Managing Quality, Safety, and Cost in Radiology, and Learning to Wear it Well

## *The Radiologisaurus: Why THEY want YOU to become a dinosaur*

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Ps-sst! Don't look now, but they would like radiologists like you and me to go the way of the dinosaur. Who exactly are "they," you ask? And why do they want us to become extinct?

It was a rude awakening for those of us who attended RSNA 2016 to find out that they are those insurance companies, big healthcare businesses, venture capitalists and anyone else who are heavily investing in artificial intelligence (AI), who would like nothing more than to see us radiologists disappear from the face of the healthcare planet.

Indeed, the topic of AI and its potential to upend radiology (ie, to one day replace radiologists entirely) caused quite a stir at the convention.

Personally, I found it quite disconcerting, to say the least, that there were so many sessions where IT experts and other non-radiologists aggressively spread such AI propaganda. "One day soon, deep-learning computers will replace radiologists," seemed to be the ominous message emanating from so many of these presentations.

One lecture I attended was moderated by Paul Chang, MD, of the University of Chicago. In contrast to his usual upbeat demeanor, Dr. Chang spoke in an unusually somber tone, stating, in so many words, that radiologists would just need to get used to being replaced by computers.

(Question: In what world does one radiologist get the right to determine the course of an entire specialty?)

He then passed the microphone to largely non-radiologist presenters, some of whom wore black turtlenecks and displayed flashy slides, creating the veneer of a vintage Steve Jobs presentation. Yet, if one took the time to digest what was actually being said, the content clearly consisted of more hype than substance.

Indeed, AI's ability to pick a dog, cat or chair out of an image containing other objects may be a basic, well-accepted concept. But our lecturers believed that the same process could soon be extrapolated to identifying minute pathologic findings in radiographic images. Not only that, but they also said we radiologists would just need to embrace the concept of being replaced outright by computers.

It was stunning to hear some of the lectures given by these IT folks and primary care doctors, who exuded such vast knowledge of a medical specialty in which they had received no formal training.

I noted that one significant result of that lecture, especially among the young residents, was widespread panic. Radiology residents were frantically emailing and calling their departments, rightfully worried that the hard-earned savings with which they had financed their medical school education and training might not bear a return on investment. Computers, they had just been told, would likely take their future jobs away.

Unfortunately, as indicated by another lecturer, the renowned radiologist, Eliot Siegel, MD, the cause of all of this chaos and confusion boils down to the usual suspect---what else?---money. The healthcare industry and insurers would rather that machines perform the work that we do because it is cheaper for them. Why pay a highly skilled doctor who has received extensive education and training in diagnostic radiology if a computer can do the same job so much more inexpensively?

I'll tell you why.

Only radiologists truly realize the intricacies of patient findings in diagnostic radiology, the radiation physics behind the images, and the reasons we are so important for our patients. Diagnostic radiology is both art and science, and radiologists are masters of synthesizing patient information by utilizing their visual skills in conjunction with their vast medical knowledge.



THE 3-PIECE SUIT RADIOLOGIST™

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## THE 3-PIECE SUIT RADIOLOGIST



Some suggest that AI may serve as an improved form of computer aided detection (CAD). But in my opinion, CAD has not been terribly helpful. Often, the computer-generated marks on mammograms are not specific, and more often than not, the circles and triangles clutter the images and seem to waste my time. Also, the marks on the images displayed on the PACS monitor can be wrong, and may divert the radiologist's focus. We are told that AI would be superior in this regard, but no matter how sophisticated AI becomes, I for one would never trust it as a first-line decision maker. Computers often make mistakes.

Recently, a friend underwent an automated EKG that concluded, "Arrhythmia and lateral wall infarct." This person had had no symptoms; the computer simply incorrectly interpreted a completely normal study. This misread could have generated more unnecessary studies and costs for the patient and his insurance carrier. This would have been avoided had the study been correctly interpreted in the first place—by a human physician.

This is a major pitfall of using AI in radiology. Besides adding downstream costs due to AI uncertainty, there will be myriad ethical arguments to consider. Who will be held responsible if a patient dies due to the faulty reading by an AI computer operating alone--the person who created the computer? Would the computers need to pass exams given by the American Board of Radiology in order to become board-certified radiologists?

In a 2016 JAMA article, Jha and Topol wrote:

"A radiology residency or a medical degree is not needed to detect lung nodules. Likewise radiologists are 'overtrained' to interpret portable chest radiographs obtained in the intensive care unit to confirm that support lines are in proper position. These studies are not challenging and may be ideal for automation and delegation to artificial intelligence."<sup>1</sup> On the contrary, academic radiologists teach us that the proper interpretation of a chest radiograph, which to many internists appears to be "easy," is actually quite challenging. Portable chest X-rays, especially, are performed on some of our sickest patients---those in ICU. Therefore, they require some of the best expertise. Radiologists do not simply look at line placement and ignore everything else on the image. The interpretation of a chest CT scan to find lung nodules is not a "cognitively simple task" as outlined by Jha and Topol. My radiology professor would often say, "This is not instant coffee;" finding that single nodule on a chest CT study is only a tiny piece of the entire clinical puzzle.

There is a running false narrative that radiologists are like factory workers who are somehow playing a simple game of (as a colleague's daughter once put it) "Where's Waldo?" This could not be further from the truth. Radiographic images are filled with complex challenges and subtleties that require high levels of reasoning, judgment, clinical acumen, radiation physics training, and expertise.

This means no computer can replace the art and science of diagnostic radiology---at least not without a corresponding drop in the quality of care. In my view, this misguided push for AI is just one facet of a larger scheme to water down the quality of health care.

And, if you ask me, that's where the irony lies:

All of us become patients at one time or another. All those individuals advocating for artificial intelligence to take over radiology will one day be affected by the eventual decrease in quality of care. Their push for poor quality care could, at the end of the day, come back to hurt them, as well.

That doesn't sound very intelligent to me.

1. Jha, S, Topol EJ. Adapting to artificial intelligence: Radiologists and pathologists as information specialists. *JAMA*. 2016; 316(22):2353-2354.