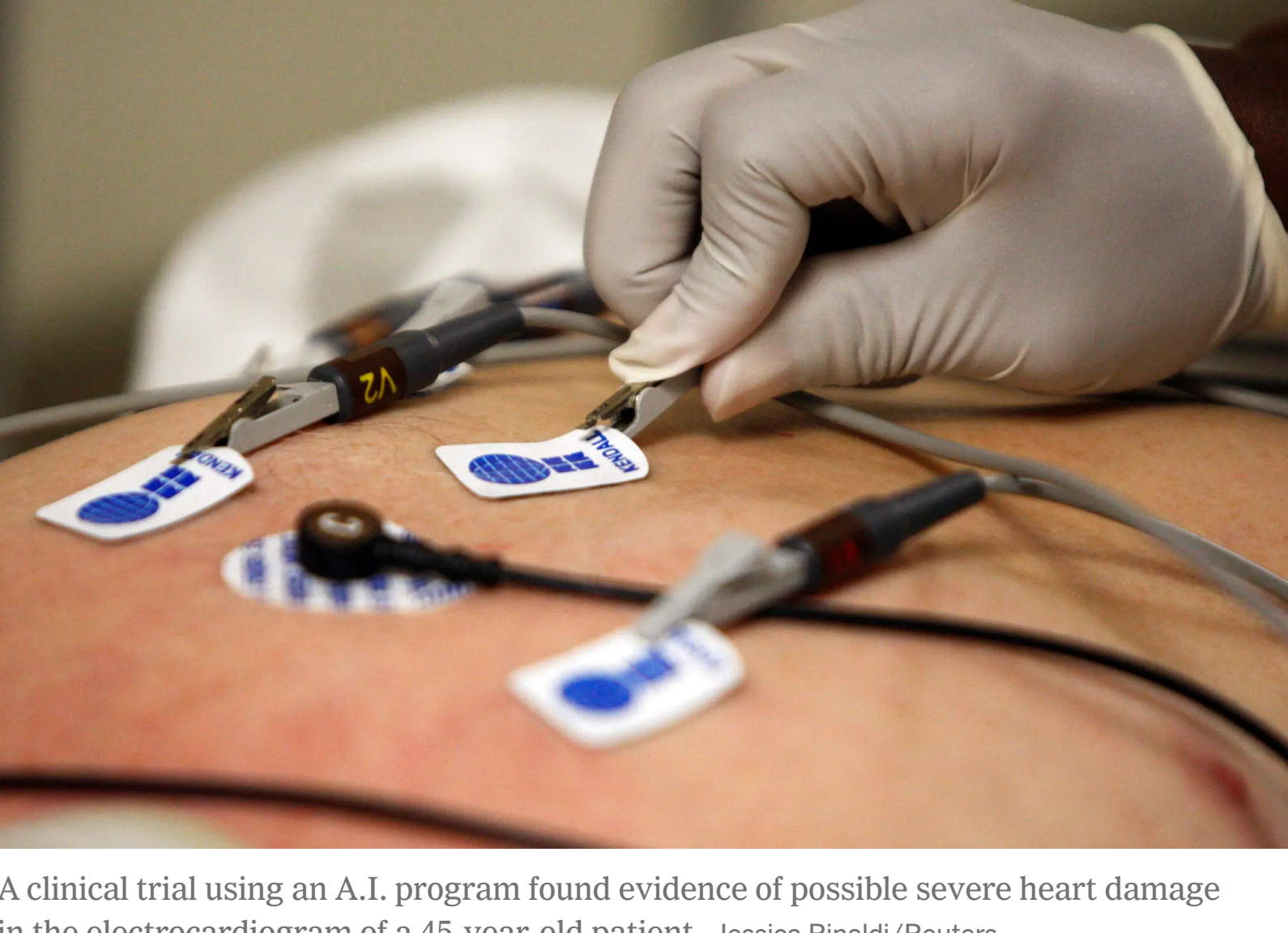


When A.I. Finds What Doctors Miss

Artificial intelligence programs can spot patterns in electrocardiograms that even expert clinicians miss, offering physicians another widely accessible tool to identify life-threatening conditions before it's too late - for free.

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A clinical trial using an A.I. program found evidence of possible severe heart damage in the electrocardiogram of a 45-year-old patient. Jessica Rinaldi/Reuters

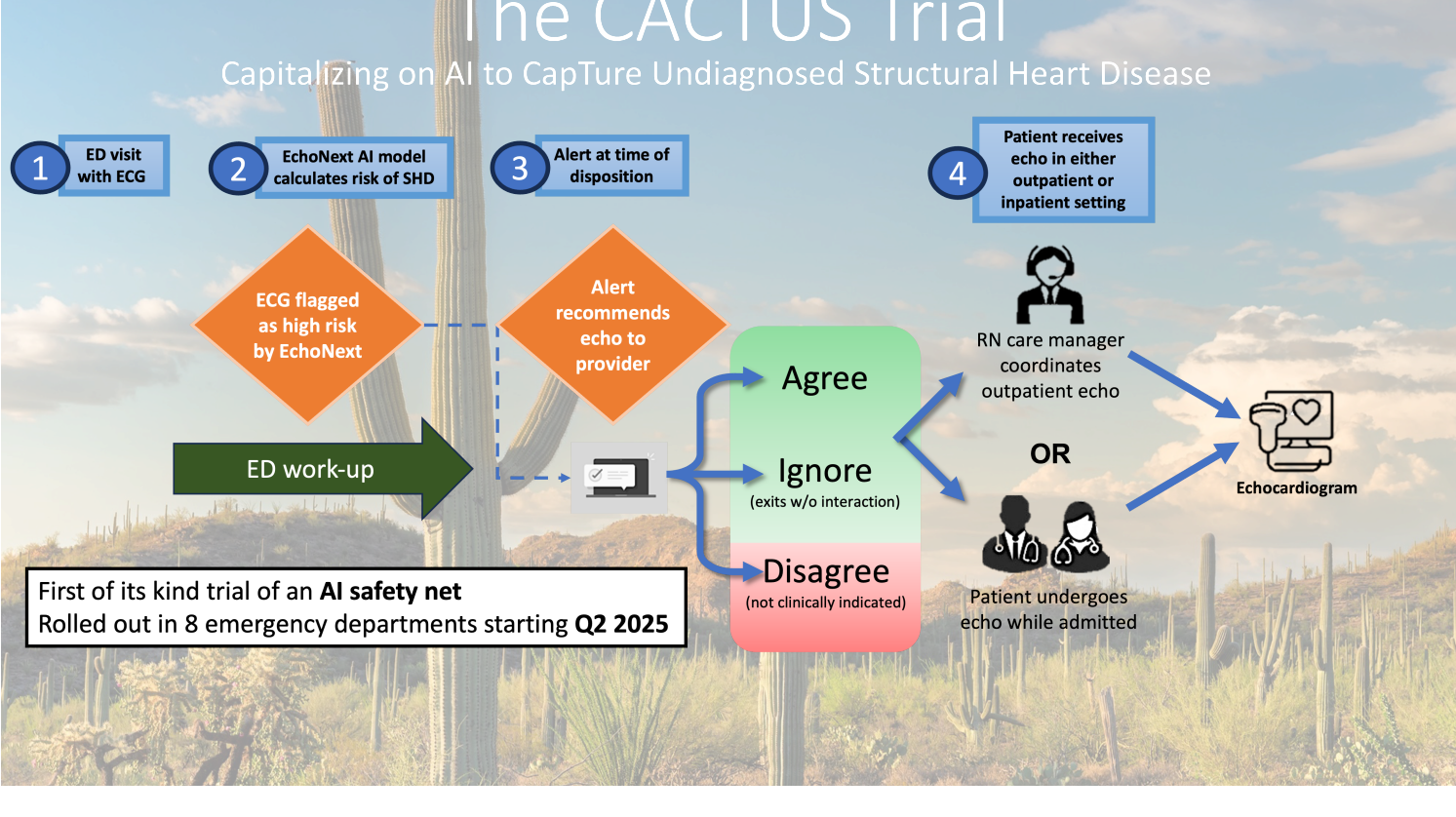
By Ayana Papaj
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What if a routine heart test could detect a life-threatening condition before a physician even suspected something was wrong?

That possibility is becoming a reality thanks to a new artificial intelligence program capable of identifying hidden heart disease using [electrocardiograms \(ECGs\)](#). In a recent [New York Times](#) article, science journalist Gina Kolata explains how the technology successfully identified severe heart damage in a 45-year-old patient whose symptoms had initially been mistaken for asthma. The program, called [EchoNext](#), examines patterns that are generally too subtle for the human eye to detect, giving physicians another tool to diagnose cardiovascular disease earlier and more accurately.

Researchers are now testing how that technology could work as a safety net for patients in emergency departments. The [CACTUS Trial](#) uses EchoNext to analyze ECGs for signs that a patient may be at high risk for structural heart disease. The trial began rolling out across eight emergency departments in 2025. When EchoNext flags an ECG as high risk, the patient's provider receives an alert recommending an echocardiogram, a test that uses sound waves to create images of the heart and allows clinicians to look more closely at its structure and function.



The CACTUS Trial shows how EchoNext can flag an ECG as high risk for structural heart disease and alert a patient's care team to consider additional testing with an echocardiogram. CRADLE/Columbia University

The technology could have especially important implications for heart disease, where recognizing warning signs early can change a patient's course of treatment. Heart disease remains the leading cause of death in the United States, taking hundreds of thousands of lives each year. The [Centers for Disease Control and Prevention \(CDC\)](#) states that many types of heart disease progress slowly, meaning patients may have few noticeable symptoms until their condition becomes much more serious. Detecting disease earlier gives physicians more opportunities to begin treatment before irreversible damage occurs.

Artificial intelligence could also help address another long-standing problem in medicine: diagnostic error. Although doctors receive extensive training, interpreting medical tests can be difficult, particularly when abnormalities are subtle or rare. In a [2023 study](#), researchers found that diagnostic delays resulting from interpretive errors can lead to delayed treatment, increased surgical risks, and worse patient outcomes. Their research also reported that approximately 75 percent of patient complaints were connected to interpretive mistakes and incorrect diagnoses.

This is where artificial intelligence may provide some of its greatest value. Instead of waiting for symptoms to become severe, tools like EchoNext can flag subtle abnormalities in an ECG that may encourage physicians to investigate further. "Now we are able to diagnose critical, high-risk conditions that the human eye can't, and potentially deliver lifesaving treatment earlier," said [Dr. Pierre Elias](#), the cardiologist who led the team that developed EchoNext. For patients, an earlier warning could mean receiving additional testing, treatment, or monitoring weeks or even months sooner.

Earlier intervention could make a significant difference in what happens next for a patient. The 45-year-old patient whose symptoms had initially been mistaken for asthma demonstrates what that difference could look like. EchoNext identified evidence of severe heart damage in his ECG, giving physicians another reason to investigate a condition that had previously gone unrecognized. Identifying abnormalities before symptoms become severe gives physicians more time to monitor patients closely and determine whether additional testing or treatment is necessary. In some cases, recognizing these warning signs earlier could help prevent more serious outcomes, including heart failure or hospitalization.

Because ECGs are already one of the most commonly performed cardiac tests in hospitals and primary care offices, researchers hope the technology can improve detection without requiring patients to undergo expensive or invasive procedures. The CACTUS Trial builds on that possibility by incorporating EchoNext into a test patients may already receive during an emergency department visit. Rather than introducing an entirely new screening procedure, the technology analyzes information already contained in a routine test and alerts clinicians when something may deserve a closer look.

Importantly, an EchoNext alert does not automatically determine what happens next. The CACTUS Trial keeps the patient's care team involved in the decision-making process. After receiving an alert, a provider can agree with the recommendation, ignore it, or determine that an echocardiogram is not clinically necessary. Physicians can then consider the A.I. finding alongside the patient's symptoms, medical history, and other test results before deciding whether further testing or treatment is appropriate.

That distinction is important as artificial intelligence becomes more common in healthcare. These programs are not intended to replace the experience and judgment of physicians. Instead, tools like EchoNext can provide another source of information that may draw attention to something a clinician should investigate further. In this case, A.I. functions less like an independent decision-maker and more like an additional safeguard within an existing healthcare system.

For patients, that partnership could provide an additional safeguard at a moment when early recognition can make a meaningful difference. A routine ECG may contain information that is difficult for even an experienced clinician to recognize on their own. By helping bring those hidden warning signs to physicians' attention, artificial intelligence has the potential to make a familiar medical test even more useful — and give doctors another opportunity to intervene before a serious condition becomes impossible to miss.

AI Disclosure Statement AI was used to assist with the structure of my writing and to check grammar and clarity.

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