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Testing whether a fast MRI scan can detect breast cancers which were not detected on mammograms, in women with average breast density

Submission date 30/09/2024	**Recruitment status** Recruiting	[X] Prospectively registered [X] Protocol [_] Statistical analysis plan [_] Results [_] Individual participant data [X] Record updated in last year
Registration date 04/10/2024	**Overall study status** Ongoing	
Last Edited 16/10/2026	**Condition category** Cancer	

Plain English summary of protocol

Background and study aims
Early detection of breast cancer saves lives. The NHS Breast Screening Programme (NHSBSP) currently uses mammograms (quick X-rays) to look for signs of breast cancer. While mammograms are fast and widely used, they can sometimes miss small, aggressive cancers. MRI scans are better at spotting these cancers but take longer and cost more, so they're usually only offered to people at a very high risk.

A newer scan called FAST MRI is quicker than a standard MRI and may be better than mammograms at finding small, aggressive cancers. So far, research has focused only on women with high breast density. This study, called DYAMOND, will test whether FAST MRI can help detect cancers in women with average breast density who haven't been included in previous studies.

If FAST MRI proves helpful for this group, it could lead to a larger study and potentially change how breast screening is done in the future.

Who can participate?
Stage 1 – Women aged 50 to 52, attending their first NHS breast screening mammogram, who do not have breast implants.
Stage 2 – Women who agreed to stage 1 may be invited to have a FAST MRI scan if their mammogram shows average breast density (called BI-RADS B) and a Routine Recall letter is received.

What does the study involve?
Stage 1
If participants consent to Stage 1, the research team will send their mammograms to the Royal

Surrey NHS Trust to be analysed for breast density. The team will also check their screening records to see if their mammogram was clear. They will then be contacted by letter or by telephone to let them know if they can enter Stage 2 and have a FAST MRI scan.

Stage 2
All DYAMOND participants who consent to Stage 2 will have a FAST MRI as well as their standard screening mammogram. Some participants will have a second FAST MRI 1 year later.

Trained health professionals will check the FAST MRI images. If any cancers are found, the women will be looked after by their local hospital, which will collect information about their care for the DYAMOND study team. Women will be asked their thoughts about having the FAST MRI scan to understand their experiences.

What are the possible benefits and risks of participating?
Benefits: The FAST MRI scan may find breast cancer earlier than it would have been found without the DYAMOND study. Treatments are more effective when a cancer is detected early, and so the cancer may be more likely to be cured.

Risks: To have a FAST MRI, participants will need to have an injection into a vein in their arm at the time of the scan. Hospitals worldwide use this type of injection every day for standard MRI scans of many different parts of the body. The MRI radiographers will follow all standard safety procedures for the injection and the scan during DYAMOND.

Where is the study run from?
North Bristol NHS Trust is running the study. Women can join the study from NHS Breast Screening Services, including Avon, Gloucestershire, Cornwall, Wiltshire, South West London and South East London.

When is the study starting and how long is it expected to run for?
May 2023 to December 2026

Who is funding the study?
The Medical Research Council (MRC) and the National Institute for Health and Care Research (NIHR) jointly fund the DYAMOND Study through the Efficacy and Mechanism Evaluation (EME) funding stream of the NIHR

Who is the main contact?
1. Dr Lyn Jones: FASTMRI@nbt.nhs.uk
2. Dr Rebecca Geach: FASTMRI@nbt.nhs.uk

https://www.cancerresearchuk.org/about-cancer/find-a-clinical-trial/a-study-looking-at-using-fast-mri-scans-to-screen-for-breast-cancer-fast-mri-dyamond

Contact information

Type(s)
Public, Scientific, Principal investigator

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Additional identifiers

Integrated Research Application System (IRAS)
330059

Central Portfolio Management System (CPMS)
59828

National Institute for Health and Care Research (NIHR)
150502

Study information

Scientific Title
Diagnostic yield study to determine whether an abbreviated form of breast magnetic resonance imaging (FAST MRI) can detect breast cancers missed by screening mammography: for women at population risk of breast cancer with average mammographic density following their initial screening mammogram

Acronym
FAST MRI: DYAMOND

Study objectives
This research aims to refine the study design and define the study population, for a future randomised controlled trial (RCT) of FAST MRI as a screening modality for women having their first mammographic screen with the NHS breast screening programme (BSP) (future application to NIHR). Specifically, the proposed work will determine if women with average mammographic density (BI-RADS category B) could benefit from screening with FAST MRI and fill the knowledge gap. The hypothesis this proposal will test is that FAST MRI can detect breast cancers missed by mammography for the 40% of the population of women having their first mammogram with NHSBSP (age 50-52) who have category B mammographic density. The findings of this study will be important, no matter whether the hypothesis is proved or disproved because they will justify either the inclusion or the exclusion of 40% of the screened population (not previously investigated) in a future study proposal to NIHR (HTA) for a randomised controlled trial (RCT) of FAST MRI.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 09/01/2024, Yorkshire & the Humber – Sheffield (NHS Blood & Transplant Centre, Holland Drive, Newcastle-upon-Tyne, NE2 4NQ, United Kingdom; +44 (0)207 104 8388; sheffield.rec@hra.nhs.uk), ref: 23/YH/0268

Primary study design
Interventional

Study design
Non-randomised controlled feasibility/pilot study

Study type(s)
Treatment

Health condition(s) or problem(s) studied
To measure the number of cancers detected by FAST MRI that were missed by screening mammography

Interventions
Current interventions as of 17/09/2025:
This study will invite women aged around 50-52 years old to take part.

Stage 1:
Screening clients will receive study information at their first mammogram appointment (after they have had their mammogram). If the client does not have breast implants, they will be invited to find out if they are eligible to have a FAST MRI - by being asked to consent to the research team looking at their breast screening records and sending their mammogram to the DYAMOND team at Royal Surrey Foundation Trust who will use a computer to measure the breast density.

Once the breast density measurement has been done, study teams will look at the results and breast screening records to check if the person is eligible for Stage 2 of the study.

Stage 2
The study teams will then send Stage-2 participant information sheets to potentially eligible women - those aged around 50-52, with average / B density breasts, and who have not been recalled by the screening programme. The study team will then contact the participant to discuss participation in Stage 2 - having the FAST MRI scan.

1,000 women will be scanned at NHS sites, chosen for the ethnic diversity of the screened population and the experience the site has in working with FAST MRI. This choice of NHS sites will ensure our sample is representative of the UK population.

NHS professionals who have completed FAST MRI reader training will interpret the FAST MRI scans. The total number of cancers detected by FAST MRI and be counted and the types, aggressiveness and size of cancer found will be recorded. The study will also count how many women need further tests but turn out not to have cancer.

The study will also look at the results of people who were not eligible for a FAST MRI because they had been recalled by the screening programme and will look at the number and types of cancers found.

Participants will be asked to share their experience of having a FAST MRI initially via a survey. The results of the survey will be purposively sampled and some women will be invited to have an interview with a qualitative researcher. The results will help to decide which women should be included in a future FAST MRI trial to measure if FAST MRI would be a good scan for the NHS to use for breast screening.

Previous interventions:
This study will invite women aged around 50-52 years old to take part.

They will receive study information at their first mammogram appointment (after they have had their mammogram). They will be invited to find out if they are eligible to have a FAST MRI - by being asked to consent to the research team looking at their breast screening records and sending their mammogram to the DYAMOND team at Royal Surrey Foundation Trust who will use a computer to measure the breast density. This is Stage 1 of DYAMOND participation.

Once the breast density measurement has been done, study teams will look at the results and breast screening records to check if the person is eligible. The study teams will then send Stage-2 participant information leaflets to potentially eligible women - those aged around 50-52, with average / B density breasts, and who have not been recalled by the screening programme. The study team will then contact the participant to discuss participation in Stage 2 - having the FAST MRI scan.

1,000 women will be scanned at NHS sites, chosen for the ethnic diversity of the screened population and the experience the site has in working with FAST MRI. This choice of NHS sites will ensure our sample is representative of the UK population.

NHS professionals who have completed FAST MRI reader training will interpret the FAST MRI scans. The total number of cancers detected by FAST MRI and be counted and the types, aggressiveness and size of cancer found will be recorded. The study will also count how many women need further tests but turn out not to have cancer.

The study will also look at the results of people who were not eligible for a FAST MRI because they had been recalled by the screening programme and will look at the number and types of cancers found.

Participants will be asked to share their experience of having a FAST MRI. The results will help to decide which women should be included in a future FAST MRI trial to measure if FAST MRI would be a good scan for the NHS to use for breast screening.

Intervention Type
Procedure/Surgery

Primary outcome(s)
Current primary outcome measure as of 17/09/2025:
The number of cancers detected on FAST MRI after a negative mammogram, measured using recorded study data at one timepoint
Cancers detected by FAST MRI are for those participants whose FAST MRI scans were classified as MRI 3b 4 or 5 and who, on subsequent investigation, had a biopsy-confirmed breast cancer (invasive and non-invasive).

A sensitivity analysis will be undertaken to assess the need for additional investigations for the MRI 3 group and whether MRI 3b and/or MRI 3a should be considered as cancers or negative results

Previous primary outcome measure:
Cancers detected by FAST MRI after a negative mammogram, defined as the FAST MRI scans classified as MRI 3b 4 or 5 with confirmed breast cancer (invasive and non-invasive) on a subsequent biopsy investigation, measured using recorded study data at one timepoint

A sensitivity analysis will be undertaken to assess the need for additional investigations for the MRI 3 group and whether MRI 3b and/or MRI 3a should be considered as cancers or negative results

Key secondary outcome(s)
The following secondary outcome measures are assessed using recorded study data and the methods stated below at one timepoint:
1. The characteristics of the cancers detected by FAST MRI (including grade, size, stage, nodal involvement)
2. Acceptability of the intervention through a questionnaire and an additional qualitative interview of a subset of participants
3. Recruitment rate is defined as those that are recruited out of all those with density B that were contacted
4. Retention/compliance rate accounts for the number that withdraw from the study once recruited or do not attend the FAST MRI scan
5. Recall rate, defined as the proportion of women classified with an MRI 3b, 4 or 5 and invited for further investigation out of the total number of recruited women who had a FAST MRI
6. The biopsy rate is calculated as the number of biopsies undertaken out of all women recruited who had a FAST MRI
7. Early call rate, defined as the number of women who have a FAST MRI at y1 (includes all those classified as MRI 3a, and those classified as MRI 3b, 4 and 5 who did not have cancer confirmed at y0 biopsy) out of all women recruited who had a FAST MRI at y0
8. Adverse reactions to FAST MRI
9. The proportion of women in each density category (A, B, C, D) in the UK NHSBSP screened population at this age
10. Interval cancers detected during the study period
11. FAST MRI classifications of y1 scans (for all those with MRI 3a at y0 and those with MRI 3b, 4 and 5 and no cancer detected at y0)
12. FAST MRI reader data, the diagnostic accuracy of readers within the study (individually and by reader group and NHS site), numbers of scans requiring arbitration, standard arbitration outcomes and expert panel arbitration outcomes

Completion date
31/12/2026

Eligibility

Key inclusion criteria
Current key inclusion criteria as of 17/09/2025:
Stage 1 Consent (Breast Density Measurement):
1. Age [49 years + 8 months] ≤ [53 years – 1 day] at time of mammogram (source: National Breast Screening System (NBSS))

2. Has had a mammogram via the NHSBSP
3. Willing and able to give informed consent to Stage 1

Stage 2 Consent (FAST MRI DYAMOND scan):
1. First screening mammogram (prevalent round) (source: participant-reported)
2. Participants with breast density category B as determined by AI breast density measurement (source: Scientific Computing Department of Royal Surrey NHS Foundation Trust (RSNFT))
3. Received standard NHSBSP “no findings” confirmation letter (source: NBSS)
4. No absolute contraindication to breast MRI (source: patient-reported, via completion of Standard Safety Questionnaire)

Previous key inclusion criteria:
1. Women with breast density category B
2. Aged [49 years + 8 months] <= [53 years – 1 day] at the time of mammogram
3. Having prevalent round mammogram screening (participant-reported)
4. Received standard NHSBSP “no findings” confirmation letter
5. Willing and able to give informed consent
6. No absolute contraindication to breast MRI

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
49 Years

Upper age limit
53 Years

Sex
Female

Total final enrolment
0

Key exclusion criteria
Current key exclusion criteria as of 17/09/2025:
Stage 1 Consent (Breast Density Measurement):
1. Has not received a mammogram within the NHSBSP
2. Aged [<49 years + 8 months] or ≥ 53 years at time of mammogram (source: NBSS)
3. Unwilling to have mammograms measured for density
4. Unwilling or unable to give informed consent to Stage 1
5. Breast implants

Stage 2 Consent (FAST MRI DYAMOND scan):
1. Breast density category A, C or D or if not determined (source: RSNFT)

2. Known recall after mammogram (source: NBSS)
3. Pregnant or breastfeeding
4. Contraindication to MRI
5. Contraindication to gadolinium-containing contrast agents (GDCA)
6. Unwilling to have FAST MRI
7. Unwilling to allow follow-up of outcomes through data linkage
8. Estimated glomerular filtration rate (eGFR) equal to or below 30 (participant reported)
9. BMI, weight and abdominal girth restrictions may apply to recruiting sites' MRI scanner(s) that could exclude otherwise eligible participants from having the study intervention.

Previous key exclusion criteria:
1. Breast density category A, C or D
2. Known recall after mammogram
3. Has not received a breast mammogram
4. Aged [< 49 years + 8 months] or > = 53 years at time of mammogram
5. Pregnant or breastfeeding
6. Contraindication to MRI
7. Contraindication to gadolinium-containing contrast agents (GDCA)
8. Unwilling to have FAST MRI
9. Unwilling to allow follow-up of outcomes through data linkage
10. Unwilling to have mammograms measured for density
11. eGFR equal to or below 30
12. BMI, weight and abdominal girth restrictions may apply to recruiting sites' MRI scanner(s) that could exclude otherwise eligible participants from having the study intervention

Date of first enrolment
22/05/2025

Date of final enrolment
31/12/2026

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Cheltenham General Hospital
Sandford Road
Cheltenham
England
GL53 7AN

Study participating centre

St Georges Hospital
Blackshaw Road
Tooting
London
England
SW17 0QT

Study participating centre
Kings College Hospitals
Denmark Hill
London
England
SE5 9RS

Study participating centre
Royal Cornwall Hospital (treliske)
Treliske
Truro
England
TR1 3LJ

Study participating centre
Great Western Hospital
Marlborough Road
Swindon
England
SN3 6BB

Study participating centre
Southmead Hospital
Southmead Road
Westbury-on-trym
Bristol
England
BS10 5NB

Sponsor information

Organisation

North Bristol NHS Trust

ROR
https://ror.org/036x6gt55

Funder(s)

Funder type
Government

Funder Name
National Institute for Health and Care Research

Alternative Name(s)
National Institute for Health Research, NIHR Research, NIHRresearch, NIHR - National Institute for Health Research, NIHR (The National Institute for Health and Care Research), NIHR

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
United Kingdom

Funder Name
Medical Research Council

Alternative Name(s)
Medical Research Council (United Kingdom), UK Medical Research Council, Medical Research Committee and Advisory Council, MRC

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

The datasets generated during and analysed during the current study will be available upon reasonable request at the end of the study from Dr Lyn Jones, FASTMRI@nbt.nhs.uk. Consent for the storage and use of anonymised data for health-related research purposes is obtained from all participants during DYAMOND study recruitment.

IPD sharing plan summary

Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Protocol article		28/09/2025	30/09/2025	Yes	No
Study website	Study website	11/11/2025	11/11/2025	No	Yes