UK Heart Failure with Preserved Ejection Fraction Registry:

rationale and design of UK HFpEF

Supplemental appendix

. *Heart* 2023;0:1–7. doi: 10.1136/heartjnl-2023-323049

The UK HFpEF Collaborative Group

Executive Steering Committee

Name	Affiliation	Expertise
Christopher A Miller	Manchester University NHS Foundation Trust University of Manchester	Chair
Abdallah Al-Mohammad	Sheffield Teaching Hospitals NHS Trust	National Institute for Health and Care Excellence (NICE) guidelines
Janine Beezer	South Tyneside and Sunderland NHS Trust	Specialist Clinical Pharmacist Heart Failure
Emma Columbine	Manchester University NHS Foundation Trust	Sponsor representative
David Cotterell	Manchester University NHS Foundation Trust	Project manager
Simon Fisher	National Institute for Health and Care Research (NIHR) – British Heart Foundation (BHF) Cardiovascular Partnership	NIHR-BHF Cardiovascular Partnership Manager
Nick Hartshorne-Evans	Pumping Marvellous Foundation	Patient representative
Laurence Humphreys-Davies	British Society for Heart Failure	Patient representative
Rebecca Hyland	Wiltshire Health and Care	Heart Failure Nurse Specialist
R Thomas Lumbers	UCL Institute of Health Informatics NIHR University College London Hospitals Biomedical Research Centre Barts Health NHS Trust UCLH NHS Foundation Trust	Genomics; electronic health record; phenotyping
Gerry P McCann	University of Leicester NIHR Leicester Biomedical Research Centre, Glenfield Hospital, Leicester, UK	Cardiovascular magnetic resonance imaging
Maria F Paton Shaun Robinson	University of Leeds Imperial College Healthcare NHS Trust	Echocardiography
Mark C Petrie	University of Glasgow	Trials/therapeutics
Cathie Sudlow	BHF Data Science Centre, Health Data Research UK	Health data (linkages, curation pipelines, trusted research environments); epidemiological design

Patient Advisory Group

Laurence Humphreys-Davies, Nick Hartshorne-Evans, Richard Cleverley, Andy Smith, Mike Wardle, Sarah Worsnop.

UK-wide Network and Working Group

(Listed in alphabetical order)

. *Heart* 2023;0:1–7. doi: 10.1136/heartjnl-2023-323049

Barts Health NHS Trust and University College London

R Thomas Lumbers, Charlotte Manisty, James Moon

Barts Health NHS Trust, Queen Mary University of London and BHF Data Science Centre

Steffen E Petersen

Betsi Cadwaldr University Healthboard

Satheesh Balakrishnan Nair

BHF Data Science Centre, Health Data Research UK

Cathie Sudlow

Bradford Teaching Hospitals NHS Foundation Trust

Andrew Clegg, Jivendra Gosai

Buckinghamshire Healthcare NHS Trust

Mayooran Shanmuganathan

Cambridge University Hospitals NHS Foundation Trust

Catriona Bhagra, Christi Deaton

Countess of Chester Hospital NHS Foundation Trust

Joanne Bateman, Jennifer Llewellyn

Cwm Taf Morgannwg University Health Board

Rhys Williams

George Eliot Hospital NHS Trust

Asok Venkatamaran

Guy's and St Thomas' NHS Foundation Trust

Rebekah Schiff

Hull University Teaching Hospitals NHS Trust

Andrew L Clark

Imperial College Healthcare NHS Trust

Jamil Mayet, Martin R Wilkins

Imperial College London

Manuel Mayr (Proteomics)

Jersey General Hospital

Lee-Anne Penn, Pierre Le Page, Sinead O'Driscoll

King’s College Hospital NHS Foundation Trust and King’s College London

Ajay M Shah, Rosita Zakeri, Kevin O’Gallagher

Leeds Teaching Hospitals NHS Trust

Kate Gatenby

Leeds Teaching Hospitals NHS Trust and University of Leeds

John P Greenwood, Sven Plein

Liverpool University Hospitals NHS Foundation Trust

Prathap Kanagala

Manchester University NHS Foundation Trust and University of Manchester

. *Heart* 2023;0:1–7. doi: 10.1136/heartjnl-2023-323049

Christopher A Miller, Fardad Soltani

Mid & South Essex NHS Foundation Trust

Rachael Arnold, Swapna Kunhunny

Newcastle upon Tyne Hospitals NHS Foundation Trust

Adam K McDiarmid, Azfar Zaman

NHS Greater Glasgow and Clyde and University of Glasgow

Mark C Petrie

NHS Golden Jubilee

Colin Berry

NHS Lothian

Marc R Dweck

NHS Tayside

Chim Lang, Ify Mordi

Norfolk and Norwich University Hospitals NHS Foundation Trust

Pankaj Garg

North Tees and Hartlepool NHS Foundation Trust

Matthew Dewhurst, Karen Hann

Northumbria Healthcare NHS Foundation Trust

David P Ripley, Thomas Green

. *Heart* 2023;0:1–7. doi: 10.1136/heartjnl-2023-323049

North West Anglia NHS Foundation Trust

Fady Magdy

University of Oxford, Oxford University Hospitals NHS Foundation Trust, Oxford NIHR Biomedical Research Centre

Stefan Neubauer, Oliver Rider

Royal Brompton & Harefield Hospitals

Sanjay K Prasad, Chiara Bucciarelli-Ducci

Royal Devon University Healthcare NHS Foundation Trust

Andrew J Ludman

Royal Free London NHS Foundation Trust

Ameet Bakhai

Salisbury NHS Foundation Trust

Thomas Jackson

Sheffield Teaching Hospitals NHS Foundation Trust

Abdallah Al-Mohammad

South Tees Hospitals NHS Foundation Trust

David Austin, Mike Chapman

South Tyneside and Sunderland NHS Foundation Trust

Janine Beezer

Southern Health and Social Care Trust

. *Heart* 2023;0:1–7. doi: 10.1136/heartjnl-2023-323049

Patricia Campbell

St George's University of London and St George's Healthcare NHS Foundation Trust

Lisa J Anderson

University Hospital Southampton NHS Foundation Trust

Andrew Flett, Paul Haydock

University Hospitals Birmingham NHS Foundation Trust

Peysh Patel, Rick Steeds

University Hospitals Coventry and Warwickshire NHS Trust

Prithwish Banerjee

University Hospitals Dorset NHS Trust

Raj Chahal

University Hospitals of Leicester NHS Trust

Gerry P McCann, Iain Squire

University of Liverpool

Susanna Dodd (Senior statistician)

University of Manchester

Niels Peek (Health informatics and data science)

. *Heart* 2023;0:1–7. doi: 10.1136/heartjnl-2023-323049

Supplemental methods

Study duration

Participants will remain in the study for 10 years from when they provide consent. It is anticipated that at the end of the study, anonymised study data will be transferred to a managed-access research or scientific archive.

Authorship

A policy for authorship that follows the principles of the International Committee of Medical Journal Editors, written by the Executive Steering Committee and agreed by the Working Group, is in place (available at https://www.ukhfpef.org/).

Data Sharing

Participants are asked to provide consent for pseudonymised participant-level study data to be shared for research purposes. Requests for access to data are managed by the Executive Steering Committee. Release of data is subject to scientific review by the Executive Steering Committee and an appropriate Data Transfer Agreement. A Collaboration and Support Policy, written by the Executive Steering Committee and agreed by the Working Group, describes the framework for collaborations (available at https://www.ukhfpef.org/).

. *Heart* 2023;0:1–7. doi: 10.1136/heartjnl-2023-323049

Supplemental Table 1. Core clinical laboratory investigations

BNP or NT-Pro BNP
hs-Troponin T or I
Haemoglobin
MCV
Haematocrit
White cell count
Sodium
Potassium
Urea
Creatinine
eGFR
Albumin
Alkaline phosphatase
Bilirubin
Alanine aminotransferase
CRP
Iron
Ferritin
Transferrin saturation
Thyroid stimulating hormone
Free T4
HBA1c

Additional clinical laboratory investigations, to record if available

IgG
IgA
IgM
Serum protein electrophoresis
Urine Bence Jones protein
Urine albumin : creatinine ratio
Urine dipstick proteinuria

BNP = Brain natriuretic peptide; CRP C-reactive protein; eGFR = estimated glomerular filtration rate; hs = high sensitivity; Ig = Immunoglobulin; MCV = mean corpuscular volume; NTproBNP = N-terminal pro B-type natriuretic peptide.

. *Heart* 2023;0:1–7. doi: 10.1136/heartjnl-2023-323049

Supplemental Table 2. Echocardiography protocol

Standard echo acquisition in line with the British Society of Echocardiography Minimum Dataset.[1] Key views and corresponding measurements are as follows:

Key views	**Measurements**
Parasternal long axis 2D	LV end-diastolic dimension (cm) LV end-systolic dimension (cm) Maximum wall thickness (mm)
Parasternal long axis RV inflow CWD	TR V_{max} (m/s)
Apical 4 chamber 2D	LV ejection fraction (%)
Apical 2 chamber 2D	LV ejection fraction (%)
Apical 4 chamber 2D GLS*	Peak GLS (%)
Apical 2 chamber 2D GLS*	Peak GLS (%)
Apical long axis 2D GLS*	Peak GLS (%)
Apical 4 chamber 2D optimised for LA volume	LA volume (cm^3)
Apical 2 chamber 2D optimised for LA volume	LA volume (cm^3)
Apical 4 chamber mitral valve PWD	E V_{max} (cm/s) A V_{max} (cm/s) DT (ms)
Apical 4 chamber mitral valve TDI	Lateral e' (cm/s) Septal e' (cm/s)
Apical 5 chamber aortic valve CWD	AV V_{max} (m/s)
Apical 4 chamber modified for RV/RA 2D	Basal RV diameter Visual assessment of RV function
Apical 4 chamber modified for RV/RA CWD	TR V_{max} (m/s)
Apical 4 chamber lateral tricuspid valve annulus MM	TAPSE (cm)
Apical 4 chamber right ventricle TDI	RV S' (cm/s)
Subcostal 2D +/- MM	IVC diameter (mm) IVC diameter during inspiration (mm)
Multiple views	Mitral, aortic and tricuspid valve function Pericardial effusion (present/absent)

* As permitted by image quality and local feasibility.

2D = Two-dimensional; A V_{max} = Peak velocity in late diastole; AV V_{max} = Aortic valve peak velocity; CWD = Continuous wave Doppler; DT = Flow deceleration time from peak E wave to end of E wave signal; E V_{max} = Peak velocity in early diastole; GLS = Global longitudinal strain; IVC = Inferior vena cava; LA = Left atrium; LV = Left ventricle; MM = M-mode; PWD = Pulsed wave Doppler; RV = Right ventricle; TAPSE = Tricuspid Annular Plane Systolic Excursion; TDI = Tissue Doppler imaging; TR Vmax = Tricuspid regurgitation peak velocity;

. *Heart* 2023;0:1–7. doi: 10.1136/heartjnl-2023-323049

1. Robinson et al. A practical guideline for performing a comprehensive transthoracic echocardiogram in adults: the British Society of Echocardiography minimum dataset Echo Red Pract. 2020; 4: G59-G93.

Supplemental Table 3. Cardiovascular magnetic resonance protocol

Core

- Localisers
- CH4 cine.
- CH2 cine.
- CH3 cine.
- LVOT cine
- Aortic valve cine
- Gadolinium based contrast agent in line with local policy.
- LV short axis cine stack.
- TI Scout
- LGE segmented inversion recovery and PSIR. CH4, CH2, CH3 and short axis stack

Supplemental

- T1 mapping basal and mid short axis, before and after Gadolinium
- CH4 fat-water sequence.
- T2 mapping. Mid short axis.
- Aortic candy stick cine
- Cine perpendicular to the ascending and descending aorta at pulmonary bifurcation level, with measurement of blood pressure.
- Phase encoded velocity mapping perpendicular to the main pulmonary artery.
- 3D Dixon fat-water sequence, centred over the renal arteries.
- Perfusion imaging if being performed clinically

Notes

- 1.5T or 3T
- The protocol is split into core and supplementary sequences. It is expected that core sequences would be performed as part of a standard clinical CMR.
- As part of site set-up, the central study team will liaise with the site regarding the details of the CMR protocol appropriate for the site, and provide site-specific CMR guidance. The protocol is a guide.

CH = chamber; LGE = late gadolinium enhancement; LV = left ventricle; LVOT = left ventricular outflow tract; PSIR = Phase-sensitive inversion recovery; TI = inversion time.