Red Cell Immunohaematology User Guide

NHS Blood and Transplant

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User Guide

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This Guide

This guide outlines the Red Cell Immunohaematology (RCI) services provided by NHS Blood and Transplant (NHSBT). The guide is of use to medical and scientific staff in hospital transfusion laboratories and others involved in, for example, antenatal care. The guide contains information about the organisation of the services and contact details for key staff.

Details of the products available from NHSBT Reagents are included.

NHS Blood and Transplant (NHSBT)

The National Blood Transfusion Service was founded in 1946 and was, until 1994, providing services regionally. In 1993 a Special Health Authority was created and in 2006 this Special Health Authority merged with UK Transplant, forming NHS Blood and Transplant (NHSBT). NHSBT is a national service and employs around 6,000 staff. The accountability for supplying blood services lies with NHSBT and the strategy for the service is formulated nationally, with local delivery. The core purpose is:

To save and improve patients' lives

Management of Red Cell Immunohaematology

RCI is managed nationally by the Head of Function, supported by National Operations and Process Improvement managers. Clinical support is provided by Consultant Haematologists. The service is supported by the Quality function.

There are 8 laboratories providing RCI services at Colindale, Tooting, Filton, Birmingham, Liverpool, Sheffield, Leeds and Newcastle. Each of the RCI laboratories is managed by a Head of Laboratory (HoL), and each laboratory is supported by a medical consultant. See Appendix 1 for contact details. Samples may be sent to another site for testing and/or booking in.

The RCI function includes a Reagents Department based in Liverpool, managed by the Reagents Operations Manager.
Quality statement

RCI is accredited to ISO15189 and RCI services, in common with other NHSBT services, are committed to a total quality philosophy. All work is carried out within the framework of a documented quality system, according to Good Laboratory Practice (GLP) and Good Manufacturing Practice (GMP) and in compliance with the Blood Safety and Quality regulations and Data Protection and Freedom of Information Acts. Techniques and procedures are validated, described in standard operating procedures (SOP) and conducted by staff whose proficiency is regularly monitored.

NHSBT Quality Managers carry out regular audits to establish and improve the level of BSQR and ISO15189 compliance. These complement external licensing and accreditation inspections by the Medicines and Healthcare Products Regulatory Agency (MHRA) and U.K. Accreditation Service (UKAS). RCI is committed to maintaining accreditation to ISO15189 as a managed network covering all its laboratories.

RCI is committed to standardising practice and strives for a consistent and high quality service for all RCI laboratories. Working together with the NHSBT medical directorate, clinical policies and procedures are implemented and developed in accordance with the principles of clinical governance.

All RCI laboratories participate in UK NEQAS (or EQAS) exercises for all relevant disciplines.

NHSBT quality experts are always pleased to share their expertise with colleagues in the wider NHS where time and resources allow. If you need help, contact the Quality Department to discuss your requirements (Appendix 1).
Complaints / compliments

NHSBT is committed to continuously improving the quality and range of services provided and welcomes any comments or suggestions from users. To ensure appropriate clinical governance, it is essential that failures of service and near misses which could have affected patient care are reported, and forms have been made available to hospital transfusion laboratories for this purpose. Please do not hesitate to discuss complaints with either Customer Services or the relevant medical consultant or Head of Laboratory. We always strive to provide a satisfactory response to any complainant. However, if you are unhappy with the handling of your complaint, please contact the Head of Customer Services (Appendix 1) Full details of the NHSBT complaints procedure can be found at: http://hospital.blood.co.uk/communications/Hospital_complaints/index.asp

Complaints must be clearly separated from communication about adverse reactions to transfusion, near misses or Patient Adverse Events which have or could have affected the quality of patient care. Such incidents and near misses often require immediate action and you are advised to discuss these with a NHSBT medical consultant or a senior laboratory scientist at your local blood centre. Serious events must be reported to SABRE (appendix 2).

Services provided by RCI laboratories

RCI provides the following services in support of hospital transfusion laboratories:

- Investigation of antibody problems, including crossmatching
- Investigation of haemolytic transfusion reactions
- ABO/D typing, including typing problems
- Investigation of positive direct antiglobulin tests, including autoimmune haemolytic anaemia (AIHA), crossmatching for these cases
- Determination of blood group by molecular methods when conventional serology is not applicable
- Investigation of IgA deficiency (provided nationally from Sheffield)
- Investigation of haemolytic disease of the fetus and newborn (HDFN)
- Antenatal reference services including quantification (testing is centralised and may be provided by another RCI laboratory) and titration of antibodies
- Determination of feto-maternal haemorrhage (FMH) (testing is centralised and may be provided by another RCI laboratory)
- Investigation of drug induced AIHA (provided nationally from Sheffield)
- Routine antenatal screening
- Provision of suitable blood for IUT and at delivery
- Medical and scientific advice
Type of investigations

Atypical antibodies, serological and crossmatching problems

Samples referred for the investigation of atypical antibodies will be tested both to confirm the specificity of the antibodies and to exclude the presence of additional alloantibodies. RCI reference laboratories have access to a large number of phenotyped red cells in addition to routine antibody identification panels to enable a full investigation to be completed. The patient’s Rh and K phenotype will be performed on the first sample received from that patient, plus testing for any other implicated antigens. Clinical advice on further transfusion support is given as appropriate. Results are entered on the NHSBT national patient database and an antibody card will be issued for patients with irregular antibodies on first presentation. These results are also available on the Sp-ICE results viewer for registered hospitals.

Serological and crossmatching problems can be discussed with the scientific staff and samples referred for investigation. Advice can be given as to the type of blood that is suitable for transfusion and the availability of such blood and in addition RCI will undertake crossmatching on request.

Haemolytic Transfusion Reactions

See appendix 2 for guidance on reporting adverse reactions to transfusions.

ABO typing, Rh phenotyping, DAT and antibody screen / identification will be performed on both pre- and post-transfusion samples if available. If no antibodies are detected by standard methods a more sensitive method may be applied. Eluates will be prepared as necessary and tested against a panel of cells, including A₁ and B cells, by an IAT method. An ABO, Rh phenotype and DAT will be performed on any implicated red cell units and re-crossmatching will be carried out against the pre- and post-transfusion samples.

The tests above will be performed using plasma, however, if all tests for antibodies are negative and there is strong evidence of haemolysis, a serum sample may be requested in order to repeat the tests. It is possible that some weak, complement-dependent antibodies will be more readily detected in serum.

If all reactions are negative, further investigations will be considered for non-haemolytic transfusion reactions e.g. HLA antibodies, anti-IgA.

Private blood grouping

Routine ABO/D groups can be performed with or without an antibody screen and a blood group card can be issued. A charge is usually made for this service.

Problems with ABO/D grouping

Samples can be referred for investigation if anomalous results are obtained with routine ABO and/or D grouping, e.g. to distinguish between partial and weak D antigens. With ABO grouping problems saliva may be requested. It is important to include relevant clinical data on the request form. A blood group card may be issued if required.
**Direct antiglobulin test (DAT)**

In a high proportion of DAT positive cases with free autoantibodies referred to the RCI laboratories, alloantibodies are also present. Therefore it is recommended that samples from patients requiring a transfusion and with a positive DAT are referred so that clinically significant alloantibodies, which might be masked, can be detected and identified. In these cases absorptions may be performed and adequate volumes of samples are required.

In recently transfused patients who develop a positive DAT, this may be caused by alloantibodies bound to donor red cells (indicating a possible delayed haemolytic reaction); in such cases an eluate needs to be prepared for which at least 1mL of packed red cells are needed.

In patients with a positive DAT and a negative antibody screen who need transfusions, it is not necessary to refer samples prior to each transfusion episode. An eluate is indicated only if there is evidence of a delayed haemolytic transfusion reaction, a change in serology or if a higher frequency of transfusion than normal is required to maintain an adequate level of haemoglobin. The DAT may be positive in patients or in healthy individuals without overt haemolysis.

**Autoimmune haemolytic anaemia**

An ABO, Rh and K phenotype are performed on all referrals. A DAT is performed with isotype and complement specific reagents (anti-IgG, -IgA, -IgM, -C3c, -C3d).

Alloantibodies in addition to autoantibodies: samples are tested to ensure clinically significant alloantibodies that may be masked by autoantibodies are detected and identified. Eluates are prepared and tested only if the patient has been recently transfused, has received a haemopoietic stem cell or bone marrow transplant or has signs of haemolysis. If other tests have proved inconclusive an eluate might also be of value.

**Red Cell genotyping**

Red cell genotyping is undertaken in RCI laboratories to support and enhance timely decision-making to improve the safety of transfusion and improve patient outcomes.

In particular, the ability to determine blood type in previously transfused patients, and those with immunoglobulin coated cells will be of significant benefit. The service is available for referrals from all users but is provided from Tooting, Colindale, Birmingham, Sheffield, Filton, and Newcastle sites.

Low throughput, rapid turnaround genotyping is performed using the Innotrain Fluogene system. The FluoGene detection system is based on polymerase chain reaction (PCR) sequence specific priming (SSP) using the Amplification Refractory Mutation System (ARMS) principle. The test enables predicted phenotypes for commonly found antigens with the Rh (D,C,c,E,e,Cw), Kell, Kidd, Duffy, MNS and Dombrock blood group systems to be given.

The use of this test will be determined by RCI and clinical staff as part of the investigation. There is no facility to request this test from RCI, and there is no charge applied when it is undertaken.
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Drug associated autoimmune haemolytic anaemia

Haemolysis suspected to be associated with the use of a certain drug can be investigated, but advice should be sought from an RCI medical consultant before sending samples.

Cold agglutinins / haemolysins and cold haemagglutinin disease

A DAT is performed and the plasma is investigated for the presence of clinically significant red cell alloantibodies at 20°C. Subsequent tests may need to be performed at 4°C and 30°C where indicated to establish clinical significance and thermal amplitude. It is not necessary to warm separate samples unless titration studies are required or specifically requested to do so by the RCI laboratory. Cold agglutinin titrations at 4°C can be performed on request in Cold Haemagglutinin Disease patients.

Transfusion advice: SAGM-suspended cells that are ABO compatible, K negative and of a Rh phenotype matched with that of the patient are selected for transfusion. If the patient has clinically significant red cell antibodies units must also be negative for the relevant antigen(s). The blood is crossmatched by a standard antiglobulin technique strictly at 37°C.

Biphasic haemolysins and paroxysmal cold haemoglobinuria

Biphasic haemolysins as a cause of AIHA are extremely rare and mainly seen as a post-viral event in children. Routine investigations for AIHA do not include the test for biphasic haemolysins but where indicated, or on request, the Donath-Landsteiner test can be performed if paroxysmal cold haemoglobinuria (PCH) is suspected. If positive, the specificity of the antibody can be determined to confirm the diagnosis.

Transfusion advice: The haemolysis in PCH is generally self-limiting. Transfusion requirements can be discussed with a NHSBT medical consultant.

Paroxysmal nocturnal haemoglobinuria

If you require investigation of a suspected case of PNH the RCI laboratories will refer you to a specialist centre such as

Haematology Malignancy Diagnosis Service at Leeds Teaching Hospitals. Tel 0113 392 6285. Hospitals may refer samples there directly for testing.

Birmingham Heartlands: 0121 424 0706

Haematology dept. King’s College Hospital, London 0203 299 3520

Transfusion advice: Previously washed red cells were recommended for PNH patients. However, there is no evidence that the survival of washed red cells is better than that of those suspended in SAG-M.
Provision of crossmatched units in difficult cases

Where the provision of crossmatched units is problematic, the RCI laboratory can undertake the crossmatch. Please make the request for crossmatched units clear on the request form. All crossmatch requests required during routine hours must be telephoned to the local RCI laboratory. Out of hours, only crossmatch requests that are required to be tested within the out of hours period must be telephoned. If the request is sent overnight for investigation and provision of crossmatched units later the following day, please telephone the RCI lab as soon as possible during routine hours the following day to confirm. In the event of difficulty in contacting RCI, please contact Hospital Services department.

Crossmatched units may sometimes be labelled by RCI as “suitable”, rather than “compatible” for a patient. If this is because either a) serology testing is not complete within RCI or b) serology cannot be resolved and the sample needs to be sent to IBGRL for further investigation, but transfusion is required urgently before allo-antibodies have been identified/excluded – then hospital laboratory staff should inform their Consultant Haematologist, who may wish to discuss with an NHSBT Consultant, whether steroid or IVIg cover for transfusion may be appropriate. Transfusion observations should be reviewed and investigation for any signs of delayed haemolytic transfusion reaction (low Hb, raised LDH, bilirubin, reticulocytes) and if these are present renal function should be monitored.

If units are labelled as “suitable” because either a) an auto-antibody / pan-reactive antibody is present, but no alloantibodies are detected, b) the patient is on Daratumamab treatment or c) other reasons such as tests were performed with modified plasma e.g. neutralised for Chido/Rodgers, or allo-adsorbed, or d) cross-matching for a baby was performed using the mother’s plasma – then the additional clinical measures above are not required.

In cases where the delay in waiting for crossmatched units to arrive from RCI may adversely impact on the patient’s condition (e.g. Hb <60g/L or the patient is bleeding or actively haemolysing), then it is advised that hospital laboratory staff escalate the case to their local Consultant Haematologist to ensure there is a plan in place to mitigate the risk of any delay in blood provision. Advice is available from NHSBT Consultant Haematologists and RCI if required.

Investigation of IgA deficiency

In cases of anaphylactic transfusion reaction or other indications, samples can be referred to test for IgA deficiency and the presence of antibodies to IgA. A card is issued to the requesting clinician together with the RCI report for IgA deficient patients in whom IgA deficiency is diagnosed as part of a transfusion reaction, with or without anti-IgA, who have experienced transfusion reactions.

Please contact Sheffield RCI for advice of how to send samples for IgA investigation before sending the referral.

Routine antenatal Screening

RCI offers an antenatal screening service which comprises:

- ABO and RhD type
- Antibody screen
- Microbiology screening and confirmation for hepatitis B, HIV and syphilis (as per NHS Infectious Diseases Screening Programme - IDPS)
Screening is carried out using fully automated systems, with interface to RCI’s LIMS. For red cell screening, NHSBT reverse group and screening cells are used. All systems are subject to internal and external audit to BSQR and ISO15189. Expert advice for red cell screening is available within NHSBT. Confirmatory microbiology testing and clinical advice is provided via a partner NHS laboratory accredited to ISO15189.

A separate request form is available for antenatal screening samples which captures essential information regarding which microbiology tests have been offered and accepted and/or declined. The request form also identifies if the sample is a post 24 week booking sample in order that the microbiology screening can be performed within 24 hours. All screening tests are available throughout pregnancy for late bookers.

Any samples with a positive antibody screen are investigated further to identify clinically significant alloantibodies and a report is issued containing clinical significance, clinical and transfusion advice and instructions for repeat sampling. Samples with a positive microbiology screen are referred to a partner NHS laboratory for confirmation and a report is issued directly to the requestor, with a copy also sent to RCI.

Screen negative results are reported automatically and available on Sp-ICE within 3 working days. Other results are available on Sp-ICE immediately after they are authorised by RCI. Any samples which have been referred for confirmatory microbiology testing will have an RCI report issued indicating a confirmatory report will follow.

An electronic failsafe system is used to ensure follow up samples are received and tested.

**Haemolytic disease of the fetus and newborn (HDFN)**

Suspected cases of HDFN can be investigated by RCI reference laboratories to detect and identify the causative red cell antibody, including immune ABO antibodies. Samples are required from mother and newborn, carefully labelled to distinguish between them.

**Antenatal reference service**

RCI offers an antenatal reference service for women whose plasma contains irregular antibodies. The specificity of the antibody is determined or confirmed and the concentration is measured. All investigations related to the prevention of HDFN are in accordance with the Guideline for Blood Grouping and Antibody Testing in Pregnancy (2006) [https://b-s-h.org.uk/guidelines/guidelines/](https://b-s-h.org.uk/guidelines/guidelines/)

**Pregnant women with a positive red cell antibody screen**

If the antibody is confirmed and is of clinical significance to the fetus, the antibody will be quantified or titrated and follow-up tests performed as recommended by BSH guidelines above. Antibody cards and explanatory leaflets are issued to all women who have clinically significant antibodies.

The follow-up investigations are:

- Monitoring maternal red cell alloantibody levels
- Identification of possible additional clinically significant antibodies
In addition the following may be recommended:
- Red cell phenotyping of the father
- Fetal genotyping (at IBGRL) using peripheral maternal blood samples

**Measurement of maternal antibody levels during pregnancy (quantification and titration)**

Measurement of antibody concentration depends on the antibody specificity:
- anti-D and anti-c are quantified in comparison to a national standard (see below)
- other antibodies, including anti-K, are titrated by testing a series of doubling dilutions of the antibody. Where available, the previous archive sample will also be titrated. The result is expressed as a titre, i.e. the greatest dilution of plasma which gives a serological reaction. A titre of 32 or above is generally considered to have the potential to cause HDFN.
- antibodies such as anti-P₁, anti-Lea and anti-Leb, which do not cause HDFN, do not require measurement.

**Anti-D and anti-c** are the antibodies most likely to cause significant fetal disease. Therefore, pregnant women with these antibodies should be followed-up at monthly intervals until 28 weeks gestation and at two-weekly intervals thereafter to term. Anti-D and anti-c are quantified against a national standard and the strength of the antibody is reported in international units (IU/mL).

The measurement of antibody in international units is one of the tools available for assessing the likelihood of HDFN. An increase by 50% or greater over the previous level indicates a significant rate of increase, irrespective of the period of gestation.

**Generally the significance of anti-D and anti-c levels during pregnancy is as follows:**

<table>
<thead>
<tr>
<th>Antibody Level</th>
<th>Risk of HDFN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-D less than 4 IU/mL</td>
<td>HDFN unlikely</td>
</tr>
<tr>
<td>Anti-D 4-15 IU/mL</td>
<td>Moderate risk of HDFN, requiring referral to a specialist obstetric unit</td>
</tr>
<tr>
<td>Anti-D greater than 15 IU/mL</td>
<td>High risk of HDFN, requirement as above</td>
</tr>
</tbody>
</table>

NB. It should be noted that HDFN has been reported at levels less than 4 IU/mL.

<table>
<thead>
<tr>
<th>Antibody Level</th>
<th>Risk of HDFN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-c less than 7.5 IU/ mL</td>
<td>HDFN unlikely, continue to monitor</td>
</tr>
<tr>
<td>Anti-c 7.5 – 20 IU/mL</td>
<td>Moderate risk of HDFN, requiring referral to a specialist obstetric unit</td>
</tr>
<tr>
<td>Anti-c greater than 20 IU/mL</td>
<td>High risk of HDFN, requirement as above</td>
</tr>
</tbody>
</table>

RCI antenatal reports provide clinical advice regarding risk of HDFN and follow-up required.

It is essential that pregnant women with levels of anti-D of ≥ 4 IU/mL or anti-c at ≥ 7.5 IU/mL are referred to an obstetric unit with experience in non-invasive monitoring for fetal anaemia at the earliest opportunity. RCI provides this advice in the antenatal reports.

Measurement of uncertainty data for quantification, titration and FMH estimation is available on request.
Due to the adoption of the NICE guidance recommending routine antenatal anti-D prophylaxis for D negative women, there is a marked increase in the incidence of low level anti-D in antenatal samples taken after anti-D injection. BSH guidelines recommend that all antenatal samples where anti-D has been detected are referred for quantification by a reference laboratory (unless an in house fully validated technique is used). RCI will provide repeat sampling recommendations based on the BSH guidelines and information provided on the request form.

**Anti-K** is a significant cause of HDFN. More than 80% of women who have anti-K, have K negative partners. Guidelines recommend a sample from the father of the pregnancy should be K typed. RCI will not routinely request paternal samples, but will recommend on the maternal report that the results of paternal testing could provide useful information to support the management of the pregnancy. If the paternal sample is typed as K negative either by RCI, or the hospital transfusion laboratory provides written confirmation that they have typed a paternal sample as K negative, samples from the mother will be requested for re-testing at 28 weeks gestation. The report will state the current paternal details and it will be the responsibility of the healthcare professional monitoring the pregnancy to confirm these are correct. If the paternal sample is K positive or if there is any doubt, samples will be requested at monthly intervals to 28 weeks and fortnightly thereafter to term.

The concentration of **anti-K and other clinically significant antibodies** is assessed by testing dilutions of the patient’s plasma and the results are reported as a titre.

Pregnant women with clinically significant antibodies other than anti-D, anti-c and anti-K should normally be re-tested at 28 weeks gestation. The results at this time will determine the frequency of follow-up testing. These antibodies are titrated as for anti-K.

Many red cell antibodies have the potential to cause HDFN. Therefore, it is essential for ALL pregnant women found to have clinically significant red cell antibodies to be referred to a hospital obstetric unit for management of their pregnancy. For women with clinically significant antibodies, including anti-K, with a titre of ≥ 32 it is also recommended that referral to a specialist obstetric unit be considered (as for women with significant levels of anti-D or anti-c - see above).

Clinical advice is given on reports of all pregnant women with antibodies that could cause fetal disease.

**Exclusion of further antibodies**

All samples referred for antibody monitoring are tested to exclude further clinically significant red cell antibodies that might have developed.

**Paternal phenotype**

When an antibody with a high chance of causing HDFN is detected (i.e. anti-D, anti-c, anti-K or other significant antibody with a high titre) the maternal report will recommend that a sample from the partner of the fetus is phenotyped, because paternal testing can be a useful to guide clinical management.
Fetal genotype

If there is a high risk of severe HDFN, caused by anti-D, anti-c or anti-K, then prediction of the relevant genotype of the fetus should be considered on the advice of a Consultant in fetal medicine. Fetal D, C, c, E and K genotyping can be performed on a sample of maternal blood. The molecular typing service is provided by IBGRL. [www.blood.co.uk/ibgrl](http://www.blood.co.uk/ibgrl)

Feto-maternal haemorrhage estimation

In any case where the Kleihauer test indicates a FMH > 2mL of fetal red cells, or where the test result is equivocal, a sample (the same as used for the Kleihauer test) can be referred to RCI for confirmation by flow cytometry. Advice on how much additional anti-D prophylaxis is recommended for large bleeds will be provided by an RCI Consultant Haematologist.

To ensure timely testing, please telephone your local RCI FMH testing laboratory if you intend to send samples for flow cytometry. In the event of difficulty in contacting RCI, please contact Hospital Services department.

Please note that for large bleeds >40mL an intravenous (IV) anti-D preparation is recommended in preference to intramuscular injection.

Provision of blood for IUT

RCI will crossmatch units for IUT on request. It is essential that RCI is notified in advance of any planned IUT in order that suitable units can be identified in a timely manner. RCI will only perform crossmatching for IUT out of hours if the case is clinically urgent.

Medical and scientific advice

Advice on all aspects of RCI investigations can be obtained from Consultant Haematologists and senior scientists. Contact details are given in Appendix 1. This advice is available 24 hours per day and details of how to contact us outside our normal working hours are given in ‘On Call’ below.

Reports include advice on selection of units for transfusion and, in the case of antenatal samples, advice on the significance of antibodies in pregnancy and the requirements for re-testing.

Out of hours/On Call

All blood centres can be contacted 24 hours per day, every day of the year (Appendix 1). Out of hours hospitals should contact RCI via Hospital Services rather than directly on all sites except Filton where a Smart Divert number: 01179693927 is in use for hospitals to contact RCI on call BMS directly.

Urgent cases

RCI aim to report results within five working days. Any referral which requires a result before this time, or any crossmatch request should be treated as an urgent request. Interim results might be incomplete and subject to change/addition before issue of the final report and may require review before they can be given. Please notify the RCI laboratory by telephone of any urgent requests. All crossmatch requests required during routine hours must be telephoned to
the local RCI laboratory. Out of hours, only crossmatch requests that are required to be tested within the out of hours must be telephoned.

During normal working hours contact the local RCI laboratory or Consultant Haematologist. Out of normal RCI laboratory working hours, for clinical and scientific advice and discussion about urgent cases and requests for urgent investigations, phone the Hospital Services department. They can put you in contact with a RCI laboratory scientist or a medical consultant.

In the event of difficulty in contacting RCI, please contact Hospital Services department.

Both during and outside RCI laboratory working hours your contact will ask you for information about urgent referrals in order to understand the immediate requirement and urgency of the case and to assist in the appropriate investigation. In addition to the patient demographics you will be asked for: the patient’s condition, current haemoglobin level, transfusion and/or obstetric history, drug history, if relevant, and transfusion requirement (special requirements etc.). We will also ask for a summary of your serological findings.

Collection of data on the outcome of pregnancies with clinically significant antibodies.

In order to collect and collate data on the effect of red cell antibodies on the fetus and newborn, RCI will issue a questionnaire for selected women who have red cell antibodies. The questionnaire requests information about the outcome of the pregnancy and condition of the baby. The aim is to build up a body of evidence about the effect of antibodies of known specificity and strength which will be valuable in determining future policies and practices for the testing and treatment of pregnant women with antibodies. Expectant mothers are informed via the antenatal information leaflet "Blood Groups and Red Cell Antibodies in Pregnancy" and on the information sheet issued with cards sent to women with significant red cell antibodies. Data Protection requirements are satisfied by the statements on the questionnaires together with the Service Level Agreement between the NHSBT and your Trust. The help and cooperation of users in completing these questionnaires is an essential contribution to this initiative.

Patient information cards

A patient information card will be sent for patients with clinically relevant irregular red blood cell antibodies or IgA deficiency with a history of transfusion reaction.
Request forms, samples, labelling requirements

Request forms

Request forms can be ordered free of charge from any NHSBT RCI laboratory. There is one request form for all RCI reference work (1A)

Sample requirements

Full details of sample requirements are listed on the reverse of the request forms.

In summary:

<table>
<thead>
<tr>
<th>Investigation</th>
<th>Sample Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alloantibody investigation</td>
<td>2 x 6mL EDTA</td>
</tr>
<tr>
<td>ABO/Rh grouping problems</td>
<td>1 x 6mL EDTA</td>
</tr>
<tr>
<td>Extended RBC phenotype</td>
<td>1 x 6mL EDTA</td>
</tr>
<tr>
<td>Auto-immune haemolytic anaemia</td>
<td>2 x 6mL EDTA</td>
</tr>
<tr>
<td>+ positive DAT</td>
<td></td>
</tr>
<tr>
<td>Haemolytic transfusion reaction</td>
<td>2 x 6mL EDTA post transfusion</td>
</tr>
<tr>
<td></td>
<td>1 x 6mL EDTA pre-transfusion + lines/remnants from units</td>
</tr>
<tr>
<td>Compatibility testing</td>
<td>2 x 6mL EDTA</td>
</tr>
<tr>
<td>IgA deficiency/antibodies</td>
<td>2 x 6mL EDTA</td>
</tr>
<tr>
<td>Haemolytic disease of the newborn</td>
<td>2 x 6mL EDTA + 1mL cord blood</td>
</tr>
<tr>
<td>Anti-D/-c quantification</td>
<td>2 x 6mL EDTA</td>
</tr>
<tr>
<td>Paternal phenotyping</td>
<td>1 x 6mL EDTA</td>
</tr>
<tr>
<td>Assessment of FMH or other minor RBC population</td>
<td>1 x 6mL EDTA</td>
</tr>
<tr>
<td>Routine antenatal screening</td>
<td>2 x 6mL EDTA</td>
</tr>
<tr>
<td>All other investigations</td>
<td>Please contact your local RCI laboratory</td>
</tr>
</tbody>
</table>

Haemolysed and Lipaemic samples

Sending haemolysed and/or lipaemic samples should be avoided where possible as free haemoglobin and/or fatty plasma can produce test result errors especially when using automated equipment. Such samples may have to be rejected. However, it is recognised that there are situations when haemolysis, in particular, is a result of the patient’s condition. Please ensure that relevant details are included on the request form to help determine suitability of samples for investigation.

Labelling of samples / completion of request forms

All samples must be accompanied by a request form specifying the tests or investigations required.

Request forms are the basis of the correct identification of the patient. The SHOT scheme has shown that serious hazards of transfusion are often caused by clerical errors. The points of identification provided on the request form must match the information provided on the sample. RCI will not accept referrals with an inadequate request form or sample labelling (see Guidelines for Compatibility Testing in Blood Transfusion Laboratories 2012).

https://b-s-h.org.uk/guidelines/guidelines/
In case of a clinical emergency RCI may agree with the requesting Consultant Haematologist or laboratory scientist to proceed with the requested investigations under concession. In such cases reports will carry an explicit warning that the three points of identification were not used for the samples and / or request form and advice that caution should be taken when accepting the results.

The requester is advised to check the identifiers and to obtain reassurance about the identifiers used for the linking between patient and sample.

Samples labelled with Addressograph labels, i.e. pre-printed labels, are not accepted by RCI. Demand printed labels which have been generated and attached at the bedside at the time of phlebotomy from scanning bar-coded wristbands on an automated system are acceptable for samples. Since it is not possible to distinguish reliably between demand printed and Addressograph labels they can be accepted only from referring organisations which have informed RCI, in writing, that their sample labels are generated in an audited system and are demand printed at the time of phlebotomy. Please contact your local Customer Services Manager if you wish to discuss this.

RCI will not normally test samples unless three or more identical points of identification are used on both request forms and samples.

Minimum patient identification. Surname and first name are one identifier:

- Surname / family name
- First name(s) in full (correctly spelt)
- NHS number or hospital number
- Date of birth

While RCI will accept hospital number as a third identifier, we would remind users that the hospital number does not specifically identify your patient. Since some hospitals use the same numbering systems and RCI stores patient data on a national database, the use of hospital number without other points of identification may lead to errors. Please use the NHS number where available. RCI are working towards a zero-tolerance policy for inadequately labelled samples.

The sample tube should be signed by the person taking the sample and must be dated to ensure that it is fresh enough to give accurate results within the parameters of the test(s) requested. For pre-transfusion samples, the time the sample was taken must also be on the sample tube. If this is not provided RCI will use a default time of 00:00 (midnight)

The following additional information is required on the request form:

- Requesting hospital (Please use your NHS code)
- Name of consultant or clinician
- Ethnic origin of patient
- Type of investigations requested, including requests for crossmatched units
- Clinical condition
- Current haemoglobin level (for cross match requests)
- Recent transfusion history (for hospital reference cases)
- Dates and doses of recent anti-D prophylaxis
RCI should be informed if samples are from private patients. The terms and conditions of service provision for the NHS by the NHSBT are agreed with the National Commissioning Group. Service provision for private patients may be charged differently.

Clinical information is essential for providing the most appropriate laboratory tests. The quality of clinical advice will also depend on provision of adequate clinical information. Absence of clinical information may lead to a delay in processing of the sample if the requester needs to be contacted to agree on the type of investigations. In particular notification of the administration of therapeutic monoclonal antibodies such as anti-CD47 or anti-CD38 is of critical importance.

The sample must be dated as the outcome of several tests may be influenced by the age of the sample. It also allows RCI to monitor turnaround times.

The type of investigation requested and reason for the request must be clearly identified on the request form.

Due to the size of neonate sample tubes, these may be accepted with an attached label, that has been completed at the time of phlebotomy, which meets the sample acceptance criteria.
The labelling requirements for samples and request forms is summarised in the following table:

<table>
<thead>
<tr>
<th></th>
<th>Sample</th>
<th>Request Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note</td>
<td>all RCI samples must be handwritten /demand printed labels</td>
<td></td>
</tr>
<tr>
<td><strong>NHS number</strong></td>
<td>Essential (if available)</td>
<td>Essential (if available)</td>
</tr>
<tr>
<td><strong>Name</strong></td>
<td>Essential</td>
<td>Essential</td>
</tr>
<tr>
<td>First and last name spelt correctly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unless patient/donor identity is confidential</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Date of Birth</strong></td>
<td>Essential</td>
<td>Essential</td>
</tr>
<tr>
<td><strong>Hospital Number or temporary unique identification number.</strong></td>
<td>Optional - <strong>must be</strong> used if NHS number is not available</td>
<td>Desirable - <strong>must be</strong> used if NHS number is not available</td>
</tr>
<tr>
<td><strong>Address</strong></td>
<td>Optional</td>
<td>Optional for reference samples but essential for antenatal screening samples</td>
</tr>
<tr>
<td><strong>Date sample taken</strong></td>
<td>Essential</td>
<td>Essential</td>
</tr>
<tr>
<td><strong>Time sample taken</strong></td>
<td>Essential for pre-transfusion samples</td>
<td>Essential for pre-transfusion samples</td>
</tr>
<tr>
<td><strong>Signature of person taking sample</strong></td>
<td>Essential</td>
<td>Not required</td>
</tr>
<tr>
<td><strong>Requesting institution name and location code</strong></td>
<td>Not required</td>
<td>Essential</td>
</tr>
<tr>
<td><strong>Requesting Clinician</strong></td>
<td>Not required</td>
<td>Essential</td>
</tr>
<tr>
<td><strong>Signature of requester</strong></td>
<td>Not required</td>
<td>Essential</td>
</tr>
<tr>
<td><strong>Clinical information: clinical condition, current Hb, recent transfusion history, dates and doses of anti-D</strong></td>
<td>Not required</td>
<td>Essential</td>
</tr>
<tr>
<td><strong>Tests required</strong></td>
<td>Not required</td>
<td>Essential</td>
</tr>
<tr>
<td><strong>Sample source e.g. blood, spleen</strong></td>
<td>Essential if not peripheral blood</td>
<td>Essential if not peripheral blood</td>
</tr>
</tbody>
</table>
Red Cell Immunohaematology User Guide

Tubes

Glass tubes are not acceptable. It is the responsibility of the referrer to ensure samples tubes are in date. NHSBT will reject blood samples that are taken in to expired sample tubes as it is against manufacturers recommendations. In circumstances where there is a clinical need to test such samples a concession will be required.

Packaging of samples

It is the responsibility of the sender to ensure that all samples are packaged in accordance with the current recommendations on the Transport of Dangerous Goods: United Nations Model Regulations to prevent breakage or spillage in transit. The outside of the box or package containing the samples must be clearly addressed to the appropriate Red Cell Immunohaematology Department with storage instructions for labile material. NHSBT reserves the right to refuse to handle any samples which are inappropriately packaged or labelled. For advice on posting samples see www.royalmail.com

Transport of samples

The storage and transport of samples from referring laboratories, prior to receipt at RCI, may impact upon the condition of the specimen and its suitability for testing. RCI request that hospitals follow the recommendations of BSH guidelines for pre-transfusion compatibility procedures in blood transfusion laboratories, which state that whole blood samples are suitable for testing if they have been stored at room temperature for up to 48 hours and beyond 48 hours (and up to 7 days, dependent on the history of the patient), whole blood should then should be stored at 2–8 °C.

Referring hospitals should ensure they have local policies or guidelines in place which detail how blood samples should be stored and transported to RCI in a timely manner, including emergency and urgent samples. RCI sample reception procedure includes a check of condition and age of sample to ensure samples are tested within 7 days of date taken. Any sample which cannot be tested within 7 days of being bled will be rejected.

All packages must be clearly labelled to ensure samples do not go astray. Please do not put samples for RCI in the same box as samples for other NHSBT laboratories as this could result in a delay in the samples being received by RCI. Printable address label templates are available on the Hospitals and Science website: https://hospital.blood.co.uk/diagnostic-services/red-cell-immunohaematology/address-labels-for-sample-boxes. Using these labels will help NHSBT staff to identify where the boxes need to be delivered to after they arrive on site, and reduce the risk of samples being incorrectly stored or forwarded to the wrong department.

The labels can be printed onto labels measuring 99.1 x 38.1 mm

Blood centre location maps can be provided on request.

Routine samples

Samples for non-urgent testing by RCI can be given to the NHSBT blood delivery driver. Please contact Sheffield RCI department for advice of how to send samples for IgA investigation before sending the referral.
Urgent samples

For urgent samples during or after normal working hours, please phone the RCI laboratory and discuss the arrangements for sending the samples. In the event of difficulty in contacting RCI, please contact Hospital Services department. Urgent samples should be transported directly from the hospital transfusion laboratory or requesting clinician to the blood centre. **NHSBT transport is not suitable for samples requiring urgent investigation.**

Reports

A medical consultant or a senior scientist sees all non-routine reports before they are issued and relevant clinical comments are made. The basic principle for reporting is to send the report to the requester. RCI reports on referrals received through hospital transfusion laboratories will be addressed to the requesting laboratory, however the final responsibility lies with the hospital Consultant Haematologist who may or may not delegate that responsibility to the laboratory manager.

Report turnaround time

RCI will produce final authorised reports on all referred samples. Normally these will be available on more than 95% of referrals within 5 working days of receipt. Reporting performance is monitored on a monthly base and if the target is consistently not met or not met for an extended period then users will be informed.

Copy Reports:

Copy report arrangements with service users are documented. If additional copies are required these need to be identified on the request form. Printed reports will be reconciled against documented requirements and the request form. If the request form and documented arrangement conflict the requirement for additional copies will be confirmed with the requestor. When requested, urgent reports can be faxed or e-mailed to a requester via an nhs.net account.

Sp-ICE

Registered users may access RCI results on the NHSBT web browser at any time. Results are placed on the web browser within one hour of the final report being printed and are therefore available before the hard copy report has reached the requester. For further details about access to the web browser contact the NHSBT Information Governance Manager (Tel. 0191 202 4581).

Computer records

The RCI laboratories are supported by a national computer system, Hematos, on which patient data are stored. NHSBT computer systems are registered under the Data Protection Act. Staff access to the patient database is on a need-to-know basis for clinical care purpose only and patient confidentiality is respected at all times.
NHSBT Reagents

NHSBT Reagents are produced at the Liverpool Centre.

Quality Statement

Where applicable, products are CE marked (98/79/EC) and all products comply with the standards laid down in the Guidelines for the Blood Transfusion Services in the UK (current edition) and are prepared to best standards of practice.

Ordering of reagents

Ideally reagents should be ordered on a standing order basis which is renewed each year. Alternatively they can also be ordered or on an ad-hoc basis by telephone, in writing or by e-mail (reagents@nhsbt.nhs.uk) to Reagents Customer Services

Prices

A price list is available on request from the contacts listed below and on-line.

Red Cell Reagents

All cells have a 52 day expiry date and are CE marked.

ABO reverse grouping and Rh control cells

10mL volumes of 3% A₁, A₂, Brr, BR₁r and OR₁r cells in Alsevers
10mL volumes of 0.8% A₁rr, Brr and OR₁r cells in BioRadCellStab
10mL volumes of 0.8% A₁rr, Brr and OR₁r cells in Grifols CellMedia

Antibody detection and identification

2-cell screen - consisting of OR₁R₁ and OR₂R₂ with homozygous expression of the S, s, Fyᵃ, Fyᵇ, Jkᵃ and Jkᵇ antigens and positive for K, P₁, N, Leᵃ and Leᵇ.

3-cell screen - consisting of OR₁R₁, OR₂R₂, and Orr with homozygous expression of the antigens as per the 2-cell screen.

Screening cells are supplied in Alsevers, BioRad CellStab or Grifols CellMedia

A range of antibody identification panels is available and are supplied as native or enzyme treated in Alsevers, CellStab and CellMedia. Panel cells in LISP are also available (non-enzyme treated only).
Red Cell Immunohaematology User Guide

Two panel sets in Alsevers, CellStab and CellMedia (native and enzyme treated) are available at all times with each panel derived from a different set of donors to allow better identification of antibody mixtures.

rr screening cells are available in CellStab and CellMedia for use in determining the presence of red cell antibodies in patients who have received prophylactic anti-D. A further pair of r'r and r'r cells are available for use in conjunction with the rr set in order to assist in the detection of anti-C and/or anti-E antibodies.

Titration cell sets consisting of R1R2 and R1R2 cells in CellStab are available for use in antibody titration tests.

**Antiglobulin test**

*IgG coated cells*
For addition to apparent negative antiglobulin reactions to ensure that there has been no inhibition of the anti-IgG. Sensitised with anti-D to give a grade 2-3 positive reaction to help ensure that even partial inhibition is detected.
Supplied as 1 x 10mL of 4% suspension

*Weak IgG anti-D control*
0.08 to 0.1 IU/mL for use as a positive control in antibody screening. Supplied as 1x10mL volume.

*Weak anti-c, anti-K and anti-Fy² controls.*
Supplied as 1 x 10mL volume

*Inert serum from group AB donors for use as a negative control*
Supplied as 1 x 10mL volume

**Serological controls and other products**

*Whole blood controls*
A and B cells (one of which is RhD positive and the other RhD negative). One containing anti-D and the other anti-K.
Supplied as a set of 2 x 5mL volumes.

*IPEx*
Supplied 6 times a year this can be used for internal proficiency testing, staff training etc. Most exercises are accompanied by some CPD questions.

**See Appendix 1 for NHBTS Reagents contact details**

NHSBT Reagents documents including order forms, price lists, product inserts, material safety data sheets, product profiles and certificates can be found at:
https://hospital.blood.co.uk/diagnostic-services/reagents/
Appendix 1

CONTACT DETAILS

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Office</th>
<th>Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head of RCI</td>
<td>Dr. Mark Williams</td>
<td>0113 820 8675</td>
<td>0776 428 0733</td>
</tr>
<tr>
<td>National Operations Manager – RCI</td>
<td>Sarah Thompson</td>
<td>0151 268 7144</td>
<td>0782 335 1741</td>
</tr>
<tr>
<td>Process Improvement Manager – RCI</td>
<td>Tess Winfield</td>
<td>0113 828 8659</td>
<td>0759 035 2173</td>
</tr>
<tr>
<td>Clinical Director – Diagnostics</td>
<td>Dr. Fiona Regan</td>
<td>0208 957 2834</td>
<td>0771 144 7235</td>
</tr>
<tr>
<td>Lead Quality Specialist – SpS</td>
<td>Jeremy Kellington</td>
<td></td>
<td>0776 428 0316</td>
</tr>
<tr>
<td>Head of Hospital Customer Service</td>
<td>Chris Philips</td>
<td>01912026612</td>
<td>0788 930 4517</td>
</tr>
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REAGENTS:

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Telephone</th>
<th>Mobile</th>
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<tr>
<td>Reagents Operations Manager</td>
<td>Michelle Weston</td>
<td>0151 268 7160</td>
<td>0776 428 0298</td>
</tr>
<tr>
<td></td>
<td>14 Estuary Banks, Speke, Liverpool, L24 8RB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

New or amended orders and General Enquiries 14 Estuary Banks, Speke, Liverpool, L24 8RB 0151 268 7157 Fax: 0151 268 7156

RCI:

BIRMINGHAM - Routine opening hours: 08:00-23:00 Mon to Fri
Address: Vincent Drive, Edgbaston, Birmingham, B15 2SG

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Office</th>
<th>Mobile</th>
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<tr>
<td>Centre switchboard</td>
<td></td>
<td>0121 278 4000</td>
<td></td>
</tr>
<tr>
<td>Hospital Services Department</td>
<td></td>
<td>0121 278 4037</td>
<td></td>
</tr>
<tr>
<td>RCI Consultant Haematologist</td>
<td>Dr Rekha Anand</td>
<td>0121 278 4013</td>
<td>0776 428 0630</td>
</tr>
<tr>
<td>Customer Services Manager</td>
<td>Cathy Lim</td>
<td></td>
<td>0747 114 7884</td>
</tr>
<tr>
<td>Head of Laboratory</td>
<td>Ian Skidmore</td>
<td>0121 278 4125</td>
<td>0780 890 6443</td>
</tr>
<tr>
<td>NHS email –</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><a href="mailto:NHSBT.rcibirmingham@nhs.net">NHSBT.rcibirmingham@nhs.net</a></td>
<td></td>
<td></td>
<td></td>
</tr>
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FILTON - Routine opening hours: 08:00-22:00 Mon to Fri, 08:00-16:00 Sat
Address: North Bristol Park, Northway, Filton, Bristol, BS34 7QH

<table>
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<tr>
<th>Position</th>
<th>Name</th>
<th>Office</th>
<th>Mobile</th>
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<tr>
<td>Centre switchboard</td>
<td></td>
<td>0117 921 7200</td>
<td></td>
</tr>
<tr>
<td>Hospital Services Department</td>
<td></td>
<td>0117 921 5724</td>
<td></td>
</tr>
<tr>
<td>RCI Consultant Haematologist</td>
<td>Dr Tom Latham</td>
<td>0117 921 7474</td>
<td>0751 576 1072</td>
</tr>
<tr>
<td>Customer Services Manager</td>
<td>Inga Willett</td>
<td></td>
<td>0752 529 9062</td>
</tr>
<tr>
<td>Head of Laboratory</td>
<td>Dr Wendy Etheridge</td>
<td>0117 921 7511</td>
<td>0776 428 0719</td>
</tr>
<tr>
<td>NHS email –</td>
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<tr>
<td><a href="mailto:NHSBT.rcifilton@nhs.net">NHSBT.rcifilton@nhs.net</a></td>
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</table>
Red Cell Immunohaematology User Guide

COLINDALE Routine opening hours: 08:00-20:00 Mon to Fri, 09:00-17:00 Sat
Address: Colindale Avenue, London, NW9 5BG

<table>
<thead>
<tr>
<th>Centre switchboard</th>
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<th>Mobile</th>
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<tbody>
<tr>
<td>Hospital Services Department</td>
<td>0208 957 2700</td>
<td></td>
</tr>
<tr>
<td>RCI Consultant Haematologist</td>
<td>Dr. Fiona Regan</td>
<td>0208 957 2834</td>
</tr>
<tr>
<td>Customer Services Manager</td>
<td>Deepa Takha</td>
<td>0752 529 9062</td>
</tr>
<tr>
<td>Colindale hospitals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cambridge and Basildon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hospitals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head of Laboratory</td>
<td>0208 957 2743</td>
<td>0771 144 7196</td>
</tr>
</tbody>
</table>

NHS email – NHSBT.rcicolindale@nhs.net

LEEDS Routine opening hours: 08:00-21:00 Mon-Fri
Address: Bridle Path, Leeds, LS15 7TW

<table>
<thead>
<tr>
<th>Centre switchboard</th>
<th>Office</th>
<th>Mobile</th>
</tr>
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<tbody>
<tr>
<td>Hospital Services Department</td>
<td>0113 820 8600</td>
<td></td>
</tr>
<tr>
<td>RCI Consultant Haematologist</td>
<td>Dr Robert Webster</td>
<td>0114 358 4813</td>
</tr>
<tr>
<td>Customer Services Manager</td>
<td>Robin Coupe</td>
<td>0771 144 7308</td>
</tr>
<tr>
<td>Head of Laboratory</td>
<td>0113 820 8697</td>
<td>0747 114 7917</td>
</tr>
</tbody>
</table>

NHS email – NHSBT.rcileeds@nhs.net

LIVERPOOL Routine opening hours: 08:00-21:00 Mon-Fri, 09:00-17:00 Sat
Address: 14 Estuary Banks, Speke, Liverpool, L24 8RB

<table>
<thead>
<tr>
<th>Centre switchboard</th>
<th>Office</th>
<th>Mobile</th>
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<tbody>
<tr>
<td>Hospital Services Department</td>
<td>0151 268 7000</td>
<td></td>
</tr>
<tr>
<td>RCI Consultant Haematologist</td>
<td>Dr Therese Callaghan</td>
<td>0151 268 7012</td>
</tr>
<tr>
<td>Customer Services Manager</td>
<td>Rukhsana Hashmet</td>
<td>0771 144 7383</td>
</tr>
<tr>
<td>Head of Laboratory</td>
<td>0151 268 7144</td>
<td>0752 529 9023</td>
</tr>
</tbody>
</table>

NHS email – NHSBT.rciliverpool@nhs.net

NEWCASTLE Routine Opening hours: 08:00-21:00 Mon to Fri
Address: Holland Drive, Newcastle upon Tyne, NE2 4NQ

<table>
<thead>
<tr>
<th>Centre switchboard</th>
<th>Office</th>
<th>Mobile</th>
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<tbody>
<tr>
<td>Hospital Services Department</td>
<td>0191 202 4400</td>
<td></td>
</tr>
<tr>
<td>RCI Consultant Haematologist</td>
<td>Dr Andrew Charlton</td>
<td>0191 202 4548</td>
</tr>
<tr>
<td>Customer Services Manager</td>
<td>Robin Coupe</td>
<td>0747 114 8121</td>
</tr>
<tr>
<td>Head of Laboratory</td>
<td>0191 202 4416</td>
<td>0771 144 7558</td>
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</table>

NHS email – NHSBT.rcinewcastle@nhs.net

SHEFFIELD Routine opening hours: 08:00-21:00 Mon to Fri
Address: Longley Lane, Sheffield, S5 7JN

<table>
<thead>
<tr>
<th>Centre switchboard</th>
<th>Office</th>
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</thead>
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<tr>
<td>Hospital Services Department</td>
<td>0114 358 4800</td>
<td></td>
</tr>
<tr>
<td>RCI Consultant Haematologist</td>
<td>Dr Robert Webster</td>
<td>0114 358 4813</td>
</tr>
<tr>
<td>Customer Services Manager</td>
<td>Delia Smith</td>
<td>0771 144 7308</td>
</tr>
<tr>
<td>Head of Laboratory</td>
<td>0114 358 4855</td>
<td>0787 263 6762</td>
</tr>
</tbody>
</table>

NHS email – NHSBT.rcisheffield@nhs.net
Appendix 2

Reporting adverse reactions to transfusions

There is a regulatory requirement in the UK under the terms of the Blood Safety and Quality Regulations 2005 to report adverse reactions related to transfusion. The Medicines and Healthcare Products Regulatory Agency (MHRA) has been appointed the Competent Authority on behalf of the Secretary of State to administer the regulations, and has developed a web-based haemovigilance reporting system called SABRE (Serious Adverse Blood Reactions and Events) to facilitate reporting.

All Trusts in the UK should be registered with the MHRA and must submit a 'notification' report to them as soon as possible following a reaction. At the time of reporting, there is the opportunity to tick a box allowing SHOT (the Serious Hazards of Transfusion confidential enquiry) access to the report details. Failure to tick this box will result in a call from the MHRA Adverse Incident Centre to advise the reporter of the need to report also to SHOT.

The SHOT Office will review the incident details and, if appropriate, will assign a questionnaire for the reporter to complete on-line. An automated e-mail is generated informing the reporter which questionnaire has been allocated and containing a link to access it. This SHOT questionnaire should be completed and returned via SABRE as soon as possible. Automated reminders will be sent at regular intervals until the questionnaire is completed.

Following investigation of the incident by the reporting hospital, and where appropriate by the blood services, the reporter is required to submit a 'confirmation' report to MHRA via SABRE which effectively closes the case, provides an assessment of the likelihood of the reaction being due to the blood component and details, where appropriate, any corrective and preventative actions put in place to reduce the likelihood of the event recurring.

Current SHOT reporting categories may be found at:

Cases in which the wrong blood component was transfused (IBCT), cases of acute transfusion reactions (ATR) including anaphylaxis and delayed haemolytic transfusion reactions (HTR) may be referred to RCI for investigation.
### Appendix 3  Information for ISO15189 4.5 Examination by referral laboratories

<table>
<thead>
<tr>
<th>Test Name</th>
<th>TAT</th>
<th>Confirmation that method has been validated / verified</th>
<th>Ref Range, include UoM if relevant (if N/A please comment)</th>
<th>Name of EQA scheme – include scheme ref (if N/A please comment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibody identification</td>
<td>95% reported within 5 working days</td>
<td>Yes, accredited to ISO15189 as per schedule 8740</td>
<td>See UoM for titration which is manual IAT</td>
<td>NEQAS BTLP</td>
</tr>
<tr>
<td>Blood grouping and phenotyping (including anomalous types)</td>
<td>95% reported within 5 working days</td>
<td>Yes, accredited to ISO15189 as per schedule 8740</td>
<td>N/A These results are qualitative not quantitative and therefore the reported result will not be associated with an uncertainty of measurement value. RCI has considered the factors which may contribute to variation within the testing procedure from patient to reporting the result. Note UoM has been calculated for automated grouping which is &lt;1</td>
<td>NEQAS BTLP</td>
</tr>
</tbody>
</table>
| Antenatal antibody titration/quantification | 95% reported within 5 working days | Yes, accredited to ISO15189 as per schedule 8740 | Titration = >95% results are +/- 1 dilution  
Quant = 15% | NEQAS antibody titration pilot  
AAQS anti-D and anti-C quantitation |
| FMH quantitation | 95% reported within 5 working days | Yes, accredited to ISO15189 as per schedule 8740 | 7% | NEQAS FMH quantitation |
| Investigation of autoantibodies / transfusion reactions and other complex red cell serology investigation | 95% reported within 5 working days | Yes, accredited to ISO15189 as per schedule 8740 | See UoM for titration which is manual IAT | NEQAS BTLP | NEQAS genotyping pilot |
| Anti-A and anti-B titres | 95% reported within 5 working days | Yes, accredited to ISO15189 as per schedule 8740 | See UoM for titration which is manual IAT | NEQAS ABOI titration pilot |