# Hope for Hearts Fund: End of Project Summary

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| **Project title** | MRI My pacemaker |
| **BHF Investment** | £130K |
| **Project duration** | 2.5 years |
| **NHS Trust** | Bart's Health NHS Trust |
| **Project Team** | PI: Dr Anish Bhuva, Consultant Cardiologist (Barts Heart Centre), Honorary Associate Professor (CUL)<br>Dr Charlotte Manisty, Honorary Consultant Cardiologist and Senior Lecturer (UCL)<br>Professor James Moon, Professor of Cardiac Imaging (UCL)<br><br>The National UK Device-MRI Working Group and the following national professional societies have all contributed to the content or supported the work:<br>▪ British Association of MRI Radiographers<br>▪ British Cardiovascular Society<br>▪ British Heart Rhythm Society<br>▪ British Institute of Radiology<br>▪ British Society of Cardiovascular Magnetic Resonance<br>▪ British Society for Heart Failure<br>▪ Institute of Physics and Engineering in Medicine<br>▪ The Royal College of Radiologists<br>▪ The Society of Radiographers<br><br>The following patient groups and charity input have all contributed to the resources:<br>Arrhythmia Alliance, Cardiomyopathy UK and Barts Charity. |

## Overview of the clinical problem the team set out to address:

Magnetic resonance imaging (MRI) is used to diagnose a wide range of illnesses. Like everyone, many people with cardiac devices (pacemakers, defibrillators or implantable cardiac monitors) may benefit from an MRI scan at some point. Technology has changed in the last decade so MRI is technically possible when it is needed, yet patients still face difficulty with access to MRI. This leads to delays in the diagnosis and treatment of many conditions that rely on MRI such as cancer, stroke and brain surgery. The "MRI my Pacemaker" campaign was set up to ensure that patients with cardiac devices have the same access to MRI as everyone else.

## How did you go about delivering the project?

The project took two approaches:

1) **Improve referrer awareness and provide patient support.**
   Because referrers are far less likely to refer a patient with a cardiac device for MRI than other patients, we developed an educational video for clinicians to raise awareness. The

campaign is also regularly contacted by patients looking for MRI services (both in the UK and abroad) and so we developed a UK referrals network. As patients are their own best advocate, we developed resources to provide support to patients at the time of an implant or if an MRI is being considered.

2) **Develop and demonstrate feasibility of a cloud-based referrals platform to make it easy for referrers and make it simpler for services to provide MRI safely.**
Referrals require are a complex process that needs multiple clinicians and patients- and so patients do not get referred and miss out on cancer and stroke diagnoses. Largely because of logistical barriers, the vast majority of UK MRI services do not provide scans for this patient group or do so at low volume. New services may require support to provide strict MRI protocols safely, and larger services are difficult to sustain due to the demands on staff time and expertise. We created an online platform to simplify the otherwise complex process so that any MRI or Cardiology department can offer the scans.

## How did you approach the evaluation of the project?

- Measures related to referrer awareness and patient support:
    - Use of educational resources,
    - Number of centres registered in referrals network.

- Measures related to safety, volume and efficiency of referrals using a dedicated referrals platform.
- Measures related to other barriers to MRI provision: policy and training.

## What outcomes did you achieve?

- **Production of educational videos and leaflets**:
    - Leaflets and videos produced for patients and to guide referrers.
    - 7 professional societies and 3 patient charities developed and disseminated these leaflets and videos.
    - Being used alongside ongoing training for Arrhythmia Alliance and Cardiomyopathy UK nurse support networks.
    - Downloaded > 700 times directly from the campaign website.

- **UK and international referrals network:**
    - Sixty MRI centres registered.
    - Approximately 100 patients linked to MRI centres (about five a month).

- **MRI referrals platform:**
  *Scale*:
    - Deployed clinically in three services (two large services, one new service).
    - MRI provision for over 500 patients.

  *User satisfaction:*
    - Referrers able to make referrals within median 7 minutes. Previously 25% of referrals took over an hour.
    - 83% referrers reported easier sharing of device details and making referrals.

  *Clinical impact:*
    - Approximately 30% for cancer, stroke or other urgent care.
    - 19% for hospitalised inpatients.
    - Easier referrals: Previously referrals were not possible from many of the referring hospitals.

- Improved access: development of regional MRI provision: 20 new centres had MRI access. Decisions to scan and protocols were made quicker (approximately 4 days saved).
- 83% of scans for cancer diagnosis allowed treatment within national targets.

*Safety:*

- 43% of scans provided for patients with *MR Unlabelled* devices in a one centre. Increased provision of scans to patients with *MR Unlabelled* devices in one centre with initially low provision.
- No adverse safety events for patients with *MR Conditional* or *MR Unlabelled* devices.
- Improved referral accuracy, avoiding delays of one week to check clinical and device details.

*Time-saving:*

- Reduction in inpatient bed stays. Internal referrals: approximately 3 bed-days saved for internal inpatient referrals compared to external referrals. External referrals: clinical care would not have progressed in many cases without MRI access.
- 25-50% time saved for services, depending on staff member.

- **Influence on policy**:
  - Educational resources and referrals management platform developed in conjunction with the Joint British Society consensus recommendations for magnetic resonance imaging for patients with cardiac implantable electronic devices (10.1136/heartjnl-2022-320810)
  - Resources recommended in United Kingdom standards for non-invasive cardiac imaging: recommendations from the Imaging Council of the British Cardiovascular Society (10.1136/heartjnl-2022-320799)

- **Training:**
  - Training of 550 clinicians from 71 institutions in 10 countries provided by a dedicated course.

## What is novel about this project?

**Collaborative problem solving:** The topic is complex– the MRI process requires imaging and heart specialists and patients to work together. Seven professional societies and three patient charities were brought together to develop guidelines, supportive tools and educational resources.

**Guidelines for the 21st century:** Guidelines were enhanced with practical, digital tools. Educational videos and patient leaflets were designed with input from all professional and patient groups so that they aligned with professional guidelines and patient needs. Digital tools were created following guidelines to facilitate the necessary information provision, risk assessment and strict MRI protocols.

**New service design/development:** Allied health professionals were supported by the referrals management platform so are now autonomous at running most aspects of the service (used as an NHS England Case Study). Other hospitals were able to set up services or increase provision of MRI to patients with *MR Unlabelled* devices.

**Solving a health inequality:** Large practical steps were taken towards solving the problem sustainably. 60 centres were registered into a UK-wide MRI referrals network, patient charity helpline education was provided and clinicians were trained to tackle the health inequality.

## What difference did the Hope for Heart fund make for your project?

**Immediate clinical care:** MRI scans were provided to an estimated six hundred patients and support, and advice (provision of resources or guidance towards an MRI centre) to another estimated seven hundred patients.

**Sustainability:** Tackling the health inequality has required work at multiple levels. Change was embedded into the system: training a large number of clinicians, supporting new services, helping active services work efficiently, policy change and referrer engagement.

**Bringing together patients, heart and imaging teams:** Such complex medical care needs to break down silos of practice. This grant brought together teams who do not normally work together to address this problem.

## What happens next?

### Web platform national roll-out

Three centres are using the web platform and there are other centres who have approached us to enrol. We will continue to expand this network.

### Ongoing improvement

Healthcare software should facilitate, not restrict, complex care delivery. We will adapt the digital pathway to facilitate MRI provision for different service models.

### National registry

A national registry of patients with device details has naturally been created. This will be used practically to facilitate device checking, for research into safe MR provision, and identification of high risk scenarios.

### Ongoing training and individual service set-up

The next course for the different healthcare professionals is planned for later this year and will continue regularly.