Radiology Industry Trends

APEX
Physics Partners

Trends in Radiology

Technological advancements in recent years—especially in regard to artificial intelligence (AI)—make the present an auspicious time for medical physics. Although the United States is currently experiencing a shortage of radiologists and other clinical specialists, this leaves plenty of opportunity for current radiology practices to expand and for new professionals to enter the field.[1]

As with most other industries and disciplines, the COVID-19 pandemic marked a dramatic turning point in medical physics, making now a suitable time to take stock of where we are and where we're going. The years 2020 and 2021 saw the acceleration of certain changes that were already in the works—this period also shed light on new revelations about how medical physics modalities can and should function as a part of health care.

Though many challenges lie ahead, radiologists and other medical physicists have many more opportunities to advance the field and, most importantly, improve patient care standards. In this paper, we at Apex Physics Partners will share what we observe to be trends in radiology as we look beyond the COVID-19 pandemic.

[1] Association of American Medical Colleges, The Complexities of Physician Supply and Demand: Projections From 2019 to 2034, June 2021, https://www.aamc.org/media/54681/download?attachment.

2. TECHNOLOGY AND RADIOLOGY

Technology forms the foundation of radiology, and technological advancements will continue to drive the evolution of the discipline. Improvements in imaging software and machinery, including the use of AI for supplemental medical image analysis, will continue to boost the accuracy of diagnoses and the effectiveness of radiotherapy treatments. Radiology departments, as traditional leaders in medical technology, are poised to continue leading advancements not just in medical physics but across entire health systems. Here are a few specific areas in which technology is expected to influence radiology in the years to come.

AI and Machine Learning

As in many other industries and disciplines, medical physicists can expect a more robust presence of AI and its subfield of machine learning, in which computer algorithms use data to make experience-based improvements to themselves. Publications on AI increased from 100–150 in 2007–2008 to more than 700 in 2016–2017, with MRI and CT accounting for more than 50 percent of said publications.[2] Deep industry interest in AI was evident at the 2019 Radiological Society of North America annual meeting, which included an expansive selection of AI sessions and education exhibits.[3] That interest, as well as the number of

[2] Pesapane, Filippo et al., "Artificial Intelligence in Medical Imaging: Threat or Opportunity? Radiologists Again at the Forefront of Innovation in Medicine," European Radiology Experimental vol. 2,1 35, 24 Oct. 2018, doi:10.1186/s41747-018-0061-6.

[3] Radiological Society of North America, "RSNA 2019 Sees Possibilities in AI," January 14, 2020, https://press.rsna.org/timssnet/media/pressreleases/14_pr_target.cfm?ID=2154.

possibilities, will only increase in the years ahead. Everyone is looking to develop AI in some capacity—from major vendors involved in radiology—including GE, Phillips, and Siemens—to major medical institutions like MD Anderson and the Cleveland Clinic. Even smaller companies like Radformation are looking to automate documentation and create other efficient solutions for radiologists.

The potential for AI in radiology is vast, with solutions designed to assist radiologists in everything from appointment management to paperwork and diagnostics itself. For example, AI can be trained to more efficiently read radiologic scans and tissue samples for information that humans might miss.[4] AI is expected to help medical physicists do their job better by absorbing huge amounts of data and zeroing in on what's important in terms of image quality, treatment planning, and dose optimization. Advancements in AI also mean more efficient equipment testing—for example, making sure the CT and MRI linear accelerators meet regulatory requirements and produce optimal images. AI software can evaluate equipment constantly, offering a much safer alternative to the old model of annual evaluations. AI may also play a role in analyzing data from dosimeters to help ensure radiologists and patients stay within acceptable radiation exposure limits.

It's important to say that AI will not replace radiologists: rather, it will do a better job of taking on time- and data-intensive procedures, ultimately making medical physicists more accurate, more efficient, and better able to focus on the indelible human tasks involved with providing superior patient care.

[4] Dhruv Chopra, "Radiology Technology Trends to Watch in 2020," Imaging Technology News, January 31, 2020, https://www.itnonline.com/article/radiology-technology-trends-watch-2020.

Hybrid Modalities

There was a time when medical physicists were generalists, offering expertise in nuclear medicine and diagnostics and radiotherapy all at the same time. As technology became more sophisticated, medical physicists moved toward specializing in particular modalities, such as CT, MRI, and PET. Although good for the accuracy and effectiveness of each modality, such specialization raises the possibility of isolating important diagnostic data as specialists focus on their modalities' strengths without giving others' full consideration.

The development of hybrid imaging is poised to leverage the best of each modality and offer more comprehensive imaging and more accurate diagnostics. As a result of the consolidation of health systems—discussed in more detail later—medical physicists have more opportunities to work together in clinical settings and collaborate. Radiologists are already familiar with PET/CT scans, which combine the radiotracers of PET with the anatomical precision of CT.[5]

Another example includes combining MRI's exceptional contrast with soft tissue and CT's ability to create dimensionally accurate anatomical information, allowing radiologists to follow the contrast through a vessel while implanting a device or treating disease. In the years to come, radiologists will continue to overlay images from different modalities onto one another to provide more information and better care. Of course, novel uses of imaging technology raise concerns in regard to regulation, which we will cover in the next section.

[5] "Positron Emission Tomography—Computed Tomography (PET/CT)," Radiologyinfo.org, accessed October 29, 2021, https://www.radiologyinfo.org/en/info/pet.

RADIOLOGY AS A PROFESSION

When thinking about trends in radiology, it's important to discuss the profession itself. What will the workplace look like for radiologists in the near future? We can't fully explore this without weighing the impact of COVID-19. To prioritize COVID-19, health systems lost significant elective procedure volume—30–55 percent during the first spike—which had a profound effect on radiology.[6] The pandemic also habituated health systems to operating at a lower volume, something that will inevitability change once the urgency of the virus subsides and millions of people seek to schedule previously delayed CT scans, MRIs, mammograms, and other forms of imaging. As mentioned in the introduction, there's already a shortage of medical physicists, and demand is only going to grow.

Health Care Consolidation

Anyone in the medical professional can see how heath systems have consolidated in recent years. A report in Health Affairs found that the share of primary care physicians affiliated with vertically integrated health systems increased from 38 percent to 49 percent from 2016–2018.[7] A report from Kaufman Hall reports that fallout from the COVID-19 pandemic is expected to accelerate consolidation as smaller entities look to larger partners to help recover from financial and operational distress.[8] Medical physics is no exception to this trend in health care, with Apex Physics Partners playing no small part in bringing practices together and exploring the opportunities this brings for raising the standard of care across the industry.

Regulatory Compliance

Medical physicists know that technology tends to outpace the development of regulations that ensure safety and compliance in regard to said technology, resulting in an uncomfortable gray area between advancement and official safety recommendations. Medical physicists must continue to seek accreditation for their respective modalities and comply with the latest regulations, but the delay between technological development and regulatory oversight makes it necessary for medical physicists to take different approaches to ensuring emerging technologies are as safe and effective as possible.

However, it can be burdensome for independent medical physicists to keep up with traditional accreditation and compliance, much less anticipate safety recommendations that haven't been developed yet. One of the advantages of belonging to a larger group of medical physicists is the opportunity to offload some of the administrative burdens—including the tasks involved with compliance—and promote an atmosphere where medical physicists can more easily collaborate on how best to ensure maximum safety and effectiveness for emerging technologies until official recommendations and regulations become available. For example, Apex Physics Partners has best practice task groups wherein medical physics partners can communicate with each other professionally and stay up to date on technology and regulations.

[6] Bruce Stuart, "How the COVID-19 Pandemic Has Affected Provision of Elective Services: The Challenges Ahead," Health Affairs, October 8, 2020, https://www.healthaffairs.org/do/10.1377/hblog20201006.263687/full/.

[7] Michael F. Furukawa, Laura Kimmey, David J. Jones, Rachel M. Machta, Jing Guo, and Eugene C. Rich, "Consolidation Of Providers Into Health Systems Increased Substantially, 2016–18," Health Affairs 2020 39:8, 1321–1325.

[8] Anu Singh, Kris Blohm, Nora Kelly, Courtney Midanek, Chris Peltola, and Blake Dorris, "M&A Quarterly Activity Report: Q1 2021," Kaufman, Hall & Associates, April 21, 2021, https://www.kaufmanhall.com/sites/default/files/2021-04/kh-ma-2021-q1-activity-report.pdf.

Letting Radiologists Be Radiologists

Regulatory compliance is just one area in which the consolidation of medical physics systems can benefit radiologists and other medical physicists. As many medical physics practices grow, practitioners find themselves getting further away from patient care—the reason they got into the field. Instead, practitioners often find themselves diverting focus to human resources, marketing, insurance reimbursement, and other business aspects that, while important, are only tangentially related to patient care.

The consolidation of practices affords medical physicists the opportunity to rely on others for non–medical physics endeavors, freeing up more time for medical physicists to go to conferences, interface with regulatory agencies and clients, serve on task groups, and engage in other activities more directly associated with improving their own abilities and the field at large.

Remote Work

Shutdowns associated with the COVID-19 pandemic forced millions of people to work from home—and many are keen to stay there. According to a survey from Pew Research, 54 percent of those surveyed expressed a desire to continue working from home after the pandemic ends.[9] It was traditionally believed that medical physicists had to be on site to ply their trade—but the same was thought to be true for many other professions that ended up adapting fine to work from home.

Medical physicists will always be required on site at least some of the time, but there are other times when medical physicists can do their job from home, assuming they're connected and have the right tools. This is another area where AI can help by streamlining the establishment of the treatment plans—and the physicist can review plans and interface with staff remotely.

MEDICAL PHYSICISTS: STRONGER TOGETHER

There are countless ways in which the COVID-19 pandemic can be seen as a setback for the medical community and a tragedy for society at large. However, the ingenuity, hard work, and collaboration involved in overcoming the virus will yield compound benefits in the years to come, reshaping medicine in general and medical physics in particular. Every day there are new plans and technologies to improve working conditions for radiologists, optimize workflow processes such as treatment planning, eliminate unnecessary exams, automate imaging processes such as drawing contours around tumors, perfect dose planning, fine-tune dosimeters to combat tumors without undue harm to healthy tissue…the list goes on and on.

We're all stronger when we collaborate, and things get a lot easier when you're part of a team. Apex Physics Partners invites radiology practices to say goodbye to the burden associated with compliance. Our dedicated team of physicists have deep experience and knowledge of ACR, ICANL, and Joint Commission requirements. We'll be with you every step of the way to ensure you stay compliant. We will also help you mitigate any risks that come up as you interact with your patients and staff. Contact us today, and let us take on regulation so you can focus on providing the best service to your patients.

[9] Kim Parker, Juliana Menasce Horowitz, and Rachel Minkin, "How the Coronavirus Outbreak Has—and Hasn't—Changed the Way American Work," Pew Research Center, December 9, 2020, https://www.pewresearch.org/social-trends/2020/12/09/how-the-coronavirus-outbreak-has-and-hasnt-changed-the-way-americans-work/.