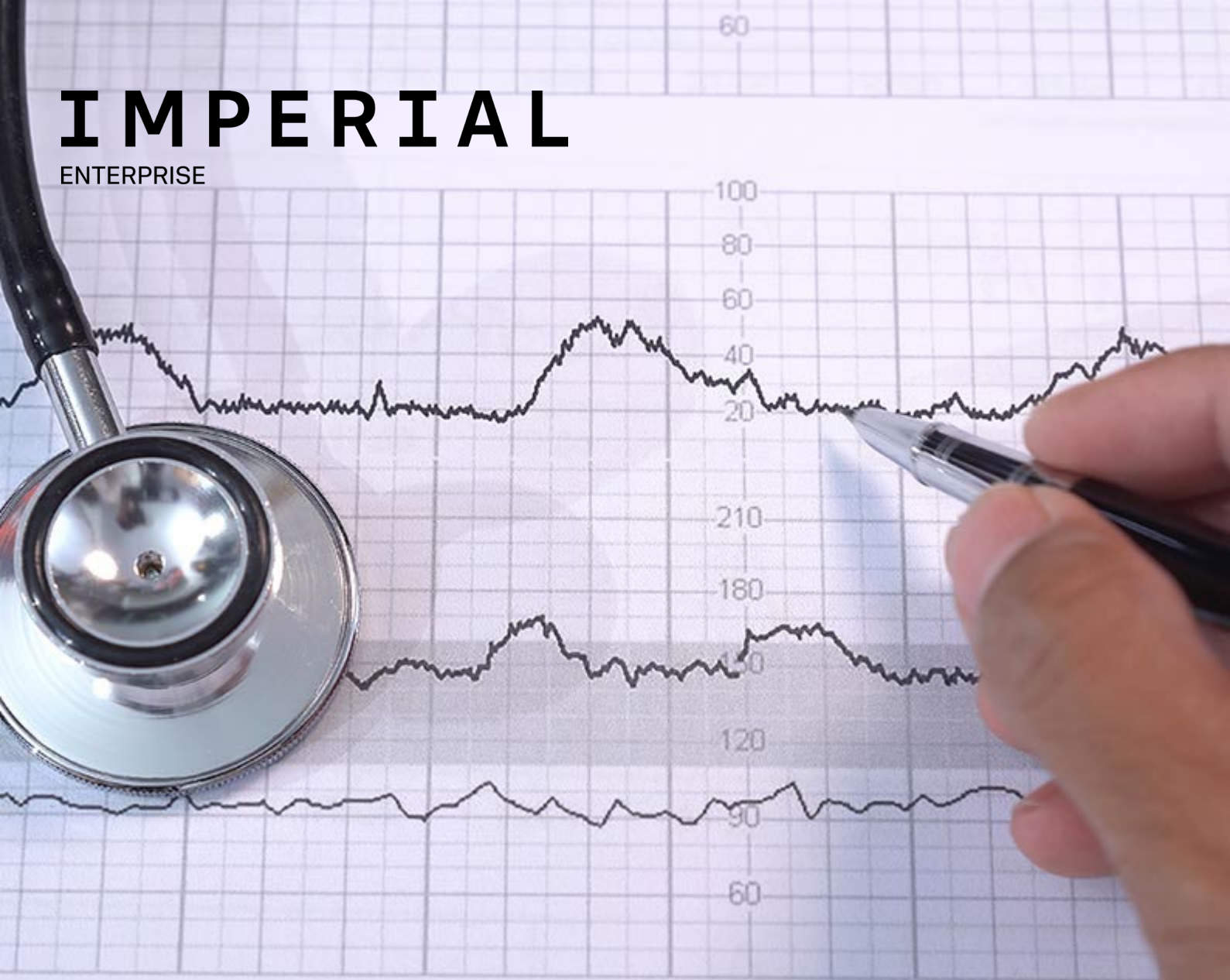


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Low-cost, simple-to-use methods for screening and monitoring of heart failure: for use in primary care, at home and in wearables

A non-invasive approach designed to generate clinically useful assessment of heart failure type and severity from simple measurements, supporting scalable heart-failure screening and monitoring by non-specialists.

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Technology reference: 11937

Intellectual property information
UK Patent Application No. 2602232.7

Inventor information
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Proposed Uses

The technology is intended for GP/community triage and primary-care screening, and for secondary-care triage where rapid heart failure stratification is needed without specialist acquisition or interpretation. It could be developed for home use and for wearables. It can be packaged as a software analysis module running on data from various modalities, enabling scalable deployment across frontline pathways.

Problem addressed

Late or missed heart failure diagnosis is common in primary care because symptoms are non-specific and current screening tools are imperfect: ~75% of UK heart failure patients are first diagnosed after acute hospitalisation, despite >40% having prior GP visits. Misdiagnosis and delay is particularly severe for women. BNP/NT-proBNP testing is recommended for screening but generates >70% false positives and misses a significant fraction of HFpEF, driving over-referral and leaving cases undetected.

Commercially, this creates pull for frontline, point-of-care/low-burden heart failure screening. The heart failure POC & LOC devices market was estimated at USD 102.3M in 2024 and is projected to reach USD 251.0M by 2030, reflecting growing demand for scalable, easy-to-use screening and triage tools. The BNP/NT-proBNP testing market was estimated at USD 1.92B in 2024 (projected USD 2.91B by 2030), illustrating the scale of spend on screening methods that still leave clinical gaps. The monetisation gate is clear: a solution must be simple and rapid enough for primary care, reduce unnecessary referrals, and provide actionable stratification that complements echocardiography capacity.

Technology Overview

The invention is a method for determining a subject's heart failure status from a pulse-wave profile obtained in one or more blood vessels. It focuses on parameters linked to the shape of the decompression wave (D-wave) and the timing and/or intensity of the compression wave (S-wave).

It can be implemented as software on devices already acquiring suitable data, including optical PPG (a prototype device of this type is pictured overleaf), oscillometric pressure cuffs, tonometry, and POCUS (among others), allowing the analytics engine to be integrated across different product form factors and care settings. Simultaneous acquisition of ECG increases accuracy.

A key differentiator is measurement simplification: the pulse-wave profile may be obtained from measurements of changes in vascular geometry only, vascular pressure only, or vascular velocity only, rather than requiring simultaneous multi-variable measurement, enabling lower-burden implementations while retaining clinically relevant discriminatory power.

This is particularly valuable where frontline tools must be cheap, fast and without need for training, supporting deployment in primary care, clinic and hospital triage, acute pathways, and resource-limited settings.

Inventor information

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Benefits

Cost and efficiency

- **Reduces referral friction:** supports triage before echocardiography.
- **Low-burden deployment:** compatible with existing sensing routes.

Performance and sensitivity

- **HF subtype potential:** can support HFrEF vs HFpEF separation.

Commercial and strategic

- **POC market pull:** aligned with heart failure POC/LOC growth (2024–2030).
- **Complements BNP pathways:** targets specificity and HFpEF screening gaps.

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Figure 1. Low-cost, standalone opto-electronic device capable of measuring vascular diameter and ECG simultaneously, and deriving heart failure status from them.

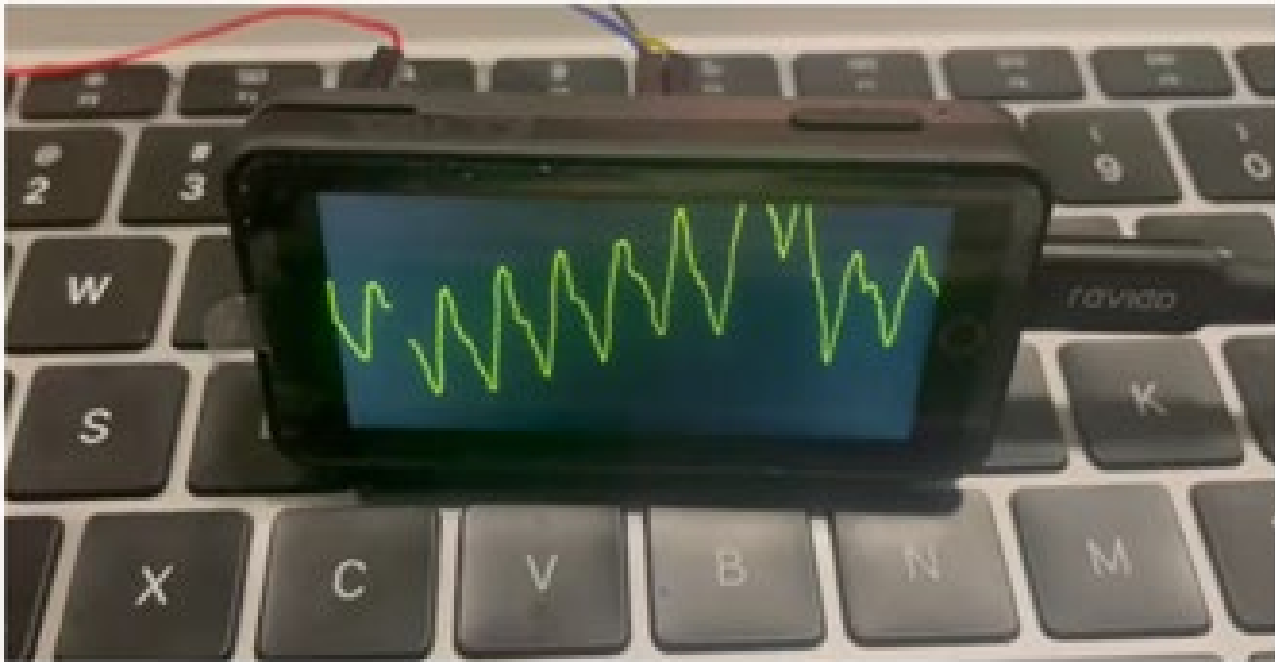


Figure 2. Receiver operating characteristic for assessing HF_rEF by measuring S-wave timing. Echocardiography was used to obtain ground truth. Performance is better than the BNP/NT-proBNP tests.

