COMMENTARY

The AI Revolution Is Coming in Emergency Care

Artificial intelligence is poised to have a transformative impact on emergency department teams and the broader world of medical diagnostics.

By **Diku Mandavia, M.D.**, Contributor
Jan. 13, 2020, at 8:00 a.m.

Human physicians are not likely to be digitally replaced any time soon, but the day-to-day data crunching will gradually switch to the AI digital assistant, freeing up physicians to focus more energetically on the most challenging cases. **(SSHEPARD/GETTY IMAGES)**

THERE ARE NOW MORE THAN 145 million emergency department visits nationwide in the U.S.

Today, despite expansion in health insurance coverage, ERs are seeing a larger and aging population, sicker patients who arrive in immediate danger with more chronic conditions, physician shortages as we expand care, a need for more expensive technical tools, and an unsustainable trend in costs and expenditures.

Partial rescue from these challenges may be coming from the most unlikely of sources: artificial intelligence. These aren't robots, but smart apps and tools that can reduce cognitive ER burdens, while increasing diagnostic speed, precision and accuracy.

The arrival of AI is poised to have a transformative impact on emergency department teams and the broader world of medical diagnostics.

Human physicians are not likely to be digitally replaced any time soon. But the day-to-day fatigue, tedium and delay of crunching through data (and accurately remembering what was learned) will gradually switch to the AI digital assistant, freeing up physicians to focus more energetically on the most challenging cases.

Think of AI as "digital consultants" – advanced computational tools, now making their way to the front lines of medicine where they augment the diagnostic skills of human doctors. Our focus in the ER on patient-centric care is actually intensified, improving care and outcomes in moments of real crisis and peril.

I have worked for more than 25 years in emergency medicine in Los Angeles, at LAC+USC Medical Center, one of the largest public hospitals in the country. There are times of maximum stress when the resuscitation suites resemble an urban battlefield.

This inner-city hospital's Department of Emergency Medicine, where I still teach and practice part time, has 125 beds and is responsible for the initial triage, evaluation and management of up to 500 patients daily. The procession includes both children and adults who frequently arrive deeply traumatized and manifesting a complete spectrum of urgent conditions, to medical and surgical emergencies.

Most of the traffic at an urban emergency department like LAC+USC involves chronic diseases such as diabetes and urgent, life-threatening conditions such as heart failure or intracranial hemorrhages, where response time is crucial.

Treatment choices differ substantially by type of stroke – knowing almost instantly if the damage is ischemic (a blocked artery) or hemorrhagic (a leaking artery) is a critical decision point. There are not always neuro-radiologists immediately on hand and a superfast AI "assistant" would save us time in defining the injury and in activating the appropriate stroke interventions.

AI already on duty at a university hospital in nearby Orange County can analyze a CT scan for a cerebral hemorrhage in about 20 seconds. With AI, we will be more confident of our diagnosis and get to the right care response sooner. Lives will be saved.

The need for speed in identifying subtypes of hemorrhages is so dire that it was the subject of the most recent AI competition of the Radiological Society of North America (RSNA), the world's largest radiology society. The RSNA Intracranial Hemorrhage Detection and Classification Challenge asked competing teams to develop an algorithm capable of identifying and classifying subtypes of hemorrhages on head CT images. For the challenge, teams were given a dataset of more than 25,000 scans.

All of the images interpreted and data entered will go toward feeding AI algorithms and physicians will soon realize the tangible impact AI can have on helping save lives.

Another patient population that researchers are looking to leverage AI for is pediatrics. Thousands of children die annually of sepsis around the world; in fact, it is the leading cause of death among the pediatric patient population.

Boston Children's Hospital has been working on the creation of a breakthrough pediatric sepsis screening tool that takes the age differences into consideration and that can be introduced into clinical workflows including on the front line in the BCH pediatric emergency unit. The tool in development links to existing data to monitor vital signs and labs to look out for key markers such as organ dysfunction.

AI will much more precisely predict the pattern of response to sepsis in a particular patient and help guide the battle for containment and cure.

While the tool is currently being tested and refined, the rollout has the potential to support clinicians with timely diagnosis of sepsis to help reduce severe cases and even mortality.

The results have been already transformational at Boston Children's Hospital and will soon be saving lives in danger around the world.

Imagine having the equivalent of the knowledge and experience of 10,000 doctors at your fingertips to help make a diagnosis in seconds. That is the reality that AI will afford us. AI will be augmenting – not replacing – our collective medical knowledge to help change lives around the world.

___

Diku Mandavia, M.D., is senior vice president, chief medical officer, at FUJIFILM SonoSite Inc., and FUJIFILM Medical Systems U.S.A., Inc. He completed his residency in emergency medicine at LAC+USC Medical Center in Los Angeles and is a clinical associate professor of emergency medicine at the University of Southern California.