- TIN INTERNET MEDIC 5
- BS Bach Tuyet -ECG

DG Alerts

Oct 15, 2025

GLP-1, SGLT2 drugs outperform older diabetes medications in cardiovascular protection

In a large US comparative effectiveness study of nearly 300,000 adults with type 2 diabetes, sustained use of glucagon-like peptide-1 receptor agonists (GLP-1 RAs) was associated with the lowest risk of major adverse cardiovascular events (MACEs), followed by sodium-glucose cotransporter-2 (SGLT2) inhibitors, sulfonylureas, and dipeptidyl peptidase-4 (DPP-4) inhibitors.

The cardiovascular benefits of GLP-1RAs were especially pronounced in patients with atherosclerotic cardiovascular disease (ASCVD), heart failure, or kidney impairment, offering important guidance for clinicians seeking to reduce cardiovascular risk through diabetes medication choice.

“This study evaluated the head-to-head comparative effectiveness of initiation followed by sustained use of 4 classes of glucose-lowering medications using principled causal inference methods combined with machine learning adjustment for baseline and time-varying covariates,” wrote Romain Neugebauer, PhD, Kaiser Permanente Northern California, Pleasanton, California, and colleagues. “MACE risk varied significantly across medication classes, with the best results observed with GLP-1RAs followed by SGLT2 inhibitors, sulfonylureas, and DPP4 inhibitors.”

This comparative effectiveness study included 296,676 adults with type 2 diabetes who were members of 6 large US health care delivery systems and initiated treatment with 1 of the 4 diabetes medication classes between January 1, 2014, and December 31, 2021. Using advanced machine learning and causal inference methods within a trial emulation framework, the researchers analysed the risk of MACE, defined as nonfatal myocardial infarction, nonfatal stroke, or cardiovascular death, over 2.5 years.

Sustained use of GLP-1RAs was associated with the lowest 2.5-year MACE risk, followed by SGLT2 inhibitors, sulfonylureas, and DPP4 inhibitors. The risk difference between DPP4 inhibitors and sulfonylureas was 1.9%, and between SGLT2 inhibitors and GLP-1RAs was 1.5%.

The benefits of GLP-1RAs over SGLT2 inhibitors were most pronounced in adults aged ≥65 years, in patients with existing ASCVD or heart failure, and those with mild-to-moderate kidney impairment. Younger adults (<50 years) did not experience this additional benefit.

Agent-specific analyses of exenatide, liraglutide, and semaglutide showed no significant differences, though newer GLP-1RAs may offer greater benefit.

“These results, along with consideration of collateral clinical effects, cost, and availability, may inform treatment decisions for adults with type 2 diabetes,” the authors concluded.

Reference:
https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2840139

Tin 1

Common triggers of elevated BNP and NT-proBNP

Cardiac conditions
- Heart failure with reduced ejection fraction
- Heart failure with preserved ejection fraction
- Right ventricular failure
- Valvular heart disease
- Diseases of myocardium (left ventricular hypertrophy, myocarditis)
- Coronary artery disease
- Myocardial trauma (contusion, cardiac surgery, cardioversion)
- Arrhythmias (atrial fibrillation)
- Pericardial disease (associated with normal or elevated levels)

Pulmonary disease
- Acute pulmonary embolism (see right ventricular failure above)
- Pulmonary hypertension
- Obstructive sleep apnea
- Infection
- Chronic obstructive lung disease

Neurologic disorders
- Ischemic stroke
- Hemorrhagic stroke

Critical illness
- Sepsis
- Burns
- Transfusion associated circulatory overload (TACO)

Other
- Renal insufficiency
- Anemia
- Cirrhosis
- Hyperaldosteronism
- Hypertension

TIN 1

PubMed®

Clin Epidemiol. 2021 Apr 7:13:265-272. doi: 10.2147/CLEP.S303560. eCollection 2021.

Incidence of Atrial Fibrillation in Persons with Very High Serum Levels of N-Terminal Pro-B-Type Natriuretic Peptide: The Multi-Ethnic Study of Atherosclerosis

Noel S Weiss [1], Esther Perez Trejo [2], Richard Kronmal [3], Joao Lima [4], Susan R Heckbert [1]

Abstract

Objective: While persons in the upper fourth or fifth of the distribution of serum levels of N-terminal pro-B type natriuretic peptide (NT-proBNP) are at a sharply increased risk of developing atrial fibrillation, their absolute risk of this condition (about 20 per 1000 per year) is not clearly high enough to justify prevention or early detection measures. We sought to determine whether the incidence of atrial fibrillation among persons with VERY high levels of NT-proBNP might be sufficiently high to warrant further action.

Design and setting: Among persons enrolled in the Multi-Ethnic Study of Atherosclerosis, we documented rates of new onset atrial fibrillation in those with increasingly high serum levels of NT-proBNP.

Results: There was a monotonic increase in the incidence of atrial fibrillation with increasing serum level of NT-proBNP, reaching rates of about 50-70 cases per 1000 person-years among those in the upper 3.1% of the distribution (above 422 pg/mL). In this group the incidence tended to be somewhat higher still among persons who were at increased risk of atrial fibrillation for other reasons (eg older age), but in no subgroup did the incidence reach 100 per 1000 person-years.

Conclusion: Serum levels of NT-proBNP have a considerable ability to predict the development of atrial fibrillation. However, the value of screening middle aged and older adults for these levels hinges largely on the ability of interventions in screen-positive people to lead to a reduced incidence of atrial fibrillation and its complications.

TIN 2

General HF Signs:

Tachycardia:

An elevated heart rate is often an early sign of HF, particularly in hypertensive patients.

Atrial Fibrillation:

This irregular heart rhythm can develop due to atrial enlargement, a common finding in HF.

Left-Axis Deviation:

This can indicate left ventricular hypertrophy, a thickening of the heart muscle that can occur in response to HF.

P wave abnormalities:

P waves, representing atrial depolarization, can be enlarged (P mitrale) or peaked (P pulmonale) due to atrial enlargement.

Prolonged PR interval:

This can be a sign of AV block, which can impact the heart's ability to pump efficiently.

Wide QRS complexes:

These indicate a delay in ventricular depolarization, potentially due to ventricular dyssynchrony.

Specific HF Types:

Heart Failure with Reduced Ejection Fraction (HFrEF):

Prolonged QRS duration, left-axis deviation, left ventricular hypertrophy, ST/T-wave abnormalities, and left bundle branch block can be associated with HFrEF.

frontiers
in Digital Health

‣ Front Digit Health. 2021 Feb 25;2:584555. doi: 10.3389/fdgth.2020.584555

Identifying Heart Failure in ECG Data With Artificial Intelligence—A Meta-Analysis

Dimitri Grün [1], Felix Rudolph [1], Nils Gumpfer [2], Jennifer Hannig [2], Laura K Elsner [1], Beatrice von Jeinsen
Christian W Hamm [1,3], Andreas Rieth [3], Michael Guckert [2,4], Till Keller [1,3,*]

‣ Author information ‣ Article notes ‣ Copyright and License information

PMCID: PMC8521986 PMID: 34713056

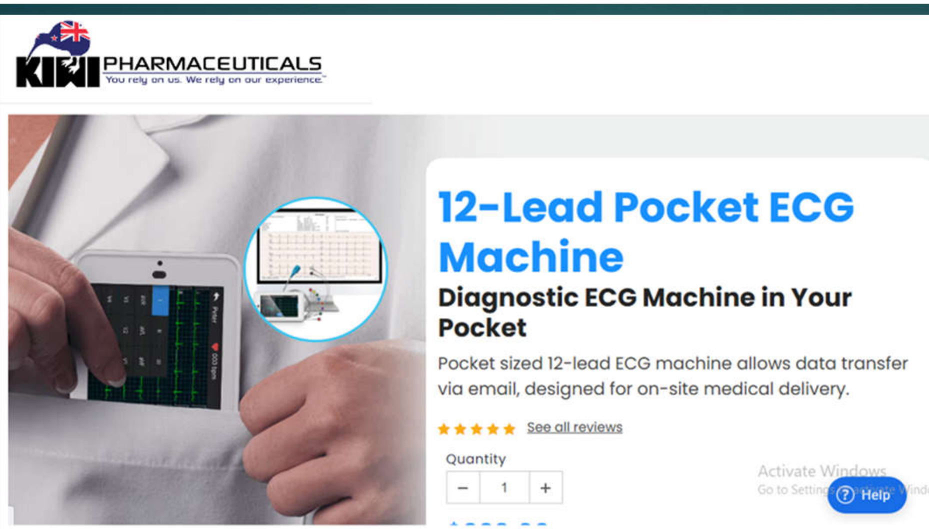
Abstract

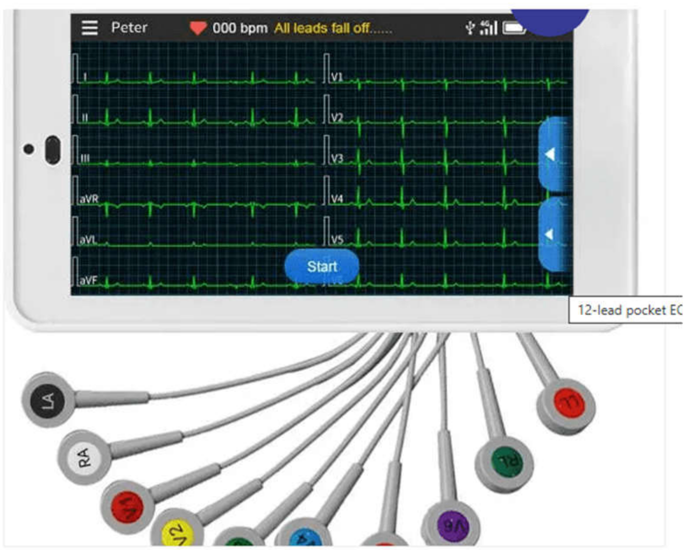
Introduction: Electrocardiography (ECG) is a quick and easily accessible method for diagnosis and screening of cardiovascular diseases including heart failure (HF). Artificial intelligence (AI) can be used for semi-automated ECG analysis. The aim of this evaluation was to provide an overview of AI use in HF detection from ECG signals and to perform a

Methods and Results: An independent comprehensive search of the PubMed and Google Scholar database was conducted for articles dealing with the ability of AI to predict HF based on ECG signals. Only original articles published in peer-reviewed journals were considered. A total of five reports including 57,027 patients and 579,134 ECG datasets were identified including two sets of patient-level data and three with ECG-based datasets. The AI-processed ECG data yielded areas under the receiver operator characteristics curves between 0.92 and 0.99 to identify HF with higher values in ECG-based datasets. Applying a random-effects model, an sROC of 0.987 was calculated. Using the contingency tables led to diagnostic odds ratios ranging from 3.44 [95% confidence interval (CI) = 3.12–3.76] to 13.61 (95% CI = 13.14–14.08) also with lower values in patient-level datasets. The meta-analysis diagnostic odds ratio was 7.59 (95% CI = 5.85–9.34).

Conclusions: The present meta-analysis confirms the ability of AI to predict HF from standard 12-lead ECG signals underlining the potential of such an approach. The observed overestimation of the diagnostic ability in artificial ECG databases compared to patient-level data stipulate the need for robust prospective studies.

TIN 3





PHYSICAL DETAILS

- **Device Dimensions:** 134 mm × 74 mm × 17 mm
- **Weight:** 250g (unit & battery in total)
- **Display:** 4.46 inches color LCD touch screen
- **Screen Resolution:** 480 × 854 pixels

MEDICAL DEVICE DEPOT

First FDA Approved 12-Lead ECG Device Works Wirelessly with iPads, iPods & iPhones

First FDA Approved 12-Lead ECG Device Works Wirelessly with iPads, iPods & iPhones

Jun 7th 2024

For the first time, using a standard 10-lead patient cable, medical professionals can acquire a 12-lead ECG using an iPad, iPod or iPhone on the newly released CardioCard Mobile.

Ellicott City, MD, March 12, 2015: Medical Device Depot, Inc. announces the release of the first portable 12-lead interpretative ECG machine available for use with the Apple iPad, iPhone or iPod. The CardioCard Mobile is the first of its kind, giving healthcare practitioners the ability to perform ECG testing by turning a hand-held Apple device into a fully-functioning ECG machine. It is now possible to provide expert ECG analysis to patients both in the doctor's office and halfway across the world. The CardioCard Mobile is a device that will arm healthcare providers with the means to save more lives by providing more accurate test results on par with hospital-grade ECG machines at an affordable price.

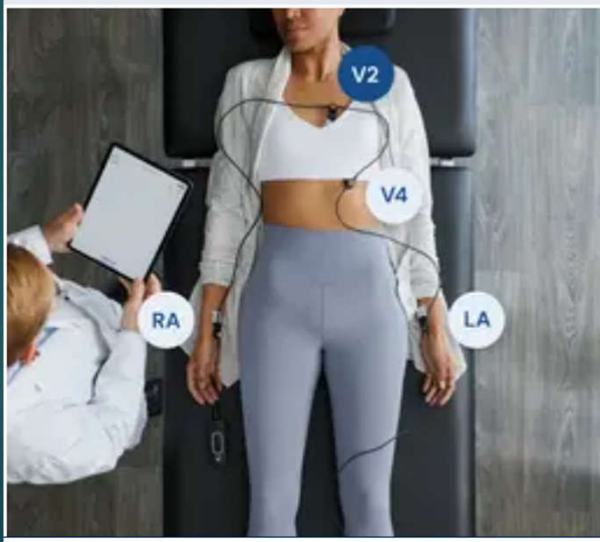
TIN 4

MOBILE 12-LEAD ECG SYSTEM

Introducing Kardia 12L

The easiest way to acquire a 12-lead ECG, making critical data accessible in more places, more often.

Learn how Kardia 12L can transform your practice with our free guide.



We challenged our engineers, clinicians, and data scientists to rethink the 12-lead ECG. The resulting technology underscores our commitment to transform cardiovascular care — simplifying and expediting access to critical cardiac data.

SEE HOW

July 18, 2024 — AliveCor, a global leader in AI-powered cardiology, today announced that the American Medical Association (AMA) has granted new Category III Current Procedural Terminology (CPT) codes that are applicable to the company's Kardia 12L ECG System, which received FDA clearance in June 2024. In accordance with the AMA semi-annual early release schedule, the new codes will be effective January 1st, 2025 and published in the 2025 CPT Code book.

CPT codes are widely used by government payers, including Medicare and Medicaid, and commercial insurance companies to identify healthcare services and procedures for reimbursement. Category III CPT codes allow data collection for new or emerging healthcare approaches and establish a foundation that facilitates reimbursement pathways for healthcare providers.

The following Category III codes for Kardia 12L were accepted by the CPT Editorial Panel meeting for the 2025 CPT production cycle:

- 0903T Electrocardiogram, Algorithmically generated 12-lead ECG from a reduced-lead ECG; with interpretation and report
- 0904T ECG ALG 12 Algorithmically generated 12-lead ECG from a reduced-lead ECG; tracing only
- 0905T Electrocardiogram, Algorithmically generated 12-lead ECG from a reduced-lead ECG; interpretation and report only

"Cardiovascular disease continues to be the leading cause of death in the US, and this recognition from the AMA brings new momentum towards improving access to life-saving cardiac care, including our latest technology," said Sanjay Voleti, CBO of AliveCor. "Our AI-powered, portable Kardia 12L is AliveCor's first device developed exclusively for use by healthcare providers, paving the way to bring this clinically-validated ECG technology to patients anytime and anywhere."

About Kardia 12L ECG and KAI 12L AI Technology

Kardia 12L ECG System combines the power of KAI 12L's AI technology and the pocket-sized Kardia 12L, to enable faster, easier detection of life-threatening cardiac conditions. KAI 12L is the world's first AI to detect 35 cardiac determinations, including heart attacks, using a reduced leadset.

Kardia 12L ECG System is battery-operated, weighs just 0.3 pounds – making it significantly smaller, more portable and easier to use than conventional 12-lead ECGs. Its streamlined leadset also makes it less invasive for patients, who do not need to fully disrobe during a reading. The device requires minimal self-guided training and is simpler and faster to use than standard 12-lead ECG machines. These features put 12-lead ECG data within reach of more healthcare providers than ever before in a variety of healthcare facilities and acute settings, including primary and urgent care offices, employer clinics, and other under-resourced or rural venues.

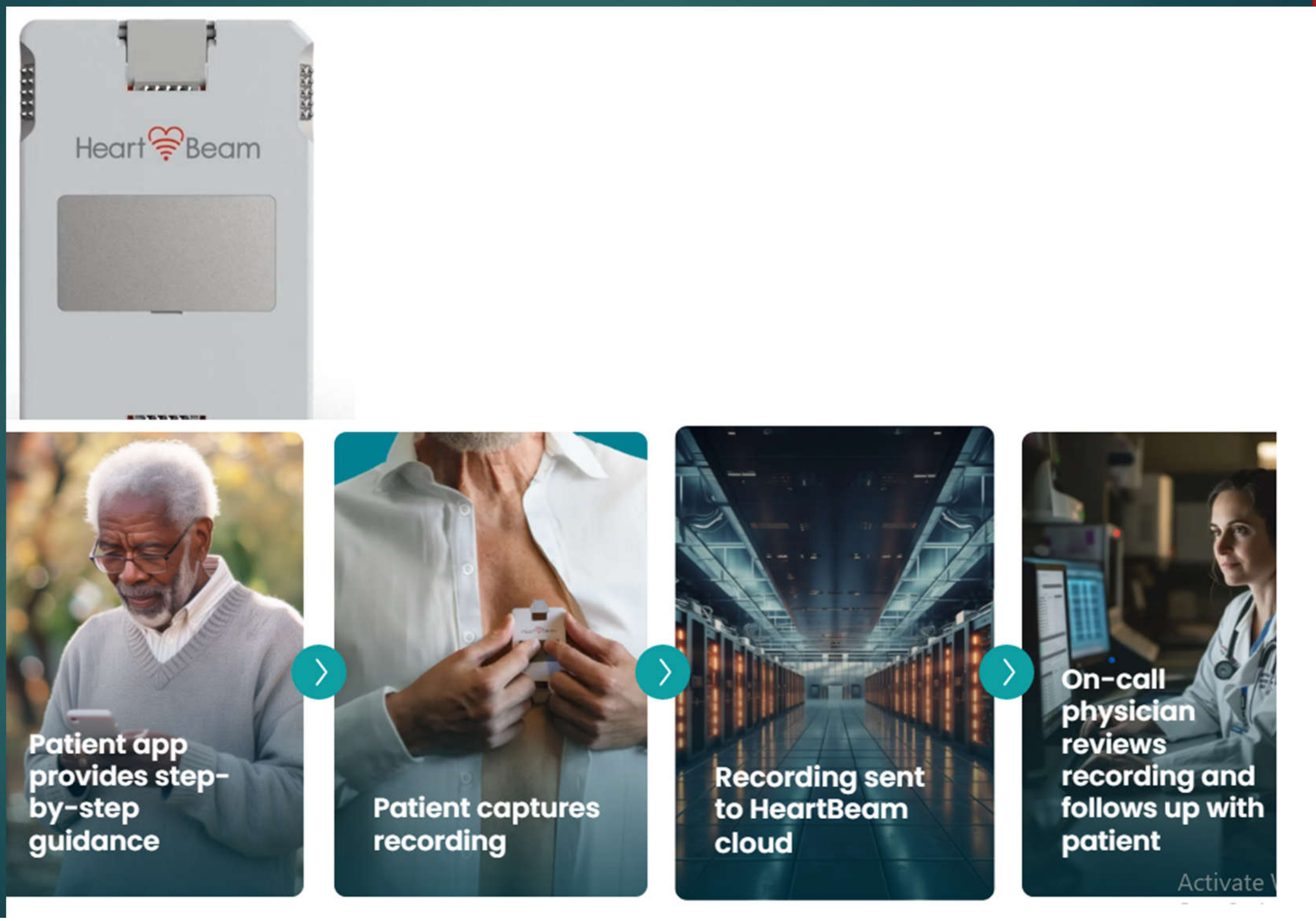
For more information: www.alivecor.com

Comparison to conventional 12-lead results

Recent data presented at Heart Rhythm Society 2024, "Diagnostic accuracy of a mobile, artificial intelligence-guided, 12-lead ECG device," showed results from a clinical study on 200 patients. See the side-by-side ECG reports from a standard 12-lead compared to one from the Kardia 12L for the same patients.

The study found that Kardia 12L enabled rapid acquisition of resting ECG information, and concluded "this approach has significant implications for rapid ECG diagnosis in clinical practice."

TIN 5



HeartBeam
Patient app provides step-by-step guidance
Patient captures recording
Recording sent to HeartBeam cloud
On-call physician reviews recording and follows up with patient

TIN 6

DAIC
Diagnostic and Interventional Cardiology

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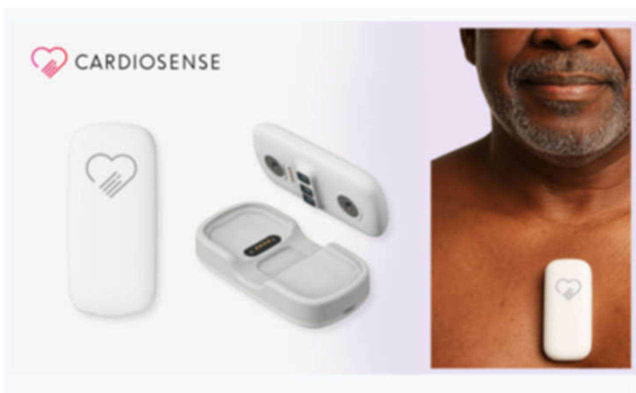
News | Wearables | July 30, 2025

Cardiosense's CardioTag Device Gets FDA 510(k) Clearance for Advanced Cardiac Function Monitoring

The CardioTag device fuses multiple sensing modalities to capture insights about the relationship between cardiac mechanics, electrical impulses and blood flow — and can be used by AI algorithms to assess cardiac pressures and volume status



July 30. 2025 — Cardiosense, a medical AI company, recently announced that the U.S. Food and Drug Administration (FDA) has granted 510(k) clearance for the CardioTag device, a multimodal, wearable sensor that simultaneously captures high-fidelity electrocardiogram (ECG), photoplethysmogram (PPG), and seismocardiogram (SCG) signals, empowering clinicians and patients with a comprehensive noninvasive solution to assess cardiac function across care settings.

“Our team is thrilled to achieve this critical milestone as part of our mission to advance cardiac care,” said Amit Gupta, Co-founder and CEO of Cardiosense. “Traditionally, noninvasive cardiac monitoring has primarily focused on ECG and rhythm analysis. With the CardioTag device, we are adding an entirely new dimension by also capturing physiological data on cardiac mechanics and blood flow, providing unprecedented visibility into a patient’s cardiac function, hemodynamics, and volume status.”

The FDA clearance authorizes the CardioTag device for noninvasive measurement of SCG, ECG, and PPG signals as well as heart rate (HR) and pulse rate (PR). SCG is a noninvasive technique that measures subtle vibrations on the chest wall associated with cardiac mechanical activity. Clinical studies conducted by Cardiosense have demonstrated that analyzing the SCG waveform alongside ECG and PPG signals can be used to accurately assess cardiac timing intervals such as left ventricular ejection time (LVET)—a measure of how efficiently the heart is pumping blood—compared to the current standard-of-care. Cardiosense will begin exploring pilots with the CardioTag device paired with AI algorithms using the SCG, ECG, or PPG data from the device.

"The CardioTag clearance marks a pivotal step toward clinical adoption and broader access to pressure-guided treatment," said Andrew Carek, Co-founder and CTO of Cardiosense. "We're excited for the foundational role that the CardioTag device will play in building a noninvasive cardiac AI platform, as the signals it collects provide a rich data input upon which AI models for cardiovascular parameters can be developed, such as our pulmonary capillary wedge pressure (PCWP) algorithm."

A recent prospective, multicenter study, published in the *Journal of the American College of Cardiology: Heart Failure* and presented as Late-Breaking Science at the American Heart Association's 2024 Scientific Sessions, demonstrated that Cardiosense's AI algorithm for PCWP, which received FDA Breakthrough Device designation, could estimate PCWP values with accuracy on par with implantable hemodynamic sensors in patients with heart failure with reduced ejection fraction (HFrEF). Upon regulatory approval for the PCWP Analysis Software, the algorithm will be paired with the CardioTag device for advanced heart failure management.

The CardioTag device was built on years of clinical research and cross-disciplinary innovation spanning biomedical engineering, cardiovascular medicine, and data science. "This is a deeply meaningful milestone. For over a decade, we've worked to turn a bold idea into a clinically reliable, noninvasive technology that truly meets patients where they are. With FDA clearance, we're taking a major step toward bringing precision hemodynamic insights into everyday patient care—no matter the setting," said Omer Inan, PhD, Co-founder and Chief Scientific Officer at Cardiosense.

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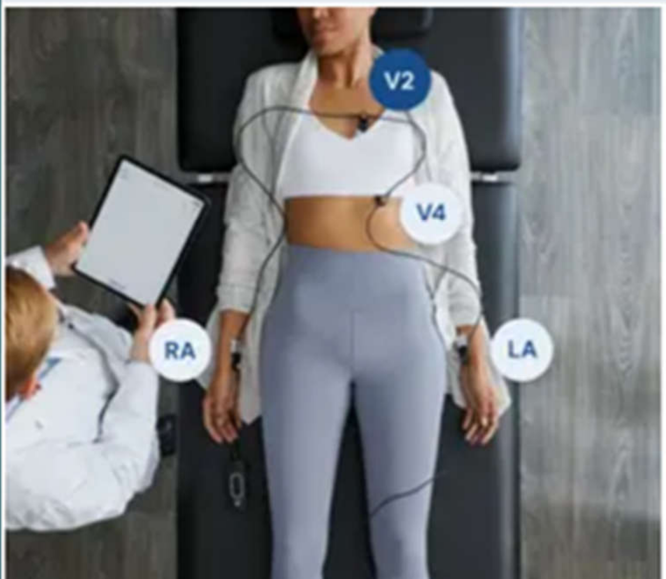

We challenged our engineers, clinicians, and data scientists to rethink the 12-lead ECG. The resulting technology underscores our commitment to transform cardiovascular care — simplifying and expediting access to critical cardiac data.

SEE HOW

- THAM KHAO:
- 1. https://www.linkedin.com/pulse/spandan-ecg-machine-both-accurate-convenient-thanks-its-thakur
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