Future Workforce: How Artificial Intelligence is Transforming Health Care

Written by Lisa Baker

A year ago, when a stroke patient arrived at Valley Baptist Medical Center-Brownsville, it could sometimes take as long as 90 minutes for the CT angiogram and perfusion scan results to come in so the provider could diagnose whether the patient was a candidate for thrombectomy – a type of surgery that would remove the blood clots from within an artery or vein. Only then was the decision made to transfer the patient to the Valley Baptist comprehensive stroke center in Harlingen.

But now, thanks to artificial intelligence software, the CTP analysis takes just minutes.

Earlier this year, Brownsville began implementing the VizNet artificial intelligence software that was already in use at the Valley Baptist comprehensive stroke center in Harlingen. Now, when a CTP scan is performed at Brownsville, the raw image data is sent immediately to an internet-connected data program known as "the cloud". There, it is analyzed by the VizNet software. And just minutes after the scan is finished, every relevant specialist – at both the spoke and the hub center – receives a push notification to their phone stating that a large vessel occlusion has been detected. The notification includes a full color picture of the scan and shows where the tissue is dead and where it is salvageable. And since both the neurologists at Brownsville and the endovascular doctors in the catheterization lab at Harlingen receive the notifications, both teams can immediately prepare the patient for the thrombectomy transfer.

"It has really helped streamline our process," said Ameer Hassan, M.D., stroke director at VBMC-Harlingen. "I don't have to worry about a technician reprocessing it, a radiologist reading it, or multiple phone calls in between. The AI bypasses that triage algorithm completely."


Hassan

As a stroke director, Hassan is always thinking about efficiency. Time is brain, and during an ischemic stroke event, every minute a radiologist spends analyzing images means an additional 1.9 million neurons lost. That's why Hassan, like other Texas physicians who are currently integrating artificial intelligence into their patient care protocol, believes that artificial intelligence is poised to transform health care.

Educating Physicians

Analyzing images is one of the simplest ways AI can improve efficiency and Valley Baptist is just one of several Texas hospitals using intelligent software for that purpose. Computers can see and analyze an image in ways that the human eyes can't. As a result, a simple image with limited diagnostic application can become a much more meaningful tool when analyzed by AI. But when images aren't already a key diagnostic tool, then adding AI to the protocol can require educating physicians on the new process.

Up until a few months ago, the Ascension Seton Heart Institute in Austin used standard stress tests and catheterizations to assess cardiac blockages. Imagery wasn't part of the protocol. "Even though cardiac CAT scans have been available for twenty years, it's always been considered a niche technology," said Tuan Nguyen, M.D., director of Cardiac CT at Seton Heart Institute. But Nguyen thought artificial intelligence could be a way to reduce the need for invasive catheterizations, and a few months ago, Seton began implementing the HeartFlow AI technology.


Nguyen

HeartFlow is an artificial intelligence software that analyzes the severity of a blockage. Just like a cardiac catheterization, the AI analyzes blood pressure before and after the blockage, enabling physicians to determine whether the blockage is clinically significant. But unlike an invasive catheter, Ascension Seton can now measure this from a simple CAT scan.

"We use computational fluid dynamics to analyze things the human eye can't assess," explained Nguyen. "Our software develops a 3D model from the CAT scan image, and it can then determine the fluid pressure before and after the blockage."

Being able to decide whether a blockage can be treated medically without any invasive diagnostic procedures is a significant improvement in patient care. But the cardiac team is still in the process of implementing the new technology. “Education is the biggest challenge,” Nguyen said. “It takes time for physicians to understand what this software does, and they’re still using their established ways of taking care of people. This is a big change and requires education and buy-in.”

Improving Outcomes

Even though artificial intelligence is so new to Ascension Seton, the AI software has already helped physicians identify patients on both ends of the diagnostic scale. Nguyen is enthusiastic about how it will benefit cardiac patients as the program grows. “It comes down to patient care,” he said. “Now we can assess findings even before we get a patient to the cath lab.” It’s especially valuable when the software reveals that a blockage is not clinically significant, since then it can be treated with medication alone, and the patient is able to go home without undergoing an invasive procedure.

And at VBMC-Harlingen, Hassan has noticed a similar pattern: sometimes AI is most useful when it confirms what doesn’t need to be done. Now, stroke directors at a branch location can make a definitive decision about whether a patient is a good candidate for a procedure, without having to first send them to the hub location for further evaluation. “This helps patients who won’t get mechanical thrombectomy at a comprehensive stroke center,” said Hassan. “It keeps them at home, at their local hospital, and near their family.”

Hassan and his team have submitted results to present to the International Stroke Conference next year about how artificial intelligence has impacted patient outcomes. Since the implementation of the AI software, Valley Baptist Medical Center has seen a significant improvement in time from CT scan to arrival at the cath lab, as well as in patients’ length of stay.

Health Care of the Future


Steve Jiang
Jiang

Artificial intelligence is already transforming health care in Texas – but it’s likely this is only the beginning. Two years ago, Steve Jiang, Ph.D., vice chair of radiation and oncology at UT Southwestern Medical Center, launched the MAIA Lab to research how AI can help doctors provide better care. “We realized three years ago this was going to change the world,” he said. Now, with Jiang as director, the MAIA Lab team is exploring how the AI of the future will integrate into health care practice.

In addition to improving imaging diagnostics and clinical decision-making, Jiang believes one of the most important future applications of AI will be in resource-limited settings. Right now, AI is mostly available in well-resourced hospitals, but because software is usually both affordable and scalable, Jiang believes it will become a key tool for reducing health care disparities. “Health care is art as much as science,” said Jiang. “AI can learn an experienced physician’s knowledge and transfer that to a less experienced physician.”

It’s a visionary idea, and likely one that won’t be practical in the short-term. But from Jiang’s perspective, even small implementations of AI can have significant impact. At its heart, AI is about improving efficiency: it enables computers to accomplish complex tasks that humans used to do. “On average, physicians spend half their time in front of computers,” said Jiang. Using AI for those computer tasks will enable practitioners to spend less time at a screen – and more time with patients. And if computers can empower physicians to spend more time in face-to-face interactions, then ultimately, Jiang believes, “AI can make health care more human.”

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