



## Global Spotlights

# British Heart Foundation-funded programme: breathlessness hub in Liverpool

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Breathlessness is a debilitating symptom affecting 10% of the adult population, rising to 25% in those over 70 years.<sup>1</sup> Cardiopulmonary diseases account for the majority of the causes of breathlessness with COPD or HF implicated in more than two-thirds of causes, and both conditions can overlap in 35% of patients.<sup>2</sup> However, diagnostic delays are common, particularly in socio-economically deprived communities where access to community diagnostics and specialist services can be limited.<sup>3</sup> This leads to delays in treatment, poorer outcomes (increased hospital admissions and mortality, poor quality of life) and higher healthcare costs.<sup>4</sup>

The Everton BEAT Breathlessness Project represents a novel collaboration between NHS healthcare providers, a Premier League football club's charity (EitC), UK's HF patient charity (The Pumping Marvellous Foundation—PMF), public health organizations and Liverpool City Council. Located in Liverpool, an area with high deprivation indices, the project uses the trusted brand of Everton Football Club to engage hard-to-reach populations. The project harnesses the impact and reach of a Premier League football club's charity to provide accessible, community-based diagnostics in deprived areas.

Our pilot study in 2024 demonstrated the feasibility of community-based screening, identifying new HF in 3% and new diagnosis of COPD in 12% of attendees.<sup>5</sup> Building upon a successful pilot, the project has received funding from British Heart Foundation (BHF) Healthcare Implementation Fund to facilitate expansion and aims to scale to 1500 patients over 12 months, evaluating effectiveness, scalability and sustainability. This model aligns with National Health Service (NHS) priorities for early community diagnosis, health inequality reduction, preventive care, and digital adoption. We describe the project's innovative approach, including symptom triage, point-of-care

testing, AI-assisted echocardiography, and integrated care pathways. Funded by BHF, the current project focuses on early-stage scaling and health economic evaluation. In this paper, we outline the methods for implementation, evaluation, and dissemination, emphasizing integration with existing NHS pathways.

## Project design and setting

The BEAT Breathlessness Hub is a prospective, multi-site intervention embedded in community settings. The primary site is EitC's 'The People's Place,' a purpose-built mental health and wellbeing hub adjacent to Goodison Park stadium in North Liverpool. This non-clinical environment reduces stigma and encourages participation from individuals who may avoid traditional healthcare settings.

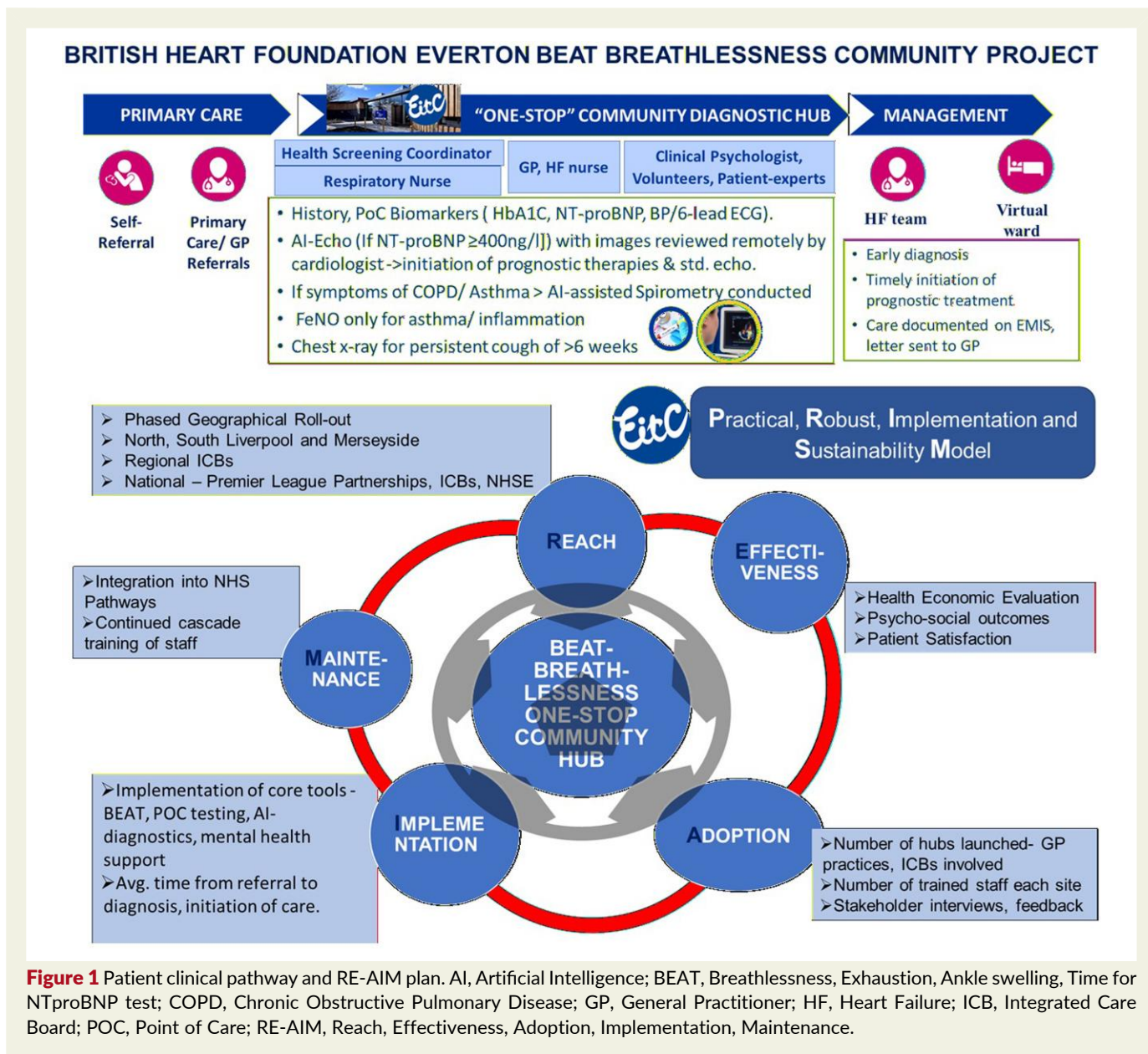
The project targets adults aged over 40 years experiencing breathlessness, recruited via self-referral, primary care referrals, or EitC community outreach initiatives ('Blue Base Pantry' which helps address food poverty, veterans' groups, mental health wellbeing groups, etc.) and other modes of communication (social media, advertising). Flyers for public, primary care, and newsletters are sent to club supporters. Inclusion criteria include persistent breathlessness (>2 weeks), exhaustion, or ankle swelling ('BEAT symptoms'<sup>6</sup>) and respiratory symptoms suggestive of COPD or asthma. Exclusion criteria encompass acute presentations requiring emergency care or known diagnoses already under specialist management.

Scaling involves expanding from the pilot to engage 1500 individuals over 12 months. Multi-site rollout includes creation of two additional hubs linked to primary care in central and southern parts of Liverpool, partnerships with other football clubs and

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integrated care boards (ICBs) in Cheshire & Merseyside and Lancashire & South Cumbria.

## Patient pathway and diagnostic tools (Figure 1)

- (i) Symptom triage assessment by trained community health workers (BEAT -Breathlessness, Exhaustion, Ankle Swelling, Time for NT-proBNP [6]; and respiratory symptoms)
- (ii) Point-of-Care Testing: Finger-prick NT-proBNP measurement (threshold  $\geq 400$  pg/mL for AI-assisted echo).
- (iii) AI-Assisted Echocardiography: For those with symptoms and elevated NT-proBNP, AI-assisted echo (US2.AI) with images acquired by trained HF specialist nurses or general practitioners, with cardiologist oversight.<sup>5,7</sup> Prognostic

guideline-directed medical therapy (GDMT) is initiated once HF is confirmed with the aim of assessment and treatment initiation within 60 min ('BEAT to Treat in 60-minutes'<sup>8,9</sup>).

- (iv) Integrated Assessments: Concurrent evaluation for COPD (AI-spirometry), asthma (Fractional Exhaled Nitric Oxide -FeNO), atrial fibrillation (KardiaMobile 6-lead ECG), blood pressure checks, smoking cessation support, and psychological factors (anxiety screening via General Anxiety Disorder-7 GAD-7 questionnaire). A clinical psychologist advises on breathlessness-anxiety interactions.
- (v) Management and Follow-Up: Confirmed diagnoses trigger direct absorption into specialist clinical pathways (e.g. HF or COPD optimization clinics, virtual wards, pulmonary rehabilitation). Lifestyle interventions, including physical activity programmes tailored to mental health, are offered through EitC's and Liverpool city council services.

- (vi) Patient support—provided by patient experts from PMF in the form of regular patient support meetings, online patient group support throughout the year (Facebook group), and self-care education.
- (vii) Spread to other healthcare systems using an online dissemination tool-kit detailing steps for the set-up of similar services elsewhere and a training pathway.

The pathway aligns with the NHS Adult Breathlessness Pathway, ensuring seamless integration with primary and secondary care. Data are captured via a digital dashboard that tracks metrics such as referral rates, diagnostic yield, and health equity indices.

## Team and governance

The multidisciplinary team includes cardiologists, HF specialist nurses, pharmacists, respiratory physicians, psychologists, GPs, patient experts, public health clinicians, and qualitative researchers. Patient and public involvement (PPI) is led by the Pumping Marvellous Foundation, ensuring patient-centred design. A Project Steering Committee, including representatives from each partner organization, provides governance oversight.

## Evaluation framework (Figure 1)

A mixed-methods evaluation assesses effectiveness, fidelity, scalability, and sustainability using a logic model:

- Inputs: Funding, specialist staff (cardiology, respiratory, mental health), diagnostic equipment (AI-assisted portable echo, spirometry, NT-proBNP kits), training resources.
- Activities: Community outreach, diagnostic sessions (target: 125/month), staff training on AI tools, and PPI workshops.
- Outputs: Number of screenings (1500), new diagnoses of HF, COPD, and seamless absorption into care pathways.
- Outcomes: Reduced diagnostic delays (measured by time from symptom onset to diagnosis), improved quality of life (European Quality of Life Five Dimension Five Level Scale), decreased hospital admissions (linked NHS data), and cost savings (health economic analysis).
- Impacts: Health inequality reduction (deprivation index analysis), model replication toolkit (clinical protocols, digital templates).

We shall perform quantitative and qualitative analysis of the outcomes, including semi-structured interviews with participants and stakeholders to explore barriers and facilitators. Fidelity will be monitored via adherence audits. Sustainability will be evaluated through integration metrics, such as adoption by ICBs, NHS pathways, and funding post-grant.

## Scaling plan

Results will be disseminated via peer-reviewed publications, social media, and other communications channels through partner organizations, NHS communications, and conferences. A replication toolkit will support rollout to other sites, including training guides and performance dashboards. Partnerships with national networks (e.g. Cardiac Clinical Networks, Integrated Care Boards, and Health Innovation Networks) as well as other Premier League clubs facilitate wider adoption.

In conclusion, the BHF-funded EITC BEAT Breathlessness Project innovates by leveraging the reach of a football club, using advanced POC diagnostics, addressing HF and COPD underdiagnosis and delays in deprived areas. This model could transform cardiorespiratory care, aligning with global priorities for prompt, equitable healthcare access.

## Declarations

### Disclosure of Interest

All authors declare no disclosure of interest for this contribution.

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