

# Can EKGs read by AI save lives? It's possible, researchers say

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Credit: Niklas Jeromin from Pexels

Artificial intelligence may do a better job than humans at spotting high-risk patients using results from a heart test, leading to better care and lower death rates, researchers say.

"The study shows that AI is much better than [doctors](#) at identifying early signs of potential death" using electrocardiogram results, said lead researcher Dr. Chin Lin, an associate professor at the School of Medicine of the National Defense Medical Center in Taipei, Taiwan. "With AI's help, doctors identified more [heart](#) issues and treated them right away."

The results will be presented Nov. 12 at the American Heart Association's [Scientific Sessions 2023](#) held in Philadelphia Nov. 11–13. The [findings](#) are considered preliminary until full results are published in a peer-reviewed journal.

Electrocardiograms, also called EKGs or ECGs, measure the heart's electrical activity and help cardiologists spot heart problems. This noninvasive test translates the heart's rhythm into wavy lines on paper that can then be read by a doctor.

For the study, researchers recruited 39 emergency or internal medicine doctors who treated 15,965 [adult patients](#), with an average age of 61, who needed an EKG for various reasons. "These reasons included [older patients](#) needing surgery or hospital stays, people with heart-related symptoms or suspected heart issues and those with known or suspected heart diseases," said Lin, who also is [chief technology officer](#) at the Artificial Intelligence and Internet of Things Development Center at Tri-Service General Hospital in Taipei.

All patients had their EKGs uploaded to the hospital's information system, but for about half, only their physicians evaluated them. For the other half, if the AI determined that a patient's EKG put them at high risk of dying, doctors were alerted within minutes by text message, Lin said. (The AI system also shared low-risk results with doctors, but without alerts).

When death rates at 90 days were compared, 3.6% of participants in the AI group had died from any cause, compared with 4.3% of those in the [control group](#).

Among the high-risk cases where physicians used AI results, the cumulative death rate was 31% lower than among those who were analyzed traditionally.

Those who AI labeled as high risk received more [intensive care](#) and other advanced treatment, which the researchers said contributed to a "significant reduction" in death from heart issues—a more than 90% reduction, in fact. The cardiac death rate was 0.2% in those whose doctors used AI versus 2.4% in those who didn't.

"The results were shocking," Lin said.

Before this research, it was known that an EKG read by [artificial intelligence](#), also called an AI-ECG, could predict death accurately, Lin said. But it wasn't known whether the information could make a difference.

"We also didn't know what doctors should do after getting an AI-ECG alert," Lin said. "So, we asked doctors in this study to take the high-risk alert seriously and decide on the best care for patients by themselves."

AI-ECG is designed to identify patients at high risk of dying by detecting subtle signs that humans usually miss, Lin said. The AI can identify potential heart issues from EKGs. "Doctors can then arrange thorough examination and intensive monitoring to catch serious illnesses early and potentially save lives."

Lin said that the patients who benefited the most from AI were those who showed less obvious signs of illness. "For patients with clear critical

symptoms, doctors would provide intensive care even without an AI-ECG alert," he said. "For those with less obvious signs, the AI-ECG alert helps doctors re-evaluate and give intensive care."

Dr. Rohan Khera, an assistant professor of cardiovascular medicine at Yale School of Medicine in New Haven, Connecticut, who was not involved in the study, commended it for using a randomized controlled trial design to an AI prediction model. Randomized controlled trials are considered the gold standard for medical research.

"It is also interesting to see that the findings suggest a benefit in sharing AI predictions with clinicians on an outcome like mortality, especially because mortality is a difficult outcome to reduce," said Khera, director of Yale's Cardiovascular Data Science Lab.

However, Khera said, the results might not have as much to do with the AI predictions "but the fact that clinicians spent more time with a subset of patients and did more testing. If a group is closely watched and tested, they tend to do better."

Lin said that because of the AI-ECG's "impressive results and potential to greatly improve medical care," the system is now used in 14 military hospitals in Taiwan.

In addition to making a difference with [high-risk patients](#), Lin said, the study showed that outcomes among low-risk cases were similar between the two groups. "This is crucial, suggesting that AI may not pose a potential risk."

**More information:** Chin Lin et al, Applying an Artificial Intelligence-Enabled Electrocardiographic System for Reducing Mortality: A Pragmatic Randomized Clinical Trial. [www.abstractsonline.com/pp8/?.../1/presentation/12544](http://www.abstractsonline.com/pp8/?.../1/presentation/12544)

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