

# Advances in detection of erratic heart rhythm

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Credit: AI-generated image ([disclaimer](#))

New research supported by the euCanSHare and HealthyCloud projects has revealed that a model combining ECG features and cardiac imaging-derived radiomics data improves the detection of AF in women. The study was published in the journal *Scientific Reports*.

AF is a heart condition characterized by an irregular and often abnormally fast heart rhythm. The most commonly encountered cardiac

arrhythmia, it happens when abnormal electrical impulses suddenly occur in the heart's upper chambers, or atria, causing them to beat out of sync with the heart's lower chambers, or ventricles. AF can cause problems such as dizziness, shortness of breath and tiredness, and it also increases the risk of stroke and heart failure.

The main clinical tool for diagnosing AF is the ECG. It is widely used to spot abnormalities in heart rhythms and waveforms. However, as the authors report in their study, "an ECG recorded at a single time point may not detect individuals with paroxysmal AF," which is intermittent AF episodes that end within seven days, either on their own or with treatment.

Another tool, [cardiovascular magnetic resonance](#) (CMR) imaging, plays an important role in assessing the function and structure of the cardiovascular system. Additionally, CMR radiomics has attracted a lot of interest because of its potential to enhance [diagnostic accuracy](#) through its ability to extract a large number of features from medical images using data characterization algorithms.

## **Better than ECG alone**

Now, if ECG features and CMR radiomics were to be combined, would this improve AF detection? This is the question the researchers sought to answer. They used information from a large-scale health database called the UK Biobank. A total of 32,121 participants with an average age of 63 years were included in the study. An estimated 51% were female. Of all the participants, 495 had prevalent AF. "The AF cohort included a greater proportion of men (69.3%), slightly older individuals with greater comorbidity burden, and higher BMI," the study reports.

The research team found that their integrative model combining radiomics and ECG had better results than ECG alone, especially in

women. "ECG had a lower performance in women than men ... but adding radiomics features, the accuracy of the model was able to improve significantly." Adding radiomics led to a considerable increase in sensitivity in the case of women, resulting in improved detection of AF events.

"Our findings provide novel insights into AF-related electro-anatomic remodeling and its variations by sex. The integrative radiomics-ECG model also presents a potential novel approach for earlier detection of AF," the authors conclude.

The euCanSHare (An EU-Canada joint infrastructure for next-generation multi-study heart research) project is developing the first centralized and secure platform for [data sharing](#) and analysis for cardiovascular research. By integrating major cardiovascular data sources from Europe and Canada, the project will accelerate data-driven research efforts in the field of cardiology. The HealthyCloud (HealthyCloud—Health Research & Innovation Cloud) project aims to develop a strategic agenda that includes a ready-to-implement roadmap for the [health research](#) and innovation cloud ecosystem.

**More information:** Esmeralda Ruiz Pujadas et al, Atrial fibrillation prediction by combining ECG markers and CMR radiomics, *Scientific Reports* (2022). [DOI: 10.1038/s41598-022-21663-w](https://doi.org/10.1038/s41598-022-21663-w)

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