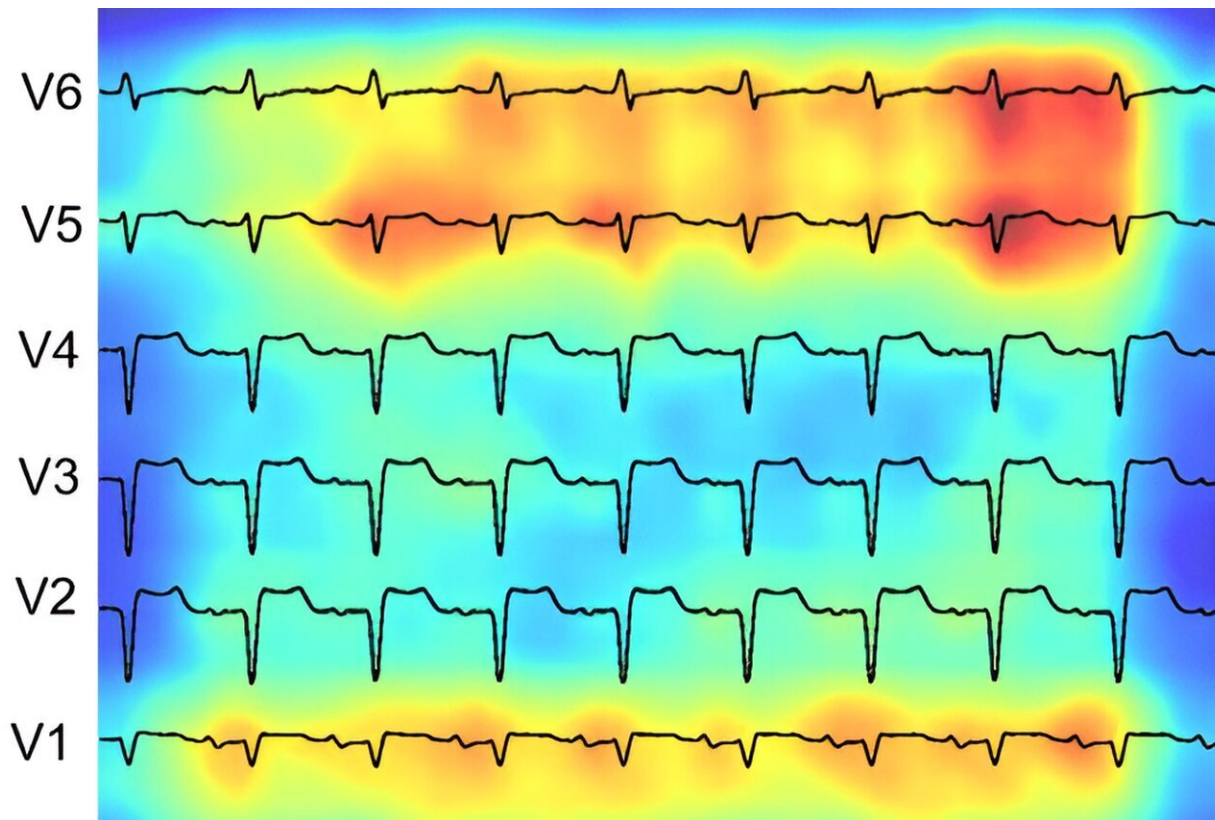


# AI-driven study redefines right heart health assessment with novel predictive model

January 4 2024

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A deep learning-based ECG analysis tool is able to identify patients at high risk for poor right ventricular function. Areas deemed important by the AI for prediction are highlighted in increasing shades of red. Credit: Duong, et al., *Journal of the American Heart Association*

In a milestone study, researchers from the Icahn School of Medicine at

Mount Sinai have harnessed the power of artificial intelligence (AI) to enhance the assessment of the heart's right ventricle, which sends blood to the lungs.

Conducted by a team using AI-enabled electrocardiogram (AI-ECG) analysis, the research demonstrates that electrocardiograms can effectively predict right-side heart issues, offering a simpler alternative to complex imaging technologies and potentially enhancing patient outcomes.

The paper, titled "Quantitative prediction of right ventricular size and function from the electrocardiogram," is [published](#) in the December 29 online issue of *Journal of the American Heart Association*.

"We aimed to find a better way to assess the health of the heart's right ventricle, focusing on its ability to pump blood and its size. Traditional methods fall short, which prompted us to explore AI-ECG analysis as a potential solution," says co-first author Son Q. Duong MD, MS, Assistant Professor of Pediatrics (Pediatric Cardiology) at Icahn Mount Sinai.

"This novel method could expedite the identification of heart problems, especially in the right ventricle, and potentially lead to earlier and more effective treatment. It holds particular importance for patients with congenital heart disease, who often face issues in the [right ventricle](#)."

The study trained a deep-learning ECG (DL-ECG) model using harmonized data from 12-lead ECGs and [cardiac magnetic resonance](#) imaging (MRI) measurements. It was conducted on a large sample from the UK Biobank and validated at multiple [health centers](#) across the Mount Sinai Health System, measuring its accuracy in predicting heart conditions and its impact on patient survival rates.

"This innovative approach departs significantly from traditional methods. Unlike other studies, this research predicts something not easily quantifiable by other common tests, such as the heart ultrasound," says co-first author Akhil Vaid, MD, Clinical Instructor of Medicine (Data-Driven and Digital Medicine) at Icahn Mount Sinai.

The investigators say that while the use of artificial intelligence allows for more precise heart information from commonly available tools, it's in an early stage and doesn't replace advanced diagnostics. Further work is needed to ensure the tool's safety and correct applicability.

In addition, the study's predictions may vary across populations, relying on existing ECG and MRI data with inherent limitations. Its application in everyday clinical practice requires further exploration, cautioned the researchers.

"Our findings mark a significant leap forward in right [heart](#) health assessment, offering a glimpse into a future where AI plays a pivotal role in early and accurate diagnosis. The study stands out for applying AI to standard ECG data, predicting right ventricular function and size numerically," says senior author Girish Nadkarni, MD.

Future research plans include external validation of the DL-ECG models in diverse populations, ensuring broader applicability and confirming clinical usefulness in conditions like pulmonary hypertension, [congenital heart disease](#), and various forms of cardiomyopathy.

**More information:** Son Q. Duong et al, Quantitative Prediction of Right Ventricular Size and Function From the ECG, *Journal of the American Heart Association* (2023). [DOI: 10.1161/JAHA.123.031671](https://doi.org/10.1161/JAHA.123.031671)

Provided by The Mount Sinai Hospital

Citation: AI-driven study redefines right heart health assessment with novel predictive model (2024, January 4) retrieved 28 April 2024 from <https://medicalxpress.com/news/2024-01-ai-driven-redefines-heart-health.html>

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