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YOUR HEALTH

How Doctors Use AI to Help Diagnose Patients

Artificial intelligence can assist in spotting heart and eye conditions, sepsis risk

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Artificial intelligence is slowly changing the care that you get at the doctor's office and in hospitals.

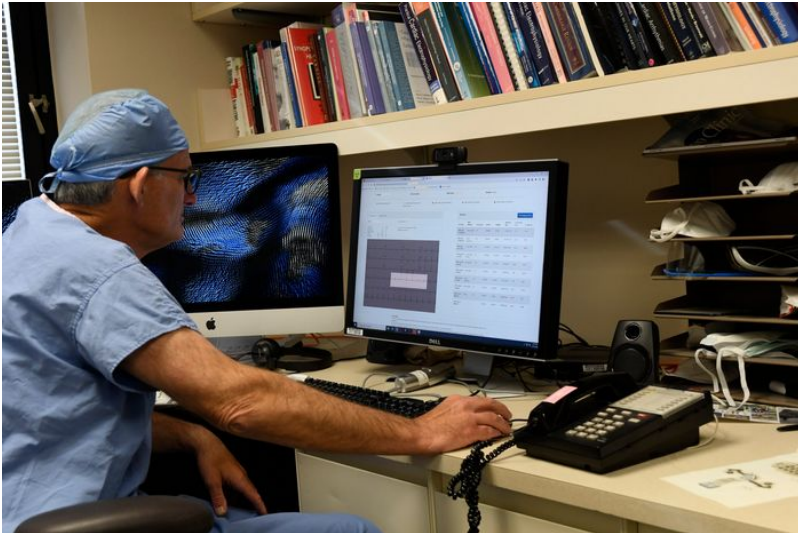
At Mayo Clinic's cardiology department, doctors use an artificial-intelligence program to help detect new heart problems. Elsewhere, a group of primary-care doctors is using it to help identify an eye condition that can lead to blindness. A number of hospitals are using it to catch patients at risk for sepsis.

AI tools use algorithms to better identify patients that might be at risk for certain conditions or diseases. Doctors aren't relying on the technology alone to diagnose patients, and their use of generative AI such as ChatGPT is largely limited to paperwork and reports, though some are testing to see if it could play a more useful role. Some doctors, however, are using AI to aid them in reaching a diagnosis, often earlier than they otherwise would.

Physicians say AI holds promise, but they are also wary of yielding to machines, both because the technology is still emerging and also because research has shown that biases in AI can harm the care some people receive. Some earlier big bets that artificial intelligence would transform healthcare proved disappointing, or at least premature, including IBM's Watson Health effort.

"I don't think we are at a place where we can just let algorithms run and make the decisions," said Michael Pencina, director of Duke AI Health, an initiative at Duke University School of Medicine that works on AI and machine-learning research. Generally, medical AI programs use an algorithm or set of algorithms that learn and get better over time with input.

One challenge lies in how the technology is developed, said John Halamka, president of Mayo Clinic Platform, which works with health technology companies to develop AI tools. The algorithms use information, often from electronic health records, such as demographic and health history, vital signs and labs to determine whether a patient might have a certain health issue.



Dr. Paul Friedman, chair of the Department of Cardiovascular Medicine at Mayo Clinic in Rochester, Minn., uses AI to look at electrocardiogram information.

PHOTO: TERRI MALLOY/MAYO CLINIC

The technology improves the more that it is used, as doctors report whether the algorithm's assessment was accurate or not. But an algorithm developed based on data from patients in Minnesota, for example, might not be applicable to patients with different demographics—at least not without some modifications.

A high-profile 2019 study in the journal *Science* found racial bias in an algorithm that led Black patients to be deprived of extra care they should have been qualified for. To address these issues, a group of tech and healthcare professionals last year started working to develop guidelines for fair, unbiased use of AI in healthcare.

So far, there is lots of research on the promise of AI and many companies working on products for doctors and health systems, but the technology has been slow to prompt widespread change across medical practices. Here are three examples of where AI is used to help diagnose patients.

Detecting Heart Conditions

At Mayo cardiology, an AI tool has helped doctors diagnose new cases of heart failure and cases of irregular heart rhythms, which are called atrial fibrillation, potentially years before they might otherwise have been detected, said Dr. Paul Friedman, chair of the clinic's cardiology department in Rochester, Minn.

Doctors can't tell on their own whether someone with a normal electrocardiogram, or ECG, might have atrial fibrillation outside of the test. The AI, however, can detect red-flag patterns in the ECGs that are too subtle for humans to identify.

In a 2022 study in the journal *Lancet*, Mayo researchers ran algorithms on more than 600,000 patients' ECGs to see whether they might be at risk of silent atrial fibrillation. The AI program identified 1,000 people, who were then asked to wear a heart monitor for a month.

Researchers found those patients had a fivefold-increased risk of being diagnosed with atrial fibrillation after a month of heart monitoring, compared with patients in a control group.

Early Eye Problems

Cano Health, a group of primary-care physicians in eight states and Puerto Rico, did a pilot last year using AI to analyze images from a special eye camera to identify diabetic retinopathy, a leading cause of blindness that can afflict people with diabetes. The test in four Chicago-area offices went well enough that the group now is looking to expand its use, said Robert Emmet Kenney, senior medical director at Cano Health.

When the AI says that patients are positive for diabetic retinopathy, they must still visit an ophthalmologist to confirm the diagnosis and get a treatment plan, Dr. Kenney said. But the program helps primary-care doctors identify patients with diabetic retinopathy right in their office without having to go to a specialist first.

"For this patient population there is a lot of times they fall through the cracks and don't get the care that they need," said Dr. Kenney of the group's largely Spanish-speaking, elderly population, estimating that more than a third have diabetes and are supposed to get their eyes checked by a specialist once a year.

Catching Sepsis Risk

Sinai Hospital in Baltimore is one hospital that uses an algorithm to identify hospitalized patients who are most at-risk for sepsis, a fast-moving response to an infection which is a main cause of death in hospitals.

The algorithm examines more than 250 factors, including vital signs, demographic data, health history and labs, said Suchi Saria, a professor of AI at Johns Hopkins and chief executive of the health AI company Bayesian Health, which developed the program.

The system alerts doctors if it determines a patient is septic or deteriorating. Doctors then evaluate the patient and start antibiotic treatment if they agree with the assessment. The system adjusts over time based on the doctors' feedback, said Esti Schabelman, the hospital's chief medical officer.

Studies published in the journal Nature Medicine last year indicated that using the algorithm in hospitals could result in patients getting sepsis treatment nearly two hours earlier on average, reducing the condition's hospital mortality rate by 18%.

"Each hour of antibiotic treatments is associated with improvement in mortality," Dr. Schabelman said. "Every hour is a big deal in sepsis."

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