Foundation Models Emerge as the "Electricity" of Radiology AI

Claudia Stahl

Note: this is the first in a series of articles based on interviews conducted at RSNA 2025 by Lawrence Tanenbaum, MD, Associate Editor of Applied Radiology*'s Artificial Intelligence section. The interview can be viewed at* Applied Radiology's *YouTube channel.*

Fans of the PBS television series *Downton Abbey*, set in early 20th-century England, witnessed the far-reaching effects of the Second Industrial Revolution—particularly innovations in electricity, mechanization, and communication—on the lives of its characters. What fueled this all-encompassing change, and what does it have in common with artificial intelligence in health care?

During a discussion with Nina Kottler, MD, Chief Medical AI Officer at Mosaic Clinical Technologies, Lawrence Tanenbaum, MD, raised the comparison as a way to describe how foundational technologies perhaps, not so quietly, reshape professional life.

Kottler, whose academic pathway started out in applied mathematics and shifted direction to medicine, said that she "wanted to be a radiologist because on every rotation, we went down into the reading room," where she was captivated by the collegial interaction among radiologists and their clinical colleagues.

Kottler's early career in radiology was rooted in data and technology, including work at the then-emerging teleradiology company NightHawk. She became an early adopter of AI in 2016, when the technology first entered radiology. In 2017, she partnered with data scientists to develop an AI model that helped radiologists apply population health guidelines at the point of care, and she has remained deeply engaged in the AI space ever since.

Despite her early interest in the potential of technology to improve workplace efficiency, Kottler acknowledged that the advent of PACS, while necessary and transformative for imaging, had an unintended consequence. "It separated us from all of the other clinicians in the hospital." Although foundation models won't bring back the reading room, the technology can "change how we communicate with other physicians and how we do our job," she said.

AI models in medicine, especially radiology, learn patterns from diverse datasets (eg, millions of images and reports) that can then be adapted to specific tasks such as detection, segmentation, reporting, and workflow support. Unlike earlier, task-specific models built for a single challenge, foundation models, trained on various types of inputs, are capable of multiple, comprehensive functions across diseases, modalities, and institutions.

In Kottler's view, today's AI opportunity is not about improving legacy processes, but about rebuilding workflows using modern technology. "If you were going to create (a radiology workflow solution) from scratch today," she said, "you would create something cloud-native, AI-native."

Much of that reinvention centers on reducing the countless inefficiencies that contribute to radiologist burnout. Fragmented data—scanned worksheets, incomplete exams, siloed clinical information—force radiologists to act as manual integrators, and "that's really silly," Kottler noted. "It doesn't mean we don't need the information, but we need something that helps us understand what that information is."

At Mosaic, the technology and AI services division of Radiology Partners, that "something" increasingly takes the form of foundational models, including both large language models (LLMs) and vision-language models (VLMs). Kottler explained that AI-driven reporting tools powered by LLMs are already delivering meaningful efficiency gains. "We're seeing about an 18% increase in efficiency from reporting alone," she said, with early signs of even greater improvements as VLMs begin assisting with x-ray and head CT interpretation. In some settings, she noted, preliminary results show gains of nearly 30%.

Most AI used in radiology today focuses on narrow, single-purpose tasks, such as pneumothorax detection on a CXR or intracranial hemorrhage triage on a

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noncontrast head CT. These tools provide a binary output, flagging whether the finding is present. Even in combination, narrow AI models generated "about a 1% capacity increase. That didn't solve our problem," Kottler said.

Foundation models, by contrast, help address the widening gap between imaging volume growth and radiologist capacity by generating a more holistic output that closely resembles what a radiologist would produce. In the future, both LLMs and VLMs are likely to become ubiquitous, embedded directly into radiology workflow across all imaging exams.

So, why the *Downton Abbey* reference? Tanenbaum likened the shift to foundation models in practice to the arrival of electricity in the homes of the last century —initially novel, but soon invisible once fully integrated into virtually everything. Kottler agreed. "These foundation models are kind of the electricity of radiology," she said. "In the next year or two, most people are not going to be dictating their studies. They're going to … be using a solution that will be creating a structured report and overseeing them."

Beyond workflow efficiency, Kottler sees foundation models enabling a more fundamental shift in the role of radiology. She described a move beyond population-based guidelines toward precision radiology, where AI extracts predictive insights from imaging pixels that humans cannot perceive. "There is far more information in the pixels than we're consuming as radiologists," she said, pointing to emerging tools that can predict disease risk years before clinical manifestation.

With these technologies, radiologists could find their profession evolving into one that is centered more on disease prevention than detection, in partnership with patients. "It's hard to get patients to change their lifestyle until a disease has manifested; but once they have a disease, it's already too late," said Kottler.

Predictive technology gives radiologists a tool with which to engage directly with patients about their future health. "If we can show them information that helps them understand their trajectory, maybe we can get them to alter their lifestyle and be more involved in their personal care to prevent diseases from developing in the first place."