm for the course, and I was encouraged to move forward.”

## Implementing the Course

During the course, students worked directly with Amorosa to learn about the AC. She asked students to develop presentations around the AC topics that aligned with their specialty areas. For Pease, this meant studying the AC that corresponded with orthopedics.

After a virtual kickoff meeting to introduce the course, Amorosa met with students individually through email, phone, and video conferencing to help them find appropriate resources and develop their presentations. She asked students to produce three presentations per week, but this number varied based on individual student needs and topics. For instance, Pease ultimately completed four presentations on the acutely limping child, scoliosis child, back pain child, and developmental dysplasia of the hip.

Students were required to include in-depth clinical and lab data along with appropriate imaging in their presentations. The research forced the students to become immersed in the AC for true learning, Amorosa notes. “Recognizing the students’ interests and future plans is key,” she adds. “Aligning AC guideline topics with their future careers brings them closer to this resource at their fingertips.”

To meet the course requirements, Pease knew that he would need a better understanding of MRI visualization techniques for his first presentation, which focused on the acutely limping child. “I sought out a number of lectures on YouTube about the physics of MRI,” he explains. “I wanted to understand MRI on a fundamental level. This opportunity to engage more with these techniques enhanced my understanding of what MRI is and how it works. I hadn’t been taught that in any of my preclinical experiences.”

Along the way, Pease received notes from Amorosa and Catherine S. King, MD, whom Amorosa consulted as a subject matter expert. King, who specializes in musculoskeletal radiology at Northwest Radiology, was then serving as chief resident at Rutgers Robert Wood Johnson University Hospital. Both Amorosa and King provided feedback about Pease’s ideas and materials and helped guide his presentation content by suggesting imaging modalities connected to specific pathologies.

## Presenting the Research

For each presentation, students delivered scripts and decks of 30–45 slides. No formal reports were required, but some students choose to present their materials to Amorosa and a consulting specialist, as well as their peers. Currently, the radiology department is in the process of uploading the learning materials they created to the department’s website.

Pease presented his final research as case studies. For example, in his presentation on the acutely limping child, he introduced a hypothetical four-year-old whose parents were concerned about him limping and favoring his right foot. Pease also developed additional context that the child had spent the morning with his maternal aunt, who is the mother of two similarly aged children. This helped Pease explore multiple possible reasons for the limp.

Pease discussed potential diagnoses for limping children based on different possible sub-scenarios, such as whether the child could identify the pain source. Using the AC for the acutely limping child, he discussed the advantages and disadvantages to different imaging techniques, such as MRI, ultrasound, and three-phase bone scan.

He also reviewed other important considerations for image ordering, such as radiation exposure, patient immobilization, and sedation, as well as parent and patient preparedness, and age-appropriate imaging selection. His presentation included appropriate images and citations for each option.

## Soliciting Student Feedback

Throughout the process, Amorosa encouraged her students to keep process and research journals. She asked the students to provide feedback to help improve the curriculum in the future.

Of the 20 students who participated in the Remote Radiology course and the students who evaluated their project experience with the AC in Radiology on the Interview Trail, 90% said they learned and found the experience “very useful/useful” for their future career.

Pease says he was extremely satisfied: “I thought the ACR AC was really excellent as an educational resource,” he says. “I didn’t know it existed before I took this course. I would definitely recommend that other medical students reference the AC when familiarizing themselves with radiology in their specialties.”



**“Many medical students couldn’t take the courses we offered because their schedules were too demanding. Instead, they would send scribes to take notes on lectures so that they could learn the material on their own.**

**This gave me the idea to create a hybrid course that encouraged independent and self-directed learning.”**

JUDITH K. AMOROSA, MD, FACR

## Looking Ahead

Based on positive feedback like this, the curriculum has been regularly offered as an elective since April of 2020. In addition, Amorosa has introduced a similar project as part of the Radiology on the Interview Trail course, and she is already considering how it might be reconfigured when students are able to see patients again. She hopes to continue offering the elective alongside regular clinical rotation opportunities and to introduce additional AC resources, such as the ACR AC app.

Amorosa encourages others to find ways to engage medical students with appropriate radiology ordering practices throughout the pandemic and beyond. “Ultimately, courses like these can boost student confidence in image ordering,” she says. “They can also help medical students recognize how appropriate orders help radiologists and ordering physicians work together to enhance patient care. As physicians, we have an obligation to pass this knowledge along to the next generation of care providers.” **B**

By Chelsea Krieg, freelance writer, ACR Press

ENDNOTE available in the digital edition at [acr.org/bulletin](http://acr.org/bulletin)



# Build or Buy?

Radiologists face numerous challenges in evaluating AI systems and deciding which might be worthwhile in their practices.

Radiology AI research and development of commercial products has undergone unprecedented growth, although implementation of AI tools in clinical practice remains limited. Radiologists face numerous challenges in evaluating AI systems and deciding which might be worthwhile in their practices. This includes which problems to prioritize and whether to build systems internally or to purchase applications from an external vendor. In this month's column, we'll discuss the key considerations for radiologists evaluating AI implementation in their practices.

## Prioritizing Problems

The fundamental challenge a radiologist faces is prioritizing which problems to address with AI. Tools exist to triage cases by identifying critical findings, increase efficiency by performing time-consuming tasks or assisting with report creation, and improve detection by identifying potentially overlooked findings. Understanding clinical context and patient populations is essential. While an outpatient-only practice might benefit most from an AI solution to identify pulmonary nodules on screening CT chest studies, a children's hospital could decide to prioritize an AI solution for bone age radiographs, and a comprehensive stroke center might prioritize an AI solution for detecting large vessel occlusion on CT angiography head examinations.

## Influencing the Decision

Having established what is to be prioritized, the next question is whether to build a tool internally or purchase an existing solution. This consideration is particularly applicable to large radiology practices and academic medical centers, as smaller practices likely lack sufficient scale to justify developing and implementing in-house AI solutions. Key considerations include the availability of data and experts to develop AI solutions, the return on investment (ROI), and long-term goals.

Development of an AI tool requires sufficient labeled imaging data for algorithms to train, as well as machine learning experts to develop and evaluate performance. Building an AI tool can be done with internal teams of experts or via partnerships between radiology practices and outside vendors. Practices might find it faster and cheaper to deploy existing pre-approved or FDA-cleared tools rather than embarking on development of an in-house solution. In areas where tools do not yet exist, however, development and FDA approval of novel AI solutions could provide opportunities for new revenue streams.

## Measuring the ROI

To date, it has been difficult to estimate the ROI from deploying AI solutions. Conventional performance metrics have largely focused on diagnostic performance, including specificity and sensitivity. For an organization evaluating whether to build or buy an AI tool, key questions include how it might translate to better patient care or improve efficiency and profit. Certainly, the New Technology Add-On Payment, which CMS established for large-vessel-occlusion AI tools, provides a valuable incentive for hospitals to adopt this technology; it remains to be seen whether other AI tools will be similarly reimbursable.

## Making the Choice

The decision to build or buy AI hinges on expected value, risk tolerance, and organizational mission. A private practice looking to maximize short-term revenue and minimize investment risk might decide to selectively purchase tools that increase efficiency or partner with an AI startup company. Academic medical centers might decide that the development of internal AI systems is an important aspect of training and research ecosystems, offering opportunities for grant-funded research to explore applications of AI — which might not immediately be reimbursable or profitable, but which could eventually improve patient care. Ultimately, all radiologists are best served by staying informed of developments in AI and leveraging local knowledge and expertise to determine what solutions will work best for our patients.

Hundreds of algorithms are now FDA-cleared for radiology and that number will only grow. Whatever your role, you'll want to understand what's involved behind the scenes. You may be surprised at what you learn along the way. **B**

By Daniel S. Chow, MD, MBA, co-director for the Center for AI in Diagnostic Medicine at the University of California, Irvine, and Justin Glavis-Bloom, MD, fellow in abdominal imaging and AI at the University of California, Irvine

### Build Versus Buy: The Conundrum of Radiology AI

How do you pick the right AI vendor? What if no vendor has developed a model for the use case you need solved? When does it become obvious that you'll need to build an in-house team and what will it look like?

In a recent webinar, ACR experts debated the pros and cons of building versus buying AI and discussed how a variety of practices and institutions are finding it possible to bring in AI tools to support radiologists and improve patient care. View the webinar at [acr.org/AI-webinar](https://www.acr.org/AI-webinar).

## What leadership skill do you wish you'd developed earlier in your career?

"I wished I had learned the leadership skill of delegation earlier in my career. As a female leader in radiology, I initially thought that others would see me delegating tasks as a sign of weakness or an indication that I couldn't handle my role. But in the end, it really shows to you are confident enough to allow other people to help you, that you value other people's input, and that you want to give others the opportunities to shine."

**Carolynn M. DeBenedectis, MD, vice chair for education and director of the radiology residency program, and associate professor of radiology at the University of Massachusetts Medical School**



"I would say readiness to delegate responsibility would have been helpful early in my career. For leaders, it is very difficult, yet crucial, to empower others in the team to self-organize and make decisions. To be able to do this, one should build the right team, communicate clear goals, and maintain a healthy level of monitoring while allowing some safety for trial and errors. This is still a work in progress for me, but I wish I had started earlier."

**Aytekin Oto, MD, MBA, dean for clinical affairs and chief physician at University of Chicago Physicians and professor and chair of radiology at the University of Chicago**



## THE RADIOLOGY LABOR SHORTAGE

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recognition of RT shortages. In a recent SCARD/ Association of Administrators in Academic Radiology survey, only 6% of respondents believed that the current RT workforce was sufficient in size for recruitment purposes. The survey also found that 53% of training programs for radiology, radiation therapy, and nuclear medicine programs are at full enrollment.<sup>8</sup> RTs are becoming a rate-limiting factor for many of our practices. In discussions with our allied health partner societies, some contributing factors include wages, concerns about safety during the pandemic, limited advancement opportunities, and a lack of respect and support compared with nurses and other healthcare workers. Clearly, we can and should do more to help support our valued allied health colleagues.

Early on, some suggested that AI would replace radiologists. Now, most experts agree that while AI might supplement radiologist workflow, there is the stronger probability that additional AI-based capabilities will expand the role of medical imaging and radiologists and may in fact add to our workload demands.<sup>9</sup>

Recently, legislation increased the number of government-supported medical residency slots by 1,000.<sup>10</sup> As of now, there is no prediction on how many of these slots may be designated to radiology. Even if radiology slots are considered, the number would unlikely be adequate to address our projected needs. We may need to prepare a future legislative effort to specifically expand radiology training positions or develop alternative approaches.

Radiology is a strong profession with optimistic projections of our future. Yet, similar to many service industries, we are experiencing workforce challenges as demands for our services continue to grow. Continued growth is opportunity and together we will find solutions to the workforce challenges. By raising awareness, the ACR is committed to working with our members, practices, and other organizations to optimize our workforce as we continue to bring vital and innovative medical care to our patients. **B**

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## NONCOMPETE CLAUSES

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Sales to an outside investor, though, might remove that opportunity. Some members countered that the resolution was not viable because practices could not disclose confidential negotiation information. They also asserted that the ACR should not provide financial resources to intervene in individual practice matters.

After vigorous debate, the Council voted to refer Resolution 25 to the ACR BOC. The BOC requested that a team, led by William T. Herrington, MD, FACR, develop a proposed resolution. Dr. Herrington's team presented its findings and offered a proposed resolution to the BOC at the BOC's fall 2021 meeting. The BOC voted to sponsor the resolution for Council consideration at ACR 2022 in April.

The BOC voted to sponsor this resolution. Notably, it resolves in part "that the ACR recommends that in the event of a substantial change in or control of ownership or structure of the practice, any restrictive covenant in an associate's current employment contract should be waived." The team believes that the threshold for "substantial change... or control" should be when a major activity, such as a merger or acquisition, occurs, not the departure of one or two practice owners.

Noncompetes present high clinical, economic, and personal stakes. Tensions may surface. Ultimately, each side must work in good faith with one another. **B**

By Bill Shields, JD, LL.M., CAE, and Tom Hoffman, JD, CAE

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