

## **Artificial intelligence assisted echocardiography to support diagnosis of heart failure**

Heart failure occurs when the heart is unable to pump blood around the body as well as it should, because it does not contract strongly enough, it does not fill correctly, or a problem with the valves of the heart. It may develop as people get older, or following other conditions such as a heart attack. Heart failure can severely limit a person's day-to-day quality of life and activities and can lead to disability and early death. Common symptoms include breathlessness, coughing and wheezing, tiredness, feeling dizzy or lightheaded, and having swollen feet and ankles. Heart failure is common, with about a million people being affected in the UK, and is becoming more prevalent as the population ages.

Heart failure is diagnosed with an echocardiograph, an ultrasound scan of the heart performed by placing a probe on the chest, which allows an expert (usually a cardiac physiologist) to image the heart using sound waves. The cardiac physiologist manually takes measurements of the heart structure and its activity. Echocardiography is essential for diagnosing heart failure and other cardiac disorders, but it is a complex investigation that can be time-consuming and requires substantial technical skill, clinical judgement and experience to do effectively. Echocardiography services in the UK are under considerable pressure due to increasing demand, post-COVID backlogs and workforce shortages. Around 152,000 people were waiting for an echocardiograph in England in March 2025, with almost a quarter waiting for more than 6 weeks. Delayed diagnosis of heart failure can lead to delayed treatment, with correspondingly worse outcomes for people and increased pressure on the healthcare system.

Artificial intelligence (AI) technologies can be used to assist the cardiac physiologist by taking automatic measurements of the heart, interpret images, and suggest diagnoses, including heart failure. The use of AI technologies could allow echocardiography to be used in wider settings, including in the community. The technologies could potentially improve diagnostic

performance leading to better detection of heart failure, support earlier diagnosis leading to more timely treatment and better clinical outcomes, and reduce pressure on echocardiography services. In this early value assessment, NICE will identify and evaluate AI assisted echocardiography technologies to support diagnosis of heart failure. It will review the evidence that is available and assess the potential clinical and cost-effectiveness of the technologies, as well as identify evidence gaps to help direct evidence generation.

### **SCM disciplines**

- Cardiac physiologist
- Echocardiography advanced or consultant practitioner
- Cardiologist with specialist interest in heart failure
- Interventional cardiologist
- Clinical scientist in cardiac sciences and/or involved in AI development
- Cardiac surgeon
- Heart failure nurse consultant or specialist
- Physician in elderly care with an interest in heart failure
- GP with enhanced role in cardiology and/or interest in heart failure