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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.

FEATURE

10 Under Attack
Stolen health information can lead to identity theft, billing fraud, and sometimes blackmail — to the detriment of both patients and the radiology groups charged with protecting their personal data.

13 Getting It Right
What you need to know about The Joint Commission’s new requirements for fluoroscopy.

14 Owning Clinical Decision Support
The Appropriate Use Criteria toolkit explains requirements under PAMA so that radiologists can better educate referrers on the process.

16 Setting an Example
Although radiology has not yet seen significant rises in female representation, other historically male-led specialties — such as surgery — have.

17 With One Click
Patients should feel a sense of ease and compassion from their providers — a primary goal of the ACR PFCC radiologist toolkit.

18 Innovation Training
An invention incubator inside the radiology department at Massachusetts General Hospital turns physicians into inventors.

20 Barriers to Integrating AI into Radiology Practice
Despite the promise of deep learning tools to recognize patterns in images and other complex forms of data, challenges still stand in the way.

DEPARTMENTS

4 From the Chair of the Board of Chancellors
We have a responsibility to train the next generation of radiologists as cancer imaging clinicians.

5 Dispatches
News from the ACR and beyond.

9 From the Chair of the Commission on Economics
The ACR 2019 Economics Forum focused on MACRA, CPT® code valuation, Medicaid payments, and other health policy topics.

21 Job Listings

22 Final Read
How can we foster a culture of support for parents during radiology residency and in practice?
Cancer Imaging: An Essential and Evolving Specialty

Radiologists who read scans performed on cancer patients should become familiar with imaging assessment criteria.

The current era of precision oncology has led to major paradigm shifts in the treatment of cancer. These shifts have a direct impact on our imaging studies and our assessment of therapeutic response. Radiologists reading scans of patients with cancer should be familiar with imaging assessment criteria because they are used by our referring clinicians to make treatment and management decisions for the patients we share.

Ideally, we should do this by putting imaging to the test as a primary objective in well-designed prospective randomized trials and by collaborating with national and international clinical practice guideline organizations such as the National Comprehensive Cancer Network’s Clinical Practice Guidelines in Oncology and Clinical Pathways — using evidence-based management to ensure that all patients receive preventive screening, diagnostic, treatment, and supportive services that are most likely to lead to optimal outcomes. Implementation of these guidelines at the point of care through decision support reduces the variability in clinical practice and improves outcomes. The ACR Appropriateness Criteria — evidence-based guidelines to assist referring physicians and other providers in making the most appropriate imaging or treatment decision for a specific clinical condition — is also one of the main ways that we put imaging to the test.

By combining our knowledge of anatomy, biology, computer science, tumor metrics, and multiparametric, multimodality, and hybrid imaging, we can gather clinical imaging evidence and develop guidelines that will provide appropriateness criteria and decision support tools to augment clinical decision-making — helping our referring clinicians order the proper test for the proper patient at the right time. This also gives us an opportunity to continuously align our practice with the rapidly evolving standards of care throughout the disease continuum.

Establishing and maintaining cancer imaging expertise within your department or clinical setting may require changes in the traditional models of imaging workflow and reporting. Radiologists may need to learn a new language; expand their expertise beyond the infrastructure traditionally based on organ, modality, or body part; understand cancer and molecular biology; become familiar with various cancer therapies, their mechanisms of action, and specific toxicities; embrace other imaging modalities such as functional and molecular imaging; and take their place as imaging clinicians who are integral members of a multidisciplinary team. I would encourage all radiologists who read imaging exams performed on cancer patients to become familiar with the language of modern oncology and to recognize this as a learning opportunity that will not only greatly facilitate their understanding of tumor biology and the mechanism of action of cancer drugs, but will also have a direct impact on their radiologic interpretation and the effective communication of their readings to the rest of the oncology team.

Radiology education is also evolving. Successful implementation of cancer imaging expertise will indeed be facilitated by updating the training of current and future generations of cancer imaging clinicians — with focused training in cancer imaging supported by a proper curriculum relevant to current and future oncologic practices. It will help ensure a level of competency that will keep radiologists relevant and integral members of the multidisciplinary team taking care of cancer patients. This training will also provide cancer imaging clinicians with the flexibility and ability to adapt to the continuously evolving field of cancer treatment. Given that cancer itself and the care of this multifaceted disease are in constant evolution, we must be flexible, vigilant, and willing to continuously educate ourselves and change our practice if necessary to provide optimal care to our patients.

ENDNOTES


Dr. McGinty would like to acknowledge the role of Annick D. Van den Abbeele, MD, FACP, associate professor of radiology at Harvard Medical School, in the development of this column.
Standing Up For Women
Michelle L. Dorsey, MD, chief of radiology at the Phoenix Veterans Affairs (VA) Healthcare System and the first VA physician recipient of the White House Leadership Fellowship, was a delegate at the 63rd Session of the United Nations (UN) Commission on the Status of Women. Representatives of member states, UN entities, and UN Economic and Social Council-accredited non-governmental organizations from all regions of the world attended the session in New York on March 11. Themes of the event included social protection systems, access to public services and sustainable infrastructure for gender equality, and women’s empowerment and the link to sustainable development.

Additionally, Dorsey was on the planning committee for the March 14 UN side event, “Critical Mass to Gender Parity: Women in Decision-Making Do Make a Difference!” The event's presenters included the Hon. Gabriela Cuevas Barron, president of the Inter-Parliamentary Union, as well as multiple ambassadors and ministers. According to Dorsey, “It was wonderful to see the standing-room-only attendance for this event, which demonstrates the continued groundswell of support for gender equality in decision-making bodies. As a radiologist, I’m proud that the ACR has been very supportive of this movement and is actively promoting participation in UN Women’s #HeForShe campaign.”

#HeForShe is a solidarity movement by UN Women which promotes gender equity across all spectrums, including healthcare, education, politics, identity, violence, and work. For more information about ACR’s #HeForShe efforts, visit acr.org/heforshe.

Breast Screening: Start at 40
The ACR supports the American Society of Breast Surgeons’ recommendations that women start getting annual mammograms at age 40. The American Cancer Society, U.S. Preventive Services Task Force, the ACR, and the Society of Breast Imaging (SBI) agree that the most lives are saved by this approach. According to a recent JACR study affirming these recommendations, the significant decrease in breast cancer mortality — which amounts to nearly 30 percent since 1990 — is a major medical success and is due in large part to the earlier detection of breast cancer through mammographic screening. “Where data are lacking, the recommendations reflect expert consensus opinions by the fellows of the SBI and the members of the Breast Imaging Commission of the ACR,” JACR study authors say. “These guidelines and recommendations are intended to suggest appropriate utilization of imaging modalities for screening. They are not intended to replace sound clinical judgment and are not to be construed as representing the standard of care. It should be remembered that mammography is the only imaging modality that has been proven to decrease mortality from breast cancer.”

Catching more cancers early by starting yearly screening at age 40 — rather than less frequent or later screening — increases the odds of successful treatment and can preserve quality of life for women.

For more information, visit acr.org/Start-at-40.

Save With Your ACR Membership
Did you know that your ACR membership can secure you discounts with a variety of companies that you likely use every day? The ACR has an affinity partnership with companies such as GEICO insurance, Mercer insurance and financial planning, the UMass Amherst Isenberg School of Management’s MBA program, Starwood Hotels, SoFi mortgage and student loans, and even UPS shipping services.

Learn about how to get all you can out of your ACR membership at acr.org/Discount-Partners.
Due to an increasing body of research demonstrating that diverse groups are more productive in a wide range of applications, diversity is becoming a strategic imperative for schools, firms and other types of institutions.

— Joi Ito, director of the MIT Media Lab, and Jeff Howe, assistant professor and founding director of the Media Innovation program at Northeastern University, at bit.ly/IDEAS_Diversity.

Creating an AI Research Roadmap

Two reports — establishing a research roadmap outlining priorities in foundational and translational research in AI for medical imaging — were published this spring. Part one on foundational research was published in April in *Radiology* and part two on translational research was published in May in *JACR*. The reports are the outcome of a workshop put on by the National Institute of Biomedical Imaging and Bioengineering (NIBIB) last August at the National Institutes of Health (NIH) in Bethesda, Md. The purpose of the workshop (co-sponsored by the NIH, ACR, RSNA, and the Academy for Radiology and Biomedical Imaging Research) was to explore the future of AI in medical imaging. The event brought government, industry, academia, and radiology specialty societies together to create a roadmap that sets a path forward for both foundational research in AI and the translational research necessary to deliver AI to clinical practice.

“Although advances in foundational research are occurring rapidly, translation to routine clinical practice has been slower because we must ensure AI in medical imaging is useful, safe, effective, and easily integrated into existing radiology workflows before they can be used in routine patient care,” said ACR Data Science Institute*®* Chief Medical Officer Bibb Allen Jr., MD, FACR. The workshop organizers plan to continue to work together — along with developers, regulatory agencies, and the public — to ensure end users can be confident that AI algorithms are accurate, free of unintended bias, and safe for patients.

To access the foundational report, visit bit.ly/Radiology_RoadmapforAI1. To access the translational report, visit bit.ly/Roadmap_Translation.

Pediatric Patients and Therapy Dogs

Pediatric patients who spend time with a therapy dog before and after MRI scans are less anxious and more relaxed about their experience, according to a pilot study published in *Pediatric Radiology*. Staff at the University of Toronto’s Hospital for Sick Children, where approximately 25–30 percent of patients require some form of sedation to complete MRI scans, have instituted a program wherein two trained therapy dogs are employed to spend time with patients prior to their imaging to calm the children — and it works. Not only does the program succeed in reducing fear and anxiety, but it reduces the need for sedation for a majority of patients — with no extra scan time and no loss of clinical quality in the final images. According to Mary-Louise C. Greer, MBBS, staff radiologist and associate professor in the department of medical imaging at the University of Toronto, “This is a very effective tool because of the availability of the dogs and the number of children who are benefiting from it. It is part of a bigger collection of techniques that all work together and one more thing we can add to minimize the need for sedation of pediatric patients.”

For more information, visit bit.ly/PediatricRadiology_Dogs.

Ordering Done Right

A nurse practitioner partnered with primary care physicians on an R-SCAN™ project to reduce the number of low-value nuclear stress test orders at a Veterans Affairs (VA) hospital in Indiana. The project resulted in a 27 percent improvement in nuclear stress test ordering, supporting a VA policy to limit veterans’ exposure to unnecessary radiation. According to Lee Ann Miller, DNP, a cardiology nurse practitioner in the stress lab of the VA Health System in Indiana, “Because R-SCAN incorporates evidence-based guidelines to assess the value of imaging tests performed, it was an attractive program to help our organization evaluate our adherence to best practices for nuclear stress tests.”

To learn more about the project, read the Imaging 3.0® case study at acr.org/Ordering-Right.
Patient Consultation in Action

Since 2005, Renee Moadel, MD, and her nuclear medicine specialist team at Montefiore Health System in New York have consulted directly with patients. The consultations not only help patients better understand their therapy options, but give patients the opportunity to help design a course of treatment tailored specifically to their needs.

To learn more, watch the Imaging 3.0 video at bit.ly/ACRMontefiore.

Here’s What You Missed

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

The New Face of Mentorship
A radiology resident discusses why putting in the effort to be a good mentee is a crucial part of a successful mentorship equation at bit.ly/RFS_Mentor-Mentee.

Nurturing the Patient Relationship
A new blog series explores the paradigm shift toward patient-centered care and how radiology fits into the healthcare value chain at bit.ly/BlogSeries_PatientConsultation.

Feeling the Burn

According to a new survey of emotional burnout among interventional neuroradiologists, endovascular neurosurgeons, and interventional neurologists, 56 percent of the 320 respondents met the criteria for burnout. The results established significant relationships between burnout and general life happiness, satisfaction with career choices, the degree to which work duties affect personal and family life, feelings of under-appreciation and past consideration of quitting neurointerventionalist practice. The survey also found that half the respondents were on call either every day or every other day. According to Joshua A. Hirsch, MD, FACR, Harvey L. Neiman Health Policy Institute senior research fellow, “Just think about that and the impact it must have on the interventionalists’ sleep and their home life. It seems clear that optimized neurointerventional care would come from providers that aren’t feeling emotional exhaustion.”

Wellness, one of the keys to avoiding burnout, was the focus of a special May issue of the ACR Bulletin. The issue discussed strategies for addressing burnout at the individual, institutional and national levels, and also shared ideas for creating a culture of wellness in the workplace.


Seventeen percent of radiology chairs are women. This has doubled since I first became a chair — a great trajectory but a long way from equity. We have so much more to do.

— Cheri L. Canon, MD, FACR, professor and chair of radiology at the University of Alabama at Birmingham School of Medicine, at bit.ly/VoR_BuildingthePipeline

ACR.ORG 7

Sept. 23

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— Cheri L. Canon, MD, FACR, professor and chair of radiology at the University of Alabama at Birmingham School of Medicine, at bit.ly/VoR_BuildingthePipeline

ACR.ORG 7
Radiologists Vary in Follow-Up Recommendations

According to a study published in *Radiology*, an AI algorithm helped Harvard Medical School researchers conclude that radiologists in the same subspecialty division can vary significantly in how often they recommend follow-up imaging examinations. The study drew from 318,366 CT, X-ray, MRI, and ultrasound studies interpreted by the institution’s abdomen, chest, cancer institute, emergency, MSK, and neuroradiology divisions in 2016. Researchers found that 12.2 percent of these radiology reports contained recommendations for additional imaging. According to the authors, “Modality was [a] significant [predictor of intraradiologist variability] across all division levels, and other factors had varied effect in each division, which highlighted considerations that are exclusive to subspecialized imaging. Individual radiologist factors, not including radiologist sex or years of experience, had the largest contribution to the observed variation. Our findings suggest that the same diagnostic finding may yield different follow-up recommendations depending on the radiologist reading the images, which could result in important implications for patient care.”

To read the full article, visit bit.ly/Radiology_Cochon.

Study Looks at Head CTs and Patient Complexity

A new study from the Harvey L. Neiman Health Policy Institute®, published online in *Current Problems in Diagnostic Radiology*, evaluates the complexity of patients undergoing head CT examinations. Melissa L. Chen, MD, a clinical neuroradiologist at the University of Texas MD Anderson Cancer Center, and her colleagues found that of the 6,363,404 head CT exams in 2017, 56.1 percent were performed in the ED and 70 percent of non-contrast exams performed in the ED were ordered in the most complex patient encounters.

“Head CT is not only most frequently ordered in the ED, but also during the most complex ED visits, suggesting that the ICD-10 codes associated with such exams do not appropriately reflect patient complexity,” said Ryan K. Lee, MD, MBA, a radiologist at Einstein Healthcare Network. “The valuation process should also consider the complexity of associated billed patient encounters.”

To read more, visit bit.ly/HPI_HeadCT.

ACR Member Survey: Sneak Peek

Full results from the 2018-2019 ACR Member Survey will be made available in the September issue of the *Bulletin*.

In the meantime, find out more about the value of ACR membership at acr.org/WeAreACR. While you’re learning about your colleagues, take a moment to leave your patient, practice, or membership story.
Delving Into Radiologist Payment Policies

The ACR 2019 Economics Forum focused on MACRA, CPT® code valuation, Medicaid payments, and other topics.

Infrastructure
In my May Bulletin column (available at bit.ly/Chang-ing_Times), I described the importance of building a strong infrastructure to respond to political change. This premise is equally important within the context of innovation and technological change. As our forum showed, the Commission on Economics has expertise across the spectrum of radiology payment policy — including Current Procedural Terminology, AMA/Specialty Society Relative Value Update Committee valuation, coverage determination, hospital payment, Medicaid services, private payors relations, and new payment model development. Across these domains, the ACR has a rich history of bringing innovative radiological technologies to patient care, and these technologies are emerging and evolving in ways we may not have predicted even a few years ago. The statutory, regulatory, and payment policy surrounding AI continues to evolve quickly, and the ACR infrastructure positions us to inform those directions. Obviously, the ACR Data Science Institute™ will be an important partner — as will the Commissions on Quality and Safety and Patient- and Family-Centered Care, among others.

External Relationships
The internal ACR partnerships I describe are hugely relevant. Just as relevant are the relationships across the house of radiology. In fact, ACR BOC Chair Geraldine B. McGinty, MD, MBA, FACR, has made external relationships a focus of the remainder of her tenure. Our Economics Forum and its diverse set of faculty highlighted this point. We had presenters who are leaders in other radiology sub-specialty societies, such as the American Society for Radiation Oncology, the Society of Interventional Radiology, the American Roentgen Ray Society, and the American Society of Neuroradiology.

Relationships across the house of medicine are also key, and the AMA and our state medical societies are key partners. Radiology is well-positioned to contribute to discussions occurring at the AMA across a range of common issues. Examples include surprise billing, scope of practice, prior authorization, and the regulatory landscape surrounding digital technologies, including AI. In fact, I believe there should be a radiologist on every state medical society delegation to the AMA, so those voices are more effectively heard.

Contemplating Both Sides
The second part involved a debate format during which two experts presented counter-arguments on the topic at hand. More importantly, the viewpoints expressed by those individuals may or may not have been congruent with their personal and professional beliefs and actions. In other words, the academic exercise forced those presenters (and the audience) to consider alternative views. This highlights the importance of hearing, understanding, and even taking both sides of an argument. Understanding one’s own position is strengthened by acknowledging and seeking to understand the opposite point of view.

After our debates, we polled the audience, via applause, on which of the two arguments was the more compelling. The responses to this informal poll were interesting and sometimes surprising, but certainly informative. Collecting the opinions of the members is at the heart of any membership society, thus informing the actions of that organization.

Once again, I’d like to extend gratitude to all who contributed to our session. I hope it was evident that the College and the Commission on Economics are continuing our commitment to advancing our profession through meaningful and far-reaching contributions.

Missed the ACR 2019 Economics Forum?
Watch it online at bit.ly/2019EconForum.
Radiologists must make cyber security a priority to protect their businesses and patient data.

“Nearly 100 percent of what radiologists do is rendering care electronically. Unless their network security is lights-out good, they are disproportionately at risk for a data breach.” That’s the cold hard truth, according to David Sousa, chief operating officer and general counsel for Curi, a North Carolina-based insurance company offering physician liability protection. And as a variety of practices are realizing — despite an ever-growing to-do list for imagers — prioritizing cyber security is a must.

Cyber attacks to obtain personal data — often held hostage for a bitcoin payment or sold to another party on the dark web — are increasingly common. Healthcare data is particularly valuable. A data breach that compromises patient information can result in substantial government fines, lost time, and a damaged reputation for the targeted hospital group or radiology practice (see sidebar on page 12 for glossary of cyber security terminology).

Stolen health information can reveal Social Security information, Medicare data, patient identification numbers (PINs), patient addresses (physical and email), and details about health insurance and medical conditions. This can lead to identity theft, billing fraud, and sometimes blackmail — to the detriment of both patients and the radiology group charged with protecting their personal data.
Easy Targets

“Medical information has the crown jewels for the bad guys when it comes to data they can monetize,” says Chris Swecker, a retired Federal Bureau of Investigation (FBI) assistant director, special agent, and currently an attorney in Charlotte, N.C. “Medicare is hit particularly hard when a beneficiary number is stolen.”

All radiology groups are fair game for hackers, Swecker says, but small- and medium-sized practices with no staff dedicated to cyber security can be easier targets. According to Swecker, “There is a general groundswell in the bad guy communities that medium-sized and smaller companies have less awareness. They aren’t focused on IT security.” As a general rule, he says, the larger you get, the better you get at security. Although that’s not true in all cases, he adds.

There has been a flurry of high-profile healthcare data breaches in the past year. Quest Diagnostics recently announced that a data breach through one of their billing vendors may have compromised the personal data of nearly 12 million patients. Shortly after, LabCorp said that the personal and financial data of more than 7 million of its customers had been exposed by the same billing vendor.

The healthcare industry had more data breaches last year than any other industry sector, Sousa points out. While not the only targets, other notable breaches occurred at Anthem, Inc., TRICARE Management Activity, Community Health Systems, Advocate Medical Group, North Bronx Healthcare Network, and Health Net, Inc., Sousa says.

A lack of awareness by someone on staff is often the inroad. “I’ve preached nonstop about developing a cultural awareness — within your company or practice and among your customer base — about how you are being targeted,” Swecker says. “The takeaway is that you need to arm yourself and your staff with knowledge.”

Duplicitious Email

According to Swecker, it’s not as complicated as people think for a hacker to invade a network and steal data. “More than 90 percent of the time a system is penetrated, it’s through simple spear phishing emails containing harmful attachments,” Swecker says. He notes that these emails can allow malware and ransomware to essentially hijack your network.

Spear phishing is the practice of sending emails ostensibly from a trusted party to targeted individuals within an organization with the purpose of retrieving confidential information. Of the 15 million patient records breached in 2018 — triple the total amount from the previous year — more than 11 million were accessed through hacking, and largely through phishing attacks.

Swecker notes there are applications that companies can buy to prepare employees for nefarious emails. “One of the best things you can do is to make your staff aware of spear phishing,” Swecker says. “These apps will send fake emails to employees to teach them, and many companies are using them.”

Phony email education is a good first step, but you really need to hire a reputable company to come in and assess your information system, Swecker says. “You need to figure out if your security is up to snuff,” he says. “Get a baseline of where you are, then designate someone to be accountable in moving forward.”

Tailored Protection

If you are a small practice and don’t have someone dedicated to cyber security full-time, then a manager or part-owner must be vigilant in asking the right questions to determine your preparedness, says José M. Morey, MD, chief medical innovation officer for Liberty BioSecurity and MedTech and AI advisor for NASA iTech.

For instance, do you use remote access to your network for off-site employees or contractors? Do staff mix personal information with private healthcare data on email? Do employees have any private patient data on their personal devices that they also use for work? “Someone has to be accountable for answering these questions,” Morey warns. “This isn’t a ground-up approach. It’s a top-down thing that needs to happen.”

Radiology leaders and designated informatics staff must also consider the multitude of entry points to their network that may lead to a data breach, Morey suggests. “For a small or large group, when you are looking for new software imaging equipment, for example, the last thing you probably ask about is cyber security features,” he says.

Hackers can get into devices in your radiology department fairly easily, Morey says. “They know that 99.9 percent of people are probably not asking the next MRI vendor, ‘How do you handle patient data encryption?’”

The imaging equipment vendors probably aren’t going to volunteer that information, he says.

Vendor agreements protect you, Sousa says. Radiology practices often outsource to vendors — whether a coding or billing company or IT firm that maintains equipment. “Because radiologists may be dependent on third-party vendors, they need to be absolutely sure that they use a HIPAA-compliant business associate agreement with those vendors,” he emphasizes. That should include, at a minimum, Sousa says, “an indemnification clause that states, ‘If your protected health information gets out there and it’s our fault, we are going to protect you totally for that.’ You should also insist that those vendors have cyber liability insurance protection.”
**CYBER TERMINOLOGY**

**BIOMETRICS:** the technical term for body measurements and calculations. It refers to metrics related to human characteristics. Biometric authentication, or realistic authentication, is used in computer science as a form of identification and access control.

**BITCOIN:** a type of digital currency in which a record of transactions is maintained and new units of currency are generated by the computational solution of mathematical problems, and which operates independently of a central bank.

**DARK WEB:** the part of the internet that is only accessible by means of special software, allowing users and website operators to remain anonymous or untraceable.

**ENCRYPTION:** the process of converting information into a code, especially to prevent unauthorized access.

**MALWARE:** software specifically designed to disrupt, damage, or gain unauthorized access to a computer system.

**RANSOMWARE:** a type of malicious software designed to block access to a computer system until a sum of money is paid.

**SPEAR PHISHING:** the fraudulent practice of sending emails ostensibly from a known or trusted sender to induce targeted individuals to reveal confidential information.

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**Breach Fallout**

In many cases, a cyber attack won’t directly impact patients through a data breach. The fallout instead hits the radiology group that was compromised in the form of regulatory penalties.

“I think the medical industry is more regulated than the financial industry,” Swecker says. “You’ve got gun-slinging attorneys general coming at you, the U.S. Securities and Exchange Commission, and HIPAA.” It is incumbent upon you to protect patient information, he says. “With so many patient notification laws, when something goes bad, the whole world will know about it,” Swecker says.

Beyond the dangers of present-day privacy regulation, patients’ perception of how secure their data is will become more of a factor in how they choose services. As health data becomes more interconnected with other data, people will insist that it is protected, Morey says. “It’s easier to change your radiologist than to switch banks or change your email provider,” notes Morey.

According to Morey, the days of not having someone with dedicated time for informatics and cyber security are long gone. With the rise of AI and machine learning platforms, more data breach hazards could be likely to follow, he says. “We live in a digital age,” Morey says. “The practices who don’t dedicate time to this are the ones who will be disrupted, dislocated, or taken over in some way.”

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**The Good News**

There are a lot of basic security steps you can take that are already commonplace for credit card companies and familiar platforms like Gmail.

The low-hanging fruit are things like implementing two-factor authentication, Morey says. This is something we use every day with mobile banking and logging into personal email accounts. “It is very easy to put in place and costs are minimal,” he says. Biometric interfaces will plug into most systems as well, and are relatively inexpensive and easy to implement, he adds.

Many cyber security providers suggest data encryption, secure email, and a revised privacy policy that reflects today’s data privacy risks. Radiologists should be aware of threats from external data brought into a practice on USB flash drives or CDs — both may be infected with viruses. Keeping private patient data segregated from staff’s personal information is a no-brainer, Swecker says. Having regular security assessments, buying data breach insurance, and forming an in-house response group to react immediately if an information system is compromised will also serve you well.

Stealing patient identification and medical record numbers requires more expertise on the part of hackers, Swecker says. “So it’s fine to outsource your IT, where a lot of information is stored in a cloud,” he says. Just develop an awareness of the dangers from within your practice, “because that’s how the bad guys are going to get in,” Swecker notes.

In the event you have a data breach, Sousa says, “the first thing the feds want to know is whether you have a checklist in place and a written compliance plan that’s designed to educate, prevent, and respond.” If you don’t, he says the fines and penalties will escalate. “They’ll say that HIPAA security updates have been in place since 2013, and that you should have been ready for this.”

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**“We live in a digital age. The practices who don’t dedicate time to this are the ones who will be disrupted, dislocated, or taken over in some way.”**

— José M. Morey, MD

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**ENDNOTES**

1. Valinsky J. Quest Diagnostics says 12 million patients may have had their personal information exposed. CNN. June 4, 2019. Available at bit.ly/Quest_Breach.
Getting It Right

How do The Joint Commission’s new fluoroscopy requirements affect radiologists?

Since 2015, The Joint Commission (TJC) has been implementing requirements for diagnostic imaging in MRI, CT, nuclear medicine, and PET. Effective Jan. 1 of this year, TJC has also implemented new requirements for fluoroscopy. This has generated many questions and concerns from facilities as to how to become compliant. Leland M. Page, PhD, medical physicist at Medical & Radiation Physics, Inc., and Dustin A. Gress, MS, ACR’s senior advisor for medical physics, address some of these concerns and point out opportunities for radiologists to lead discussions on the new requirements and how to meet them in their own institutions, clinics, or practices.

What are the new training requirements from TJC?

Page: The Joint Commission requires that all users of fluoroscopy — including physicians, non-physicians, and ancillary personnel — participate in ongoing education. This educational program must include annual training on “safe procedures for operation of the types of fluoroscopy equipment being used.” Also required is training on radiation dose optimization and tools for pediatric and adult patients, addressed in the Image Gently® and Image Wisely® campaigns.

Did the ACR support these training requirements?

Gress: No, the ACR opposed The Joint Commission’s fluoroscopy training requirements. During the comment period we suggested changes that aligned with the training, education, and credentialing described in our Technical Standard for Management of the Use of Radiation in Fluoroscopic Procedures (read more at bit.ly/FluoroStandard). Unfortunately, The Joint Commission did not modify its requirements to spare radiologists this burden — despite radiologists’ extensive training and experience in fluoroscopy.

How do Image Gently and Image Wisely relate to these requirements?

Gress: The expectation will be that fluoroscopy users are familiar with the campaigns. And both Image Gently and Image Wisely have implemented an attestation process on their websites. As you review fluoroscopy articles and material, you may self-attest and generate a certificate — which can be printed or saved as a PDF — that should be filed or retained with other required personnel credentials and continuing education. Additionally, both campaign websites have educational materials with continuing education credits available. Image Wisely has several fluoroscopy radiation safety cases, and Image Gently has the Pause and Pulse program, which is a series of educational tools and resources for pediatric fluoroscopy. All of these demonstrate familiarity with the campaigns, and so they count toward fulfilling the requirements.

How do you recommend handling the requirements?

Page: In this modern era, you can find web-based training products that may meet your needs. However, I recommend reaching out to your medical physicist to assist with not only delivering safety training — whether that’s an onsite refresher, a recorded webinar, or something else — but also crafting an appropriate policy for your group or institution. A carefully-written policy could go a long way toward limiting burden of training requirements.

Who should be responsible for tracking and enforcing these requirements?

Gress: Because the use of fluoroscopy and thus the training requirements extend well beyond radiology, it’s best that the tracking and enforcement at a multi-disciplinary institution be owned at a higher administrative level. Because radiology contains the subject matter experts within the institution, they should provide leadership in policy guidance and creation. However, the lateral enforcement of these training requirements could be inefficient, and potentially harmful, to interdepartmental relationships.

What other requirements are included in this update?

Page: TJC now requires a radiation safety officer to monitor the safety practices of the services, sites, or departments they oversee, and verify compliance with established

“The Joint Commission requires that all users of fluoroscopy — including physicians, non-physicians, and ancillary personnel — participate in ongoing education.”

— Leland M. Page, PhD

continued on page 21
Owning Clinical Decision Support

Collaborating clinicians should champion CDS tools to ensure best imaging practices.

As radiologists push forward in providing the high-value and appropriate imaging that best serves their patients, an opportunity for collaboration, cost-savings, and better patient outcomes is at hand. By working with referring physicians who are unsettled by CMS’ Appropriate Use Criteria (AUC) mandate under PAMA, radiologists can ease the adoption process and maximize the value CDS delivers.

It behooves radiologists to help referring clinicians understand the value that evidence-based CDS brings to the table. But that can be a hard sell, says Arun Krishnaraj, MD, MPH, vice chair for quality and safety at the University of Virginia Health System. “Some physicians mistakenly see CDS as a loss of control — as a system that’s being imposed on them,” he says. “Their frustration isn’t necessarily with following AUC, but with what they see as an obstacle to something that was previously easier to do. There is substantial literature that shows CDS works and is superior to the current system, and we need to raise the education level around that.”

The ACR has heard concerns from some members about a lack of awareness by referring providers around using CDS before ordering advanced diagnostic imaging for Medicare patients. In response, the College provides an AUC toolkit that explains requirements under PAMA so that radiologists can better educate referrers on the process. The ACR, in collaboration with RBMA, has also created resources to prepare referring physicians for the CMS mandate and to keep them apprised on any changes to the AUC requirement.

Referring Support

There are many benefits of CDS, says Christopher M. Gaskin, MD, FACR, associate chief medical information officer at the University of Virginia Health System. Ordering imaging tests can be confusing for referring clinicians, Gaskin says, and CDS provides assistance at the point of order entry — when it is most appropriate and likely to save time on the back end.

“When considering the numerous advanced imaging tests — such as whether to use contrast or not — CDS offers standardized, expert assistance to order the best test the first time,” Gaskin says. “This potentially helps patients avoid unnecessary radiation exposure and the substantial costs associated with unnecessary or less beneficial tests.”

The feedback ordering physicians get when using CDS includes potential alternative tests in the context of their patient’s clinical scenario, Gaskin says. That feedback can be tailored by patient age, gender, clinical setting, the ordering provider’s specialty, and other factors. “This can help ensure the process is efficient, focused, relevant, and high-yield. Other information on costs, radiation dose, and any relevant literature can be offered for additional guidance,” he says.

Sometimes providers may feel pressured by patients or families to order low-value advanced imaging tests in an attempt to provide definitive answers, Gaskin says. In these cases, CDS can provide objective support for why a test isn’t being ordered, leading to an opportunity for shared decision-making and improved patient-centered care. “Essentially,” Gaskin says, “CDS adds to documentation justifying clinical decision-making.”

Collaborative Process

Putting CDS into full effect means respectfully engaging referrers to get them on board, says Sarah E. Reimer, MD, radiologist and researcher with Aurora Health Care in Milwaukee. “This needs to start in the early stages of CDS implementation. Referrers must have a say and a chance to raise concerns about gaps in content — and receive a response to their concerns.”

Time spent on implementation should be a consideration. For instance, vendors may not have the full picture of the installing organization and can be overly optimistic about the time and effort required to get a CDS system up and running at a particular site, Reimer says. “There needs to be substantial engagement and an investment of time by both radiologists and referring providers. Time spent on CDS education and change management is not billed, but it’s definitely part of the overall cost of good implementation,” she notes.

Studies show that specific design features of CDS systems need to be thoroughly evaluated to determine how best to reduce inappropriate high-cost imaging at your institution or community. CDS developers need input from the people who will actually be using the system, Krishnaraj says. When there is apprehension, he says, “we need to say, ‘I understand this may be frustrating for you, but that’s exactly why I need your help.’” Referring providers should know that the front-end time they spend on CDS will be given back to them in abundance once the process is in place, he adds.

When encouraging ordering providers to participate, you can emphasize potential credit earned under the
“When considering the numerous advanced imaging tests — such as whether to use contrast or not — CDS offers standardized, expert assistance to order the best test the first time.”

— Christopher M. Gaskin, MD, FACR
Setting an Example

Surgery has seen gains in female representation. What can radiology learn from the field?

Radiology is one of the least diverse specialties — lagging behind much of medicine when it comes to participation by women and underrepresented minorities (URMs). Currently, only 25 percent of radiologists are women. While the current ACR president, vice president, BOC chair, Council vice speaker and JACR editor are all women, as are 11 of the 33 members of the BOC, diversity in leadership remains low — only 17 percent of academic radiology department chairs are women.

Having greater female representation in leadership is important — and can lead to better female representation in radiology as a whole, says E. Isin Akduman, MD, program director of radiology at Saint Louis University Hospital. Susan J. Ackerman, MD, FACR, chair of the ACR Committee for Women, agrees. “When medical students see someone like themselves and that person is at the decision-making table, they want to be like that leader.”

Although radiology has not yet seen increases in female representation and leadership, other historically male-led specialties — such as surgery — have. In 2008, women made up only 37.5 percent of the trainee population. In 2018, however, nearly 43 percent of surgical trainees were women.

Dana A. Telem, MD, MPH, associate professor of surgery at the University of Michigan Medical School, credits culture change with the increase in female representation. “When duty hours changed across medical and surgical disciplines, surgery re-emerged as a popular field for students to enter,” says Telem. “We were no longer viewed as a discipline where you were on call every night, not sleeping, and not engaging in life outside of the hospital.” Telem adds, “Additionally, the historical version of a surgeon (male or female) — ill-tempered, aggressive, and sharp — is no longer tolerated. And as such, more women have come on board.”

This is not to say that surgery doesn’t have work to do, notes Telem. “We still have less than 5 percent of women in high-level leadership positions such as chairs or deans of academic medical centers, and when you look at URMs women, those numbers plummet further.” So, what can medicine do to promote more women in leadership?

One method Akduman, Ackerman, and Telem all agree on: sponsorship. “Mentorship is helping someone get to where they need to go,” says Telem. “Sponsorship is taking that a step further by giving an individual opportunities and putting your name behind them in recommendations.” Ackerman adds, “Every chance I hear about an opportunity for someone to be on a committee at any level, if I know someone I think would be a good fit, I recommend them. Women need to become better at recommending women.”

Akruman also recommends that radiology departments seek ways of exposing students to radiology. “One reason that female medical students choose not to go into radiology is because they believe radiologists have no patient contact — which we know isn’t true,” she says. “If you wait until fourth year when they graduate, it’s too late. They’ve already made their decisions.”

According to Akduman, “Female leaders also need to make themselves available to these medical students and to their residents. Not only are you a role model, but you can also help the program feel more welcoming to them. My residents feel like they’re able to come to me with their concerns, and through that I’ve been able to determine that a lot of medical students are concerned about family planning and the possible radiation exposure they could have as residents.” Because of that, starting this month, Akduman’s department will have information that goes out in the resident welcome packet that explains that a resident’s rotation can be adjusted to accommodate for pregnancy. “When we do that, we show we’re considering their unique needs,” notes Akduman. “Pregnancy is a life event and the female residents should not be blamed or feel guilty about planning a family. By addressing this ahead of time, they feel more welcomed and less stressed.”

No matter the profession, the bottom line is that diversity in leadership creates diversity in a specialty and, overall, a more diverse medical field — able to care for the already diverse pool of patients that physicians encounter every day. “We have to consider: what do we want our patients, the teams we’re building, and our recruits to look like?” says Telem. “Does our leadership represent that? If not, I think it will be a hard task to bring everyone in.”

By Meghan Edwards, freelance writer, ACR Press

ENDNOTES

With One Click

ACR’s PFCC toolkit gives radiologists the information they need at their fingertips to transform their practices.

Julie G. Moretz, assistant vice president of patient-and family-centered care (PFCC) for Augusta University Health, knows the power of PFCC first-hand. When her son Daniel was diagnosed with heart disease at birth and underwent 12 surgeries and a heart transplant all before the age of eight, Moretz and her husband wanted to be as involved with his care as possible.

“I’ll never forget one of the first scans Daniel had as a baby,” says Moretz. “As the technologist started the process, I saw Daniel begin to vomit. No one was near him and I couldn’t get to him fast enough. He was choking. I frantically banged on the glass window to alert someone as to what was happening.”

Now, there are different protocols in place to make sure that families like Moretz’s never have to feel this way. Families can sit with patients during scans, wait with them in waiting rooms, and be there for them throughout the medical process. For most patients, and especially those with no knowledge of the medical system, it is difficult to advocate for themselves if they are not privy to how care works. Providing that knowledge is the goal of the ACR PFCC radiologist toolkit — which contains resources on initial assessment, planning, education, and evaluation of PFCC in practice.

“Patients and caregivers want to be involved and that is a better way for physicians to provide care,” says Ian A. Weissman, DO, FACR, staff radiologist at Milwaukee Veterans Health Administration and chair of the PFCC toolkit committee. “Our goal is to have the best information on PFCC available and accessible with one click of a mouse.”

According to Weissman, the toolkit contains resources specific to various practice environments, including private radiology practices, children’s and academic hospitals, and veterans’ health. It is customized based on the needs and specialty of the providers and gathers all the best practice information in one easy-to-navigate website. It provides everything from articles and videos to case studies and real patient stories.

Weissman notes that as radiologists scroll through the toolkit, it becomes clear to them that there are a slew of creative options to integrate patient-focused care into everyday practice. He adds that users are able to add resources they find useful and share insights with the network of providers that use the toolkit.

“When providers make a point of prioritizing patients, outcomes get better,” says Weissman. “For those who don’t know where to begin or what PFCC actually looks like in practice, online tools like this one can make all the difference.”

As division chief of breast imaging at the University of Vermont, Sally D. Herschorn, MD, FACR, is well aware of patient needs. A member of the toolkit committee, she says, “Many new scenarios arise every day in practice that require innovative approaches to providing the best patient experience. Having the toolkit, where you can easily find solutions to providing patient-centered care, is a big plus. Although we often come up with our own solutions to problems, not having to reinvent the wheel and knowing a solution has the support of patient advocates makes things much easier.”

Moretz believes that when healthcare providers implement PFCC, it empowers patients to be involved in their own care — something she strongly advocates for in her role on the toolkit committee and as a patient advocate.

“Given that value-based care is linked to measuring and improving the patient experience — now a major focus of most hospitals — it is important for radiologists to understand how they can engage patients and their families in care,” says Moretz. “The PFCC toolkit walks them through how to do just that.”

By Ivana Rihter, freelance writer, ACR Press

“For those who don’t know where to begin or what patient-centered care actually looks like in practice, online tools like this one can make all the difference.”

— Ian A. Weissman, DO, FACR

ACR.ORG 17

Physician Resources for Patient- and Family-Centered Care

The ACR is committed to helping you improve the patient experience. Explore materials to enhance your understanding of — and participation in — new practice and payment models and help you provide more patient- and family-centered care at acr.org/PFCCToolkit.
Before Marc D. Succi, MD, joined Massachusetts General Hospital (MGH) as a radiology resident in July of 2015, he had already secured several patents and launched two startup companies, gaining valuable experience as an inventor and CEO. His entrepreneurial background made him the go-to invention expert at MGH, quickly revealing the hospital’s need for more robust innovation resources.

“I realized a tangible need existed for innovation training, because clinicians want to be innovative, but most don’t have the tools to bring their ideas to fruition,” says Succi.

After observing the struggles of creative physicians who didn’t know how to approach innovation, Succi developed plans for an in-house prototyping lab and entrepreneurship incubator designed to transform ideas into impactful inventions. He founded The Medically Engineered Solutions in Healthcare (MESH™) Incubator at MGH — the first innovation incubator and accompanying curriculum that is known to be integrated into a medical training program, in any specialty.

To outline the opportunity, Succi described how radiologists are well-positioned to drive innovation across the hospital. For this reason, Succi proposed building the invention incubator in the radiology department, where he could provide training, resources, and equipment to help radiologists and other physicians innovate. He envisioned a workshop equipped with prototyping tools, like microprocessors and 3-D printers, coupled with a hands-on curriculum and informational lecture series to empower radiologists and other physicians with the skills to turn their ideas into reality.

Succi explained that MESH would mentor physicians through the early stages of innovation. By the end of the training, participants would be ready to leverage their prototypes and early data to seek outside funding to develop their ideas further. With this educational goal, Succi noted that MESH would be a relatively lean start-up. He requested a five-figure investment to open the incubator and outlined a long-term vision that would get inventions to bedside in five to 10 years.

While MESH’s profitability would take time, Succi emphasized that it would bring enduring value to the hospital and the profession. “It’s about training the future leaders of medicine to impact patient care and, in the process, branding radiology as the center of innovation, which elevates our value in the healthcare landscape,” Succi says.

Gaining Support

“The idea of enabling non-engineers to use design principles to prototype potential inventions intrigued me,” says Brink. “Certainly, as patents are commercialized, we will earn future royalty revenue but we’re not looking at ROI from that perspective. It’s more important that we provide an outlet for our residents to develop new skills, so they can create tools to improve care.”

With Brink’s backing, Succi received seed funding from the radiology department in July of 2016 to open the MESH Incubator.

Creating a Creative Space

Although hospital leaders were excited about the incubator’s potential, they weren’t sure where to house the innovation workshop. Initially, administrators offered Succi space in a building next to the hospital, but that didn’t support his vision of making innovation more accessible. In a stroke of serendipity, MGH was relocating some radiology offices just as Succi was searching for a space. The move freed up an area adjacent to the reading room, and Brink agreed when Succi suggested that it would be a good location for the incubator.

From there, Succi made a list of the tools and equipment necessary to build out the workshop — including a 3-D printer, computer-aided design software, microprocessors, electrical components, and other prototyping support.
tools. He also began developing the incubator curriculum.

To start, Succi surveyed radiology residents to assess their baseline understanding of innovation. He discovered that 82 percent of residents weren’t comfortable creating a device prototype, and none of them knew how to write an intellectual property (IP) disclosure. So, he built the program around these topics.

Nurturing Innovative Ideas

In late 2016, Succi launched the first of two incubator courses, the Core Invention Design Curriculum (CIDC). This year-long invention mentorship is open to residents, fellows, and attending radiologists, as well as other physicians who have an idea they want to develop.

During the first six months of the CIDC, participants work one-on-one with Succi and MESH leaders in a mentorship format to validate the clinical need for their ideas. To that end, they gather patient feedback and data to define how their inventions could potentially impact patient care. During the second six months, participants prototype and iterate their inventions in the workshop before drafting and submitting IP disclosures.

Teaching Innovation Basics

While the CIDC is geared toward residents and physicians who just need the right space and skills to execute their ideas, not all residents and physicians have specific ideas to engineer. Recognizing this, Succi began developing the second incubator course, called the Core Residency Design Curriculum (CRDC), in late 2017.

The CRDC is designed to proactively educate residents and physicians throughout MGH on the basics of 3-D printing, programming, prototyping, entrepreneurship, writing patents and business plans, and other skills.

In this week-long innovation boot camp, participants hear from Succi and other subject matter experts, including the director of the hospital’s Center for Clinical Data Science, who discusses AI and machine learning — important aspects of any contemporary innovation program.

Measuring the Impact

Succi launched the CRDC as a pilot project in August of 2018. The pilot involved three classes with four residents in each class, for a total of 12 students, each of whom rated the course as “extremely effective.”

To further gauge the CRDC’s impact, Succi and the other expert presenters developed pre- and post-course assessment exams to rate students’ understanding of innovation. The scores soared from less than 50 percent to approximately 90 percent — spurring Succi to offer the curriculum to all residents, fellows, and attending physicians at MGH.

Fueling the Conversation

To build awareness around the incubator and keep innovation top of mind, Succi introduced the MESH Innovator Lecture Series. Launched in mid-2017, the quarterly program is “a platform for interesting people talking about innovative things,” he says.

These lectures aren’t limited to radiology. Succi invites speakers from various disciplines and draws attendees from across the hospital and beyond. Generally, Succi focuses on topics and speakers that are “relevant to the modern clinician.” Each lecture draws an average attendance of between 30 and 40 people — including medical students, residents, staff, and even members of the public.

Generating Interest

MESH has become a strong branding and recruiting tool for the hospital, strengthening its reputation for innovation. Incubator participants have already disclosed five patents, and more applications are pending.

An IR who was having trouble stabilizing the radiofrequency ablation probe in patients’ chests developed one of the first patentable devices through the CIDC. After Succi observed several of the clinician’s procedures, the two worked together to design and 3-D print a probe stabilization device, which they tested in several simulations before writing the patent disclosure.

Succi and the clinician are now focused on further developing the technology and licensing the device for industry use. “This is just one example of the innovations we’re working on that will have a direct impact on the delivery of care,” Succi says.

Reinforcing Radiology’s Role

Interest in the CRDC has been so high, in fact, that Succi received another radiology department grant in December of 2018 to fund the purchase of additional 3-D printers and other equipment, enabling the CRDC’s expansion to other specialties throughout the hospital. By the end of 2019, the program will expand further to include clinicians from other institutions.

“We’re even working with other hospitals to help them establish their own incubators, creating a collaborative network for sharing knowledge and resources,” Succi says. “Ultimately, we want to popularize innovation across medical disciplines, while elevating radiology’s position in a quickly-changing landscape of value-based care.”

— James A. Brink, MD, FACR

ENDNOTE

Barriers to Integrating AI into Radiology Practice

What are some challenges that adversely impact our progress with machine learning and prevent us from moving forward?

Machine learning methods for biomedical image analysis that are better and more precise than humans for specific tasks have been around for nearly two decades. However, they are rarely used in current practice. In fact, visually inspecting and subjectively describing an imaging study has not fundamentally changed since the very first scientific report of findings on an X-ray in 1896.

Despite the prowess of newer deep learning methods for recognizing patterns in images and other complex forms of data, the same fundamental barriers from the past two decades still stand in the way.

Workflow integration
Integration into a hospital system’s PACS and dictation software is a necessary first step. Fortunately, commercial entities understand this, and tools are starting to be deployed centrally through AI marketplaces affiliated with various PACS. However, standardization and integration of these tools are still in early stages.

Clinical deployment of advanced biomedical image analysis research tools is also slowed because image preprocessing pipelines often require lengthy processing times and multiple quality control (QC) steps. While deep learning methods allow for rapid analysis of new data, the development of robust clinical systems requires that preprocessing and QC steps be automated — so that few or no manual QC steps are required.

Data variability and ability to generalize
Research in biomedical image processing has a historical focus on clean, homogeneous data sets — such as a 3-D MPRAGE or FLAIR sequence used in a research protocol to investigate a particular disease. However, the performance of these datasets, which are typically acquired from a single institution, has been shown to overestimate performance in the real world. This is particularly true when applied to data from other institutions.

Deep learning methods have the potential to overcome issues of lower-quality clinical data and variability across imaging parameters and institutions, but they require larger sample sizes and more diverse, unbiased training data. Acquiring this data is no small task, especially given privacy concerns and the time required for labeling and annotation.

Disease diversity within and between individuals
To be successful, the majority of image processing tools and commercial radiology AI algorithms have been tailored to tackle a specific disease or abnormality, such as measuring calcium scores, ejection fraction, or multiple sclerosis plaques. This “narrow” perspective of defining the specific tasks that are solvable by AI algorithms is a critical first step that is embraced by the ACR Data Science Institute™. General AI is still a long way off and there is debate over whether computers will ever be able to excel in general AI, given the complexity of the human brain in analyzing problems.

While the narrow tasks being solved by AI provide decision support, they are far different from the reality of a radiologist’s overall job. To be useful, narrow AI solutions will have to be integrated into more comprehensive solutions. This must be done for every body part, multiplied by every modality. Ignoring the sheer diversity of human diseases is called the spectrum bias.

Further complicating narrow AI approaches is the problem that more than one disease or abnormality is often present in the same patient — such as when small

Emerging tools should be evaluated in the following areas.

1. **SPEED**: Does the tool reduce the time in which critical findings are reported and acted upon? Many early initiatives in AI, such as detecting hemorrhage in head CTs or large vessel occlusion on CTAs, are based on this premise. However, only a relatively small percentage of studies require such rapid triage for these types of tools to add significant value.

2. **ACCURACY**: Does the tool make the radiologist more diagnostically accurate? Even if a tool is precise in what it quantifies, it might be irrelevant diagnostically (i.e., addressing a problem that doesn’t need to be solved).

3. **EFFICIENCY**: Does the tool reduce radiologists’ time spent reading studies? Many tools that add information will tend to slow down a radiologist. This is especially true if there is a specific tool for each task or disease that is encountered. In addition, many AI algorithms still result in false positives that slow radiologists down. However, some perceptual tasks, including those that require longitudinal comparisons, could be made more efficient through AI tools with automated measurements/comparisons.
vessel ischemic disease and chronic infarcts/insults are adjacent to a brain metastasis. If an AI tool can only address one (or even a few) types of abnormalities within a single patient, it will be of limited use for most imaging studies.

One potential solution to overcoming disease diversity and developing a more comprehensive solution is combining data-driven and domain-expert approaches. Ignoring the body of knowledge that we have already developed about the appearance of different diseases seems foolish, particularly for rare diseases in which adequate novel training examples will be hard to come by.

Clinical utility

Even if we overcome the first three barriers by developing an AI tool both robust in data variation and fully integrated into clinical workflow, it must fundamentally add value to be adopted into clinical practice and be worth paying for (see sidebar on page 20).

Although we are starting to remove the barriers for integrating biomedical image analysis and machine learning into radiology practice, many hurdles that have prevented clinical translation in the past 20 years still remain. Overcoming them will require significant effort and collaboration among academia, industry partners, and professional societies.

By Jeffrey D. Rudie, MD, PhD, radiology resident and informatics fellow at the University of Pennsylvania

ENDNOTES

5. Zebra Medical Vison 510k Clearance of Calcium Scoring on CT, Available at bir.ly/Scoring_Ct.
7. Isocertix 510k Clearance of Icobrain for Multiple Sclerosis Lesion Segmentation, Available at bir.ly/Clearance_Ms.

Getting It Right

continued from page 13

standards. Of course, this individual is charged also with making recommendations for improving radiation safety, intervening as necessary to stop unsafe practices, and implementing (and documenting) corrective actions.

There are also some new requirements for radiation dose indices. First, TJC now requires cumulative air kerma or kerma-area product be documented in a retrievable format. Secondly, sites must establish thresholds for these or other appropriate radiation dose indices — above which further review is performed to assess for the possibility of adverse radiation effects. Thirdly, sites must review and analyze the instances in which organizational thresholds for radiation dose indices were exceeded.

Again, I would recommend working with your medical physicist to establish the proper thresholds and follow-up actions when thresholds are exceeded. For fluoroscopy systems that cannot provide the indices mentioned above, fluoroscopy time and number of digital acquisition images are deemed appropriate substitutes to meet the requirements. Also, these requirements for tracking and assessing radiation dose indices do not apply to fluoroscopy systems used for therapy treatment planning, nor to mini C-arms.

Some specific tests are also listed for medical physicists to perform during their annual performance evaluations of the fluoroscopy systems.

Are radiologists required to purchase radiation dose index monitoring software?

Gress: No, TJC prepublication requirements specifically mentioned PACS as an example of a retrievable format for radiation dose indices. Again, this is an area where your medical physicist may be of assistance in creating an appropriate policy for your clinical environment — given the capabilities of your fluoroscopy systems and other operational constraints.

CLASSIFIED ADS

These job listings are paid advertisements. Publication of a job listing does not constitute a recommendation by the ACR. The ACR and the ACR Career Center assume no responsibility for accuracy of information or liability for any personnel decisions and selections made by the employer. These job listings previously appeared on the ACR Career Center website. Only jobs posted on the website are eligible to appear in the ACR Bulletin. Advertising instructions, rates, and complete policies are available at jobs.acr.org or e-mail careercenter@acr.org.

Missouri – A private practice is seeking a fellowship-trained breast radiologist to join its busy breast practice serving over 20,000 patients per year. The position includes screening, diagnostic, US, MRI and same-day biopsy procedures. The position is a partnership track one and comes with 10–12 weeks of vacation and an excellent benefits package.
Contact: Email CVs telwing@gmail.com

Illinois – A private practice group which staffs Central DuPage Hospital and Delnor Hospital of the Northwestern Medicine System is seeking a board certified/board eligible diagnostic radiologist with breast imaging fellowship experience. This is a full-time or part-time position with top level compensation and a comprehensive benefits package. The position will not require nights, weekends, or holiday coverage.
Contact: Email CVs to Sharman Jayachandran, MD, at Sharmanjay@gmail.com

New York – A private radiology practice in Brooklyn is looking for a part-time/full-time radiologist to read all modalities on the premises, including mammography. Benefits and malpractice insurance will be applied.
Contact: Fax resumes to 866-469-5142

Pennsylvania – A hospital-based practice has a teleradiology opportunity with availability in 2019. The practice is offering full-time employment with benefits or independent contractor status (East Coast residence is preferred). The candidate must be proficient in all modalities. The hours will be seven days on/seven days off, Monday–Saturday from 1:00 p.m. to 11:00 p.m., Sunday from 8:00 a.m. to 5:00 p.m., and no overnight shifts.
Contact: Email CVs to Linda.Bush@rawv.com
How can we foster a culture of support for parents from residency to practice?

“I applaud the ACR for giving attendees the option of child care during ACR 2019 and believe all national radiology meetings should follow suit — to showcase radiology as a specialty that supports parents. Child care duties often fall on females and this would help female radiologists, residents, and future radiologists to participate fully, without additional stress. Similarly, institutions and hospitals should — wherever possible — provide accessible, affordable, and preferably onsite child care that caters to long and often unpredictable physician hours.”

— Sherry S. Wang, MD, assistant professor of abdominal imaging at the University of Utah

“I joined my current practice less than three months after having my first child. For the past seven months, my colleagues have been understanding and respectful of my needs as a breastfeeding mother — as I try to juggle the newfound responsibilities of parenthood and a first job. Their flexibility and eagerness to help out has made all the difference. Having an open, honest conversation about your new needs is critical to ensure your success in these challenging and often unpredictable times. It’s the first step to creating a culture that is accommodating for all.”

— Michele V. Retrouvey, MD, radiology resident at Eastern Virginia Medical School
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