ISRCTN24285790 https://doi.org/10.1186/ISRCTN24285790

Precision blood transfusion

Submission date
26/06/2026

Recruitment status
No longer recruiting

Registration date
02/11/2026

Overall study status
Ongoing

Last Edited
02/11/2026

Condition category
Haematological Disorders

[_] Prospectively registered
[X] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
People with sickle cell disorder often need regular blood transfusions. Although blood is matched for some important blood groups, some patients still develop antibodies against donated blood. This can make future transfusions more difficult and increase the risk of serious transfusion reactions.

Researchers have developed a computer-based tool called bloodMatcher. This tool helps NHS Blood and Transplant (NHSBT) staff select donor blood by looking at a wider range of blood group information. The aim is to improve how closely donated blood matches each patient. Better matching may reduce transfusion-related complications and help make the best use of rare blood units. This study will assess whether bloodMatcher can be used safely and effectively within routine NHSBT practice before larger studies are carried out.

Who can participate?
People may be able to take part if they:
1. Are aged 16 years or older
2. Have sickle cell disorder of any type
3. Have been receiving regular exchange blood transfusions for at least three consecutive transfusion episodes
4. Has had a genotype submitted for analysis on the axiom array
5. Are willing and able to give written informed consent
People cannot take part if they are difficult to transfuse because of certain previous transfusion complications, have had significant problems attending their transfusion appointments, or are currently pregnant or planning a pregnancy.

What does the study involve?
Around 40 people with sickle cell disorder who already receive regular exchange blood transfusions will be invited to join the study.
Participants will continue to receive their usual care from their normal clinical team. There will be no extra hospital visits, and no new medicines or treatments will be given.
Researchers will compare information from three previous transfusion episodes that used the standard blood selection process with three study transfusions that use information from the bloodMatcher system. Before each transfusion, participants will have their usual blood tests. Women of childbearing age will also have a pregnancy test.

The main difference during the study is that bloodMatcher will help NHSBT staff choose suitable donor blood units. Experienced transfusion scientists will review all suggested blood units to ensure they are safe and meet national standards. If a suggested unit is not suitable, the standard blood selection process will be used instead.
Any transfusion reactions or delays will be recorded. After the third study transfusion, the research team will review the collected information. Participants can withdraw from the study at any time without it affecting their medical care.
What are the possible benefits and risks of participating?
Participants may not receive a direct benefit from taking part. However, bloodMatcher may help achieve closer blood group matching between donors and recipients. This could potentially reduce the risk of transfusion-related complications.
The risks are expected to be low because participants will continue to receive standard transfusion care. The blood units selected using bloodMatcher will undergo the same safety checks as routine transfusions, with additional review by senior transfusion scientists. If any concerns arise, the standard blood selection process will be used.

Where is the study run from?
NHS Blood and Transplant (UK)

When is the study starting and how long is it expected to run for?
July 2026 to July 2027

Who is funding the study?
The study is funded by NHS Blood and Transplant, the National Institute for Health and Care Research (NIHR), and the University College London Hospitals Biomedical Research Centre.

Who is the main contact?
Uclh.haem-match@nhs.net

Contact information

Type(s)
Principal investigator, Scientific, Public

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Public, Scientific, Principal investigator

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Additional identifiers

Integrated Research Application System (IRAS)
354482

Central Portfolio Management System (CPMS)
71019

Grant code
AI_AWARD02331

Study information

Scientific Title
A single centred feasibility study to evaluate and compare the implementation of an antigen-prioritising algorithm with standard care to arrange units for blood transfusion prior to selection by staff at NHS Blood and Transplant (NHSBT)

Acronym
Haem-Match Feasibility Study

Study objectives
Primary objective:
To evaluate the implementation of a principally antigen-prioritised algorithm (bloodMatcher) vs. the current principally age-prioritised algorithm used to arrange units for blood transfusion prior to selection by staff at NHSBT at a single SHU.

Secondary objective:
To compare the degree of matching of blood groups achieved by bloodMatcher with that achieved by its present equivalent (standard of care), which organises units principally according to age.

Tertiary objective:
To inform the design of future multicentred studies of bloodMatcher, including the capabilities for electronic capture of relevant outcome and transfusion data.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 16/03/2026, West Midlands – South Birmingham Research Ethics Committee (2 Redman Place, Stratford, London, E20 1JQ, United Kingdom; +44 207 104 8121; southbirmingham.rec@hra.nhs.uk), ref: 26/WM/0011

Primary study design
Interventional

Allocation
N/A: single arm study

Masking
Open (masking not used)

Control
Uncontrolled

Assignment
Single

Purpose
Basic science, Device feasibility

Study type(s)

Health condition(s) or problem(s) studied
Haemolytic anaemias

Interventions
This is a single-site retrospective-prospective feasibility study using an algorithm called bloodMatcher, which arranges units prior to selection by NHS Blood and Transplant (NHSBT) staff principally according to blood group matching and compares it with the current algorithm, which principally arranges units according to age. The system aims to match donated blood to people with sickle cell disorder more closely by using detailed blood group information, rather than the current system, which mainly selects blood by age. Better matching may reduce the chance of reactions and other complications for patients and, at a system level, reduce the allocation of rare units to people who do not need them, preserving this valuable resource for those who do.

Around 40 adults with sickle cell disorder who already receive regular exchange blood transfusions will be invited to take part. We will compare data from three previous transfusion episodes using the current algorithm with data from three study transfusions in which bloodMatcher is incorporated. Taking part will not change participants' usual treatment, and their clinical care will continue to be coordinated by the same clinical team. They will be approached by the research team, provided with information about the study, and asked to give written consent if they wish to participate. Women of childbearing potential will undergo a pregnancy test.

Before each transfusion, participants will have the usual blood tests. The only difference is that the BloodMatcher algorithm will help NHSBT staff choose donor blood units primarily based on their best match for the recipient instead of the current storage age-based system. Senior transfusion scientists will review each suggested unit to ensure it is safe and meets national standards, providing an additional layer of oversight within the study protocol. Several other established checking procedures performed by NHSBT Hospital Services staff, as well as laboratory and nursing staff prior to transfusion administration, will remain unchanged. If a suggested blood unit is not suitable, the current algorithm will be used instead.

Transfusions will take place in the usual way, and any reactions or delays will be recorded. After the third study transfusion, the research team will review the data. There are no additional hospital visits, no new drugs or treatments, and participants may withdraw from the study at any time without affecting their clinical care.

Intervention Type
Device

Phase
Not Applicable

Drug/device/biological/vaccine name(s)
BloodMatcher algorithm

Primary outcome(s)
1. Approval or rejection by the Haem-Match Multidisciplinary Team (MDT) of each blood unit recommended by bloodMatcher, including the reason for any rejection (categorical) measured using review of recorded Haem-Match MDT decisions for each recommended unit at the MDT review of each blood order, before transfusion

2. Whether bloodMatcher-selected units are available when required for each blood order, and whether these units are transfused or standard practice is used to select alternative, non-algorithm-selected units measured using review of blood bank records, bloodMatcher recommendations and transfusion records to establish unit availability, identify the units actually transfused and record the reason for reverting to standard practice, where applicable at blood unit selection and at each transfusion

Key secondary outcome(s)
1. Whether an antigen-positive blood unit is transfused to an antigen-negative recipient (binary), assessed for each transfused unit and each blood group antigen evaluated measured using comparison of donor-unit and recipient antigen profiles recorded in laboratory/blood bank records, linked to the record of units actually transfused at each transfusion
2. Whether an antigen-negative blood unit is transfused to an antigen-positive recipient (binary), assessed for each transfused unit and each blood group antigen evaluated measured using comparison of donor-unit and recipient antigen profiles recorded in laboratory/blood bank records, linked to the record of units actually transfused at each transfusion
3. Key changes to study procedures, bloodMatcher implementation and transfusion workflows required to enable a future multicentre study measured using review of study findings and documented operational issues to identify and describe the changes require at the end of the study

Completion date

09/07/2027

Eligibility

Key inclusion criteria
1. 16 years or older
2. Sickle Cell Disorder (any genotype) on a regular EBT programme for at least three contiguous episodes
3. Has a red cell genotype submitted for analysis on the Axiom array
4. Is willing to be approached for NIHR BioResource Research Tissue Bank Improving Health Outcomes (IBHO) study (REC22/EE/0230)
5. Willing and able to provide written informed consent

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
16 Years

Upper age limit
120 Years

Sex
All

Total final enrolment
40

Key exclusion criteria
1. Difficult to transfuse - defined as needing NHSBT Red Cell Immunohaematology (RCI) support for sourcing appropriate units or crossmatching units for transfusion OR episode of hyperhaemolysis in the past OR Delayed haemolytic transfusion reaction in last 4 months
2. Previous poor concordance or irregularity with transfusion regimen – defined as repeated changing appointment dates with little notice,or non-timely attendance for group and screen or for transfusion episodes (at discretion of PI)
3. Current pregnancy or planning to become pregnant (a known risk factor for alloimmunisation)

Date of first enrolment
09/07/2026

Date of final enrolment
09/10/2026

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
University College London Hospitals NHS Foundation Trust
250 Euston Road
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Sponsor information

Organisation
NHS Blood and Transplant

ROR
https://ror.org/0227qpa16

Funder(s)

Funder type
Government

Funder Name
NHS Blood and Transplant

Alternative Name(s)
National Health Service Blood and Transplant, UK National Health Service Blood and Transplant, NHSBT

Funding Body Type
Government organisation

Funding Body Subtype
Local government

Location
United Kingdom

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
University College London Hospitals Biomedical Research Centre

Alternative Name(s)
UCLH Biomedical Research Centre, NIHR University College London Hospitals Biomedical Research Centre, UCLH BRC, UCL NIHR BRC

Funding Body Type
Private sector organisation

Funding Body Subtype
Research institutes and centers

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	version 1	26/03/2020	30/07/2026	No	Yes
Protocol file	version 1	29/01/2026	30/07/2026	No	No