# UK researchers unveil AI-powered stethoscope that detects heart conditions within seconds



Researchers in the UK have developed an artificial intelligence (AI)-powered stethoscope capable of detecting major heart conditions such as heart failure, heart valve disease, and abnormal heart rhythms within seconds. The innovative device, about the size of a playing card, replaces the traditional chest piece with a microphone that captures subtle heart sounds imperceptible to the human ear. It also records an electrocardiogram (ECG), transmitting this data to the cloud where AI algorithms, trained on extensive patient data, analyse the signals for early signs of heart problems. This advancement could revolutionise early diagnosis and treatment, potentially saving lives by facilitating timely interventions.

A large-scale study conducted by Imperial College London and Imperial College Healthcare NHS Trust demonstrated the AI stethoscope’s effectiveness. Over 12,000 patients across 96 general practitioner (GP) surgeries in west and north-west London were tested with the device and compared to over 10,000 patients from 109 surgeries where traditional methods were used. Those assessed with the AI-enhanced stethoscope were found to be more than twice as likely to receive a heart failure diagnosis within the following 12 months. Furthermore, abnormal heart rhythms, which often cause no symptoms but can heighten stroke risk, were detected 3.5 times more effectively, while detection of heart valve disease nearly doubled.

The clinical potential of this technology lies in its ability to identify heart conditions at much earlier stages than currently possible. Dr Sonya Babu-Narayan, clinical director at the British Heart Foundation and consultant cardiologist, described the AI stethoscope as a “real game-changer” that modernises the traditional 200-year-old tool for the 21st century. She emphasised that earlier diagnoses enable patients to receive critical treatment sooner, preventing emergencies and improving long-term health outcomes.

The AI stethoscope quickly delivers diagnoses, with sensitivity and specificity comparable to traditional diagnostic tests, but achieved non-invasively in a matter of seconds during routine GP visits. Studies involving the Eko DUO smart stethoscope combined with AI algorithms have shown detection rates of 91% sensitivity and 80% specificity for heart failure, underscoring its reliability and potential to transform primary care diagnostics.

The AI technology also shines in detecting early structural changes in heart valves from ECG readings, identifying potential issues before symptoms emerge or ultrasound scans can detect abnormalities. This capability supports proactive management strategies, potentially reducing the incidence of severe valve diseases and their complications by allowing timely interventions before the condition worsens.

Encouraged by these promising findings, initiatives like Imperial College London’s TRICORDER programme are now rolling out AI-enabled smart stethoscopes in 100 GP clinics across London and Wales. This deployment aims to establish whether widescale adoption of the device can improve diagnostic accuracy, reduce NHS costs, and improve patient outcomes by catching heart conditions earlier in primary care settings.

The results have been shared at major medical venues, including the European Society of Cardiology’s annual congress in Madrid, highlighting the broad medical community’s interest in the technology’s future. Plans are underway to expand the use of AI stethoscopes to additional GP practices in south London, Sussex, and Wales, signposting a transition towards more tech-enabled, preventative healthcare.

If widely implemented, AI stethoscopes could signify a pivotal shift in cardiovascular care, enabling earlier intervention, reducing preventable hospital admissions, and ultimately saving lives through faster, more accurate detection of heart disease at the front lines of healthcare.

### 📌 Reference Map:

* Paragraph 1 – [[1]](https://www.bbc.com/news/articles/c2l748k0y77o?at_medium=RSS&at_campaign=rss), [[3]](https://www.imperial.ac.uk/news/232954/artificial-intelligence-tool-could-help-gps/), [[5]](https://www.imperial.ac.uk/news/232954/artificial-intelligence-tool-could-help-gps/)
* Paragraph 2 – [[1]](https://www.bbc.com/news/articles/c2l748k0y77o?at_medium=RSS&at_campaign=rss), [[2]](https://www.imperial.ac.uk/news/249316/ai-stethoscope-rolled-100-gp-clinics/), [[7]](https://www.imperial.ac.uk/news/249316/ai-stethoscope-rolled-100-gp-clinics/)
* Paragraph 3 – [[1]](https://www.bbc.com/news/articles/c2l748k0y77o?at_medium=RSS&at_campaign=rss)
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* Paragraph 5 – [[4]](https://www.imperial.ac.uk/news/266333/ai-identify-hidden-heart-valve-defects/), [[6]](https://www.imperial.ac.uk/news/266333/ai-identify-hidden-heart-valve-defects/)
* Paragraph 6 – [[2]](https://www.imperial.ac.uk/news/249316/ai-stethoscope-rolled-100-gp-clinics/), [[7]](https://www.imperial.ac.uk/news/249316/ai-stethoscope-rolled-100-gp-clinics/)
* Paragraph 7 – [[1]](https://www.bbc.com/news/articles/c2l748k0y77o?at_medium=RSS&at_campaign=rss), [[7]](https://www.imperial.ac.uk/news/249316/ai-stethoscope-rolled-100-gp-clinics/)

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## Bibliography

1. <https://www.bbc.com/news/articles/c2l748k0y77o?at_medium=RSS&at_campaign=rss> - Please view link - unable to able to access data
2. <https://www.imperial.ac.uk/news/249316/ai-stethoscope-rolled-100-gp-clinics/> - Researchers at Imperial College London have initiated the TRICORDER programme, deploying AI-enabled smart stethoscopes to 100 GP clinics in London and Wales. This trial aims to assess whether these devices can enhance early diagnosis of heart failure, potentially reducing NHS costs and improving patient outcomes. ([imperial.ac.uk](https://www.imperial.ac.uk/news/249316/ai-stethoscope-rolled-100-gp-clinics/?utm_source=openai))
3. <https://www.imperial.ac.uk/news/232954/artificial-intelligence-tool-could-help-gps/> - A novel AI algorithm, combined with the Eko DUO smart stethoscope, has been developed to provide immediate heart failure diagnoses within 15 seconds. This technology demonstrated 91% sensitivity and 80% specificity compared to traditional diagnostic methods, highlighting its potential for early detection in primary care settings. ([imperial.ac.uk](https://www.imperial.ac.uk/news/232954/artificial-intelligence-tool-could-help-gps/?utm_source=openai))
4. <https://www.imperial.ac.uk/news/266333/ai-identify-hidden-heart-valve-defects/> - An AI algorithm has been shown to detect early structural changes in heart valves from ECG readings, even before symptoms or ultrasound-detectable changes occur. This advancement could enable early identification of patients at risk of significant heart valve issues, facilitating timely interventions. ([imperial.ac.uk](https://www.imperial.ac.uk/news/266333/ai-identify-hidden-heart-valve-defects/?utm_source=openai))
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6. <https://www.imperial.ac.uk/news/266333/ai-identify-hidden-heart-valve-defects/> - The AI algorithm's ability to predict future heart valve issues from ECGs could lead to proactive management strategies, reducing the incidence of severe valve diseases and associated complications through early intervention. ([imperial.ac.uk](https://www.imperial.ac.uk/news/266333/ai-identify-hidden-heart-valve-defects/?utm_source=openai))
7. <https://www.imperial.ac.uk/news/249316/ai-stethoscope-rolled-100-gp-clinics/> - The TRICORDER programme's deployment of AI-enabled stethoscopes in GP clinics represents a significant step towards integrating advanced technology into primary care, aiming to enhance diagnostic accuracy and efficiency in detecting heart failure. ([imperial.ac.uk](https://www.imperial.ac.uk/news/249316/ai-stethoscope-rolled-100-gp-clinics/?utm_source=openai))