Northumbria Healthcare
NHS Foundation Trust

NORTHUMBRIA HEALTHCARE BLOOD TRANSFUSION LABORATORY HANDBOOK

Location of laboratory

Northumbria Healthcare NHS Foundation Trust **Blood Transfusion Department** is located at the Northumbria Specialist Emergency Care Hospital in Cramlington. This centralised testing service supplies blood and components to all sites within the Trust. Regular routine transport runs between NSECH/NTGH and NSECH/WGH. Supply to other hospitals within the Trust is on an ad hoc basis.

Clinical services offered by the laboratory

The laboratory provides a comprehensive testing and provision of component service. Clinical advice is also available 24/7.

Test repertoire includes:

- blood grouping and antibody screening
- antibody identification
- supply of blood components
- supply of blood products
- screening of prevention of haemolytic disease of the foetus and newborn (HFDN)

Referral Laboratories

Complex investigations and the provision of components for complex cases may need to be referred for further investigation. Samples are referred directly to the following laboratories:

Red Cell Immunohaematology Newcastle Blood Transfusion Centre Barrack Road Newcastle NE2 4NQ 0191 202 4416	Red Cell Immunohaematology Leeds Blood Transfusion Centre Bridle Path Leeds LS15 7TW 0113 820 8658	Histocompatibility and Immunogenetics Newcastle Blood Transfusion Centre Barrack Road Newcastle NE2 4NQ 0191 202 4410	Histocompatibility and Immunogenetics Filton Blood Transfusion Centre 500 North Bristol Park, Filton Bristol BS34 7QH 0117 912 5733

Northumbria Healthcare NHS Foundation Trust

Contact Numbers and Opening Hours

	Email	Availability	Extension	Direct Dial
Transfusion Laboratory	transfusion-nsech@nhct.nhs.uk Do not use for urgent queries	24/7	72242 72241 72243	0191 6072242 0191 6072241 0191 6072243
Transfusion Laboratory Fax		24/7	72241	0191 6072241
Transfusion Senior Staff – Cheryl Kempton and Sharon Nicholls	cheryl.kempton@nhct.nhs.uk sharon.nicholls@nhct.nhs.uk	08:15 – 20:00 Monday - Friday	72242	0191 6072242
Transfusion Laboratory Manager – Karen Ward	karen.ward@nhct.nhs.uk	09:00 – 17:00 Monday – Friday	72233	0191 6072233
Consultant Lead for Transfusion – Dr Simon Lyons	simon.lyons@nhct.nhs.uk	09:00 – 17:00 Monday – Friday	36853	07557 295895
Transfusion Practitioner – Anna Bartholomew	anna.bartholomew@nhct.nhs.uk	08:06 – 18:00 Tuesday - Friday	33817	07825 078456
Transfusion Support Assistant – Amanda Tate	amanda.tate.@nhct.nhs.uk	13:00 – 17:36 Monday – Friday	72243	0191 6072243
Emergency Direct Outside Line		Only to be used in the event of a major incident		01670 707129
Clinical Advice		24/7 – contact Consultant Haematologist via switchboard		
Major Haemorrhage at NSECH only		24/7 – activate protocol by calling 2222		

Urgent Requests

Please contact the laboratory by telephone to alert laboratory staff of samples en route for urgent processing.

Making a Complaint

Should you wish to raise a concern or make a complaint please speak initially to a member of the laboratory senior team who will hopefully be able to resolve the issue quickly. Informal concerns and complaints should then be emailed to transfusion-nsech@nhct.nhs.uk. Informal complaints will be documented and investigated via the transfusion incident monitoring process.

Formal complaints should be logged and investigated as per Trust Policy RMP14.

Completion of the Request Form

Please use the appropriate request form for the tests and/or components/products required – there are currently 3 forms in use for blood transfusion:

- Purple blood transfusion request form – group/antibody screen and retain sample, direct antiglobulin test, supply of blood components or products, prevention of HFDN testing
- Antenatal booking form – group/antibody screen pregnant woman at booking only
- Antenatal request form – group/antibody screen pregnant woman at any time during pregnancy but not at delivery

Complete the form in ballpoint (indelible) ink ensuring the handwriting is clear and legible. Pre-printed patient identification labels can be used on the request form (but not on the sample itself) ensuring the additional information required e.g. ward/hospital/surgery is clearly stated.

The transfusion request form must contain:

- Full patient identification details:
  - first name,
  - surname,
  - date of birth,
  - gender,
  - Trust identification number,
  - NHS number

- Name of requesting doctor, and consultant if different.
- Location of patient – including hospital site
- Special requirements – CMV negative, irradiated or none
- The patient's diagnosis and the reason for the transfusion.
- Past obstetric and transfusion history wherever possible, including details of any previous atypical antibodies (check the Patient Alert Sheet).
- If blood components or products are requested indicate the number and type and the time and date they are required.
- Signature and printed name of the authorised clinician/nurse making the request.
- Signature and printed name of the individual who takes the blood sample from the patient and the date and time the sample was taken.

Requests for unidentified patients in A&E must have the Major Incident, A&E or Trust number along with the patient's gender and an estimated date of birth.

Cord/baby sample requests must have both Trust and NHS number.

Special requirements must be indicated on all requests sent on the purple request form – if not the clinical area will be contacted by the laboratory staff to ascertain patient status – components will not be issued until this can be confirmed.

Northumbria Healthcare operates a zero tolerance approach to sample/request labelling. If the sample or request form is not labelled according to Trust Policy it will be rejected by the Laboratory and you will be required to take a further sample from your patient.

Requests will be rejected if

- any patient information is missing from the request form or sample tube
- any information is incorrect
- there is a discrepancy between request form and sample tube
- request form not signed by requestor and phlebotomist
- sample not signed by phlebotomist
- sample date not stated (if time not stated this will be set at midnight on date stated)

Sample Collection and Labelling

No prior preparation of the patient is required. Patient-collected samples are not processed by blood transfusion.

Venous samples should be collected using aseptic technique following Trust policy.

Venous samples should be collected using the BD Vacutainer® Evacuated Blood Collection System. If using a needle and syringe use a BD Vacutainer® Blood Transfer Device (catalogue number 364810) to transfer the blood safely to the specimen tube. Do not inject the blood via the top of the bottle as this has the potential to cause haemolysis – if transfer device not available remove and safely dispose of the needle, remove the sample tube top and fill the required volume from the syringe. Replace the sample tube top using a push and twist motion to secure.

Blood collected by non-approved techniques may become clotted or haemolysed and this will result on the test request being rejected.

Store tubes at 4-25^{o}C away from direct sunlight. The liquid preservative and anticoagulants are clear and colourless (EDTA may have a white to slightly yellow appearance) – do not use if they are discoloured or contain precipitates.

This symbol denotes the expiry date. Do not use tubes after their expiration date. Tubes expire on the last day of the month and year indicated on the tube.

Most tubes container additives in varying concentrations dependent upon the amount of vacuum and the required additive to blood ratio for the tube. The following tubes are suitable for use within blood transfusion:

Cap colour	Catalogue Number and Draw Volume	Tube Type	Determinations	Mixing requirements	Recommended Order of Draw
	Cat. No. 367941 Draw Volume 6ml	Crossmatch	Blood Group/Antibody Screen, Antibody Identification, DAT, Crossmatch	Mix 8 – 10 times	Blood samples should be taken in the following order: 1. Blood Cultures 2. Citrate 3. Serum 4. Serum 5. Heparin 6. Haematology EDTA 7. Transfusion EDTA 8. Glucose fluoride oxalate
	Cat. No. 368860 Draw Volume 4ml	EDTA	FMH estimation (kleihauer), DAT, Infant blood group	Mix 8 – 10 times	
	Cat No. 367836 Draw Volume 2ml	EDTA	Infant blood group, DAT	Mix 8 – 10 times	
	Cat No. 450474 Draw Volume 1ml	EDTA	Infant blood group, DAT	Mix 8 – 10 times	
	Cat No. 367837 Draw Volume 6ml	Serum	Specialised immunohaematology and histocompatibility tests	Mix 5 – 6 times	
	Cat No. 367954 Draw Volume 5ml	SST™II	Specialised immunohaematology and histocompatibility tests	Mix 6 times	

Purple topped vacutainers are not used for crossmatching. Specimen tubes cannot be shared with other departments. Unfortunately the department is unable to accept intra osseous samples.

Specimen tubes must be labelled at the patient's side – positive patient identification is essential.

All staff taking samples for blood transfusion must have a valid venous sampling competency assessment.

NOTE: Samples received leaking/broken, inadequately labelled, aged, clotted, haemolysed or otherwise unsuitable for testing will not be processed; an appropriate comment will be added to the patient report. If the requested tests are urgent, laboratory staff will notify the ward/clinician.

Signed and labelled tubes should then be placed in the transport bag attached to the request form. Seal the bag. The person taking the blood sample must then sign and date/time the 'blood taken by' section of the request form.

High Risk Samples

Any high risk samples must be clearly identified by either use of the appropriate sticker or documenting on the request form 'high risk'.

There are no special handling requirements for blood transfusion specimens.

Timing of Sample Collection

Transfusion or pregnancy may cause either a primary or secondary immune response resulting in the production of unexpected antibodies against red cell antigens. Samples used for crossmatching must take account of this and ideally crossmatching should be performed on as fresh a sample as possible, ideally taken within 24 hours of the intended transfusion.

To ensure that a sample is representative of a patient's current immune status, the group and save and/or crossmatch should be performed no more than **3 days** in advance of the transfusion.

Blood/blood products must be transfused within **72 hours** of sample collection:

Sample age	Complete transfusion within
Taken today	3 days of sample date
1 day old	2 days
2 days old	1 day

All routine transfusions require a **patient to have been grouped on two separate occasions** (by separate venepuncture) and for the results to match. This is to reduce the risk of wrong blood in tube incidents which lead to the biggest risk of ABO incompatibility. This will not affect patients who already have a historical blood group in our system such as those taken at pre-assessment clinics. The transfusion laboratory will inform the clinician when a second sample is needed.

Do **NOT** routinely send 2 samples for patients. Do not send a second sample on a patient unless requested to do so by the laboratory. If a second sample is required as part of the same clinical episode this must be taken by a **different phlebotomist**.

When a second sample is requested for a patient, provided it is taken in a timely manner, this will not delay the issue of blood for that patient.

Transport of Samples

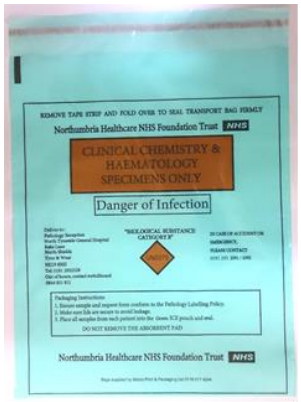
Samples should be delivered to Pathology Specimen Reception (at NSECH, NTGH, HGH and WGH) as soon as possible after collection. They can be delivered by hand (as is usually the case following a phlebotomy round) or sent via the air tube system. Transfusion samples which are sent to specimen reception on the base sites (NTGH, HGH and WGH) will be forwarded onto the Transfusion lab at NSECH for processing.

The Pathology Department at NSECH is open 24 hours a day; 7 days a week, so there should be no need to store samples on any department. Community staff should endeavour to return any blood samples to base in time for the last pathology pick up of the day. There are specimen receptions on each of the base sites and these are open 08.30-17.00 Monday – Friday (excluding public holidays). Once samples have been received they will be transported to the lab at NSECH on the next available planned pick up.

If a significant delay in sample transportation to the laboratory is anticipated, please discuss with laboratory staff, as sample deterioration may limit the viability of results.

Transport of urgent samples from the base sites will need to be arranged on an ad hoc basis. During base site specimen reception opening hours the sample should be taken immediately to the department and the staff informed of its urgency, staff will organise urgent transport to NSECH. Outside base site specimen reception opening hours clinical staff will need to arrange their own transport.

Specimens should be taken to the Urgent Care Centre for packaging:

Labelled and sealed request.	Place in green transport bag.	Place sealed transport bags into transport box and close zip. Ensure bag labelled with **correct destination.**	Secure zip with plastic seal. Give sealed transport box to driver for delivery to NSECH.
			

Arrange transport:

Transport Option	Contact Number	Instructions
BLOOD BIKES - available Monday - Friday 7pm until 7am and Friday 7pm until 7am Monday	TEL: 0191 228 6495	REQUEST CATEGORY 2 TRANSPORT - URGENT REQUEST - clearly state where collect FROM and to deliver to NSECH Pathology Reception. The driver will give you a completed collection/delivery receipt on arrival.
LIFELINE— based in Seaton Deleval	TEL: 03335 77 88 99	REQUEST URGENT TRANSPORT—clearly state where collect FROM and to deliver to NSECH Pathology Reception. Complete a taxi booking form and give blue copy to driver with transport box.
TAXI	Hexham—Eco Cabs Tel: 01434 600 600 North Tyneside—Noda/Budget Tel: 0191 298 5050 Tel: 0191 222 1888 Wansbeck—Phoenix 01670 540 222	REQUEST URGENT TRANSPORT—clearly state where collect FROM and to deliver to NSECH Pathology Reception. Complete a taxi booking form and give blue copy to driver with transport box

Telephone Requests

Telephone requests for issue of blood components and blood products are accepted. Ensure that you have full patient details to hand as well as any special requirements before telephoning the laboratory as you will be asked to provide this information.

Patient Consent and Confidentiality

All staff adhere to Trust Policy IG05 for ensuring the safety and confidential handling of patient/service user information so that they do not inadvertently breach any Trust confidentiality requirements, and ensure they comply with NHS and legal requirements.

Patients must be consented prior to specimen collection and prior to the administration of any blood components or products. Details for obtaining consent can be found in Trust Policy CG03.

NICE TRANSFSUION GUIDELINES (NG24) mandate formal consent for every transfusion episode. Prescribers are REQUIRED to obtain consent on the blood transfusion chart. A separate consent form is available for transfusion dependant patients (renewed yearly). The blood should not be administered without consent being completed.

Tests Repertoire and Turnaround Times

The turnaround times listed below are once request/sample received in the laboratory at NSECH. Journey times for samples to reach the laboratory at NSECH must be taken into account.

Key Factors Affecting Tests

Incorrectly or incompletely labelled samples will be rejected. Clotted samples will also be rejected.

Insufficient, haemolysed, lipaemic (fatty plasma) samples may be rejected as they can produce test result errors especially when using automated equipment.

However it is recognised that the patient's clinical condition may result in haemolysis therefore it is essential to include clinical details so that the suitability of each request can be determined.

Requesting Additional Tests

Please contact the laboratory so that they can determine if additional testing can be performed taking into account the age and condition of the sample.

Two Sample Rule and Issue of Blood Components/Products

Safety of transfusion begins with collection of the sample. SHOT data continues to confirm that samples taken from the wrong patient continues to be a serious problem. BSH Guidelines published in 2012 recommended that a second sample is requested for confirmation of the ABO group of a first time patient, where this does not impede the delivery of urgent red cells or other components. This became known as 'the 2 sample rule'. In order to improve patient safety the Trust introduced the '2 sample rule' in March 2013.

To clarify:

- Positive patient identification must take place
- Do not routinely send 2 samples on patients – the Trust has a massive database of historic data (not all available on ICE). Only send a second sample if instructed to do so by laboratory staff.
- If a second sample is required as part of the same clinical episode this must be taken by a different phlebotomist
- The request for a second sample will NOT delay the provision of blood for a patient in an emergency. Group O blood will be issued until the patient's blood group has been confirmed.

Out of hours service

All requests processed 24/7 – priority will be given to urgent requests.

Test/Request	Specimen type	Turnaround time from receipt of sample/request	Notes
Blood Group and Antibody Screen (including Antenatal screening)*	EDTA	**Urgent:** usually 1 hr **Non-urgent:** 1-2 days	Often referred to as 'group and save' or 'group and retain' May take longer if atypical antibodies detected - especially if referral to reference laboratory required.
Direct Antiglobulin Test	EDTA	Same day	DAT only requests reported via Haematology
FMH screen - Kleihauer	EDTA	Same day	Sample should be collected within 2 hours of delivery or sensitising event.
FMH quantitation	EDTA	Depends on time sample referred – usually same day/next day.	Referred to RCI Leeds for confirmation of FMH – result is initially telephone to the laboratory – confirmation paper report can take up to 7 days to process.
Crossmatch	EDTA	**Emergency:** Group O blood labelled for emergency patient on demand from NSECH transfusion laboratory or collected from the Issue Banks at HGH, NTGH and WGH (6 units available). **Urgent:** 35 – 40 minutes plus transport time provided suitable sample available within the laboratory. **Non-urgent:** 2 hours plus transport time.	If antibodies present turnaround time will be case dependent. Emergency group O blood must only be used in a life threatening situation as it is not suitable for all patients. If patient suitable for electronic issue blood can be issued within 5 minutes provided fully tested valid sample available.
FFP/Octaplas Issue	Not required if patient blood group known	Same day (usually within 30 – 40 minutes)	Patients born after 1st January 1996 should receive Octaplas. Automatic access to FFP is available for certain categories of patients without the need for Consultant Haematologist approval. Details can be found on the blood transfusion webpage. FFP/Octaplas is prescribed based on the patient's weight.

Test/Request	Specimen type	Turnaround time from receipt of sample/request	Notes
Platelets	Not required if patient blood group known	Same day – not held in stock* – ordered on individual patient basis	Patients born after 1st January 1996 should be given apheresis platelets. Automatic access to platelets is available for certain categories of patients without the need for Consultant Haematologist approval. Details can be found on the blood transfusion webpage. One adult therapeutic dose of platelets contains > 240 x 10^9/l of platelets and will typically result in a rise of approximately 20 – 40 x 10^9/l in an average-sized adult. Platelets for use in neonates and infants are available – discuss each case with the transfusion laboratory. *One pool of Group A platelets is held in stock for use in an emergency and forms part of MTP Pack 1 (see below).
Cryoprecipitate	Not required if patient blood group known	Same day (usually within 30 – 40 minutes)	Patients born after 1st January 1996 should receive methylene blue treated cryoprecipitate. Request must be authorised by Consultant Haematologist. Only available at NSECH. The adult therapeutic dose is 2 pools which will typically raise the plasma fibrinogen by about 1g/L. Cryopreciptiate for use in neonates and infants is available – discuss each case with the transfusion laboratory.

Test/Request	Specimen type	Turnaround time from receipt of sample/request	Notes
Beriplex	Not required	Within 30 minutes	Automatic access to Beriplex is available for certain categories of patients without the need for Consultant Haematologist approval. Details can be found on the blood transfusion webpage. Beriplex is collected direct from the transfusion laboratory at NSECH. At HGH, NTGH and WGH stock is held in the drug fridge next to the Issue Bank – contact the transfusion laboratory at NSECH who will arrange for is remote issue.
Novoseven	Not required	Within 30 minutes	Request must be authorised by Consultant Haematologist. Only available at NSECH.
Haemophilia products e.g. advate, hemate P etc,	Not required	Usually same day	Not stocked on-site – delivered by RVI Pharmacy to transfusion at NSECH for named patient.
Anti-D	Not required if patient blood group known	Same day	Anti-D is stocked at NSECH and HGH. Issue to other sites is facilitated from NSECH. If testing already completed e.g. 28 weeks antenatal, RAADP can be issued immediately.
Specialised immunohaematology and histocompatibility tests	Depends on test – discuss with laboratory	Depends on test – discuss with laboratory.	Please contact the laboratory to discuss arrangements for any specialised testing before making a request and taking samples from the patient.
MTP – massive transfusion protocol	See separate section below		Can only be activated at NSECH

Clinical Advice

Clinical advice is available 24/7 by contacting any one of our team of Consultant Haematologists – contact the on-call consultant via switchboard.

Ordering of Blood Components and Products

Blood components and products can be ordered by completing the transfusion request form or via the telephone.

Please label fully, correctly and legibly to avoid unnecessary delay. Remember that after properly identifying the patient, the collection of the blood, its dispersal into the bottle and the labelling of the bottle must be carried out as one continuous uninterrupted event at the patient's 'bedside'. Any patient having a sample taken for pre-transfusion testing should have an identification wristband attached throughout the admission. If the ID band has to be removed, it is the responsibility of the person removing it to attach it elsewhere on the patient.

Special Requirements

It is essential that clinical staff are aware of certain patients' special requirements for blood components (irradiated and/or CMV-negative RBCs and platelets). This information should be available on the Patient Alerts sheet at the front of the patient's notes. If full notes are not available for a patient admitted via Emergency Care, staff should take note of PAS code **BLOO** which alerts them to patients with special requirements.

Details of the categories of patients with special requirements can be found on the reverse of the blood transfusion request form. Information can also be found on the blood transfusion webpage.

Special requirements must be indicated for all requests – if not the clinical area will be contacted by the laboratory staff to ascertain patient status – components will not be issued until this can be confirmed.

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Collection of Blood Components and Products

The MSoft blood tracking system BloodHound is used across the Trust to control access to the Blood Issue Fridges and Platelet Incubator. This secure system allows us to track by use of biometrics who has accessed the fridge or incubator and also provides an additional safety step to ensure the correct components is collected for the correct patient.

Only trained and competency assessed 'blood collectors' can access the kiosk and therefore collect blood and components.

Clinical Use of Blood Components and Products

Transfusion carries risks. Good clinical practice demands that any blood/product should only be given when the patient is judged likely to benefit and other alternatives have been exhausted.

NICE Guidelines NG24 (https://www.nice.org.uk/guidance/ng24) on Blood Transfusion cover the assessment for and management of blood transfusions in adults, young people and children over 1 year old. They cover the general principles for blood transfusion and include recommendations on alternatives, thresholds, patient safety and patient information. These guidelines together with Trust policy and procedures should be used when determining transfusion requirements.

Further advice, policies and procedures are available on the Trust Intranet via the following links:

Blood Transfusion Policy	CG11
Pre-transfusion Management	TTC01
Requesting Blood Components	TTC02
Transfusion Samples	TTC03
Collection of Blood Components	TTC04
Pre-transfusion Checks and Administration of Blood Components	TTC05
Transfusion Reactions and Adverse Events	TTC06
Emergency Blood Management	TTC07
Guidelines for the Management of Massive Blood Loss	TTC08

Component/Product	Indications	Contraindications	Dose	Rate
Red Cells	Where the patient is stable, is not bleeding and major bleeding is not anticipated: • Patients without cardiovascular disease and especially younger patients, transfusion is likely to be appropriate to maintain Hb levels in range 70 – 90 g/l. Transfusion is unlikely to be appropriate at Hb level above 90 g/l. • Patients known to have, or likely to have, cardiovascular disease, transfusion is likely to be appropriate to maintain Hb in the range 90 – 100 g/l.	Warning: patients at risk of TACO (transfusion associated circulatory overload) should have a risk assessment.	In adults a unit of red cells raises Hb by 7 – 10 g/l	A unit of blood (red cells) will usually be given over a period of 90 minutes - 2 hours per unit, although there may be occasions when a slower administration rate is required (NB Transfusion of each unit must be completed within a maximum of 4 hours of removal from refrigeration).
FFP	Replacement of a single inherited coagulation factor deficiency for which no virus-safe fractionated product is available Treatment of angio-oedema in C1-esterase deficiency Only consider fresh frozen plasma transfusion for patients with clinically significant bleeding but without major haemorrhage if they have abnormal coagulation test results (for example, prothrombin time ratio or activated partial thromboplastin time ratio above 1.5). Consider prophylactic fresh frozen plasma transfusions for patients with abnormal coagulation who are having invasive procedures or surgery with a risk of clinically significant bleeding.	Do not use fresh frozen plasma transfusions to correct abnormal coagulation in patients who: • are not bleeding (unless they are having invasive procedures or surgery with a risk of clinically significant bleeding) • need reversal of a vitamin K antagonist. FFP must not be used as a volume expander or for the reversal of warfarin.	The recommended therapeutic dose is 12 - 15 mL/kg. This may have to be exceeded in massive bleeding and consumptive coagulopathies and dose is dependent on the clinical situation and coagulation results. Reassess the patient's clinical condition and repeat the coagulation tests after fresh frozen plasma transfusion to ensure that they are getting an adequate dose, and give further doses if needed.	FFP transfusion should not usually exceed a rate of 30 ml/minute.

Component/Product	Indications	Contraindications	Dose	Rate
Platelets	Offer platelet transfusions to patients with thrombocytopenia who have clinically significant bleeding (World Health Organization [WHO] grade 2) and a platelet count below 50×10^9 per litre. Use higher platelet thresholds (up to a maximum of 100×10^9 per litre) for patients with thrombocytopenia and either of the following: • severe bleeding (WHO grades 3 and 4) • bleeding in critical sites, such as the central nervous system (including eyes) Offer prophylactic platelet transfusions to patients with a platelet count below 10×10^9 per litre who are not bleeding or having invasive procedures or surgery, and who do not have any of the following conditions: • chronic bone marrow failure • autoimmune thrombocytopenia • heparin-induced thrombocytopenia • thrombotic thrombocytopenic purpura Consider prophylactic platelet transfusions to raise the platelet count above 50×10^9 per litre in patients who are having invasive procedures or surgery.	Do not routinely offer prophylactic platelet transfusions to patients with any of the following: chronic bone marrow failure • autoimmune thrombocytopenia • heparin-induced thrombocytopenia • thrombotic thrombocytopenic purpura. Do not offer prophylactic platelet transfusions to patients having procedures with a low risk of bleeding, such as adults having central venous cannulation or any patients having bone marrow aspiration and trephine biopsy.	An initial adult dose of $250x10^9$/l provided either as pooled or apheresis platelets Do not routinely transfuse more than a single dose of platelets. Only consider giving more than a single dose of platelets in a transfusion for patients with severe thrombocytopenia and bleeding in a critical site, such as the central nervous system (including eyes). Reassess the patient's clinical condition and check their platelet count after each platelet transfusion, and give further doses if needed.	Platelets should be transfused over a period of 20-30 minutes.

Component/Product	Indications	Contraindications	Dose	Rate
Platelets	Consider a higher threshold (for example 50–75×10^9 per litre) for patients with a high risk of bleeding who are having invasive procedures or surgery, after taking into account: • the specific procedure the patient is having • the cause of the thrombocytopenia • whether the patient's platelet count is falling • any coexisting causes of abnormal haemostasis. Consider prophylactic platelet transfusions to raise the platelet count above 100×10^9 per litre in patients having surgery in critical sites, such as the central nervous system (including the posterior segment of the eyes).			
Cryoprecipitate	Consider cryoprecipitate transfusions for patients without major haemorrhage who have: • clinically significant bleeding **and** • a fibrinogen level below 1.5 g/litre. Consider prophylactic cryoprecipitate transfusions for patients with a fibrinogen level below 1.0 g/litre who are having invasive procedures or surgery with a risk of clinically significant bleeding.	Do not offer cryoprecipitate transfusions to correct the fibrinogen level in patients who: • are not bleeding **and** • are not having invasive procedures or surgery with a risk of clinically significant bleeding.	A single unit contains a mean of approximately 400 - 460mg fibrinogen. The adult therapeutic dose is 2 pools of 5, or one unit per 5 - 10 kg body weight, dependent on the degree of fibrinogen deficiency. Response should be monitored by repeat coagulation tests.	Cryoprecipitate transfusion should not usually exceed a rate of 30 ml/minute.

Component/Product	Indications	Contraindications	Dose	Rate
Beriplex	Beriplex is an intravenous prothrombin complex concentrate used for urgent warfarin reversal in combination with vitamin K. It is indicated in patients with life/limb/sight threatening bleeding or requirement for emergency surgery in patients on warfarin. If INR <1.5 then reversal may not be appropriate.	Use with caution in patients with DIC or decompensated liver disease.	Beriplex 30 iu/kg rounded to nearest 500 units. Recheck INR after 5 mins - if insufficient correction then consider further dose after discussion with Consultant Haematologist.	Given as slow iv bolus over 5-10 mins in combination with 5mg iv Vitamin K.
Novoseven	Novoseven is recombinant activated factor VII and may be used in some extreme cases of major uncontrolled blood loss. Uncontrolled blood loss despite adequate blood component replacement. It is likely to be of most use in small blood vessel bleeding with continued ooze. It is not a replacement for surgical control of bleeding.	It is important to ensure good thromboprophylaxis in such patients once haemostasis is secured due to the prothrombotic nature of Novoseven.	Initial dose of 90 µg/kg. If there is clinical benefit then this can be repeated two hours later.	

Automatic access to Platelets, FFP and Beriplex is available for certain categories of patients without the need for Consultant Haematologist approval. Details can be found on the blood transfusion webpage. Where defined criteria not met approval for issue must be sought from a Consultant Haematologist.

Cryoprecipitate (except as part of MTP) and Novoseven must be authorised by a Consultant Haematologist prior to issue.

Management of Massive Blood Loss

The Massive Transfusion Protocol can ONLY be activated at NSECH.

Major blood loss and massive transfusion may threaten the survival of patients in many different clinical settings and challenge haematological and blood transfusion resources. A successful outcome requires prompt action and good communication between clinicians, diagnostic labs, transfusion labs and the blood service centre. Early consultation with senior surgical, anaesthetic and haematology colleagues is essential and the importance of good communication and co-operation in this situation cannot be over-emphasised.

Guidelines for the Management of Massive Blood Loss and the Use of the Massive Transfusion Protocol are available on the Trust Intranet via the following link:

Blood Transfusion: Massive Blood Loss

Blood samples should be sent to the laboratory at the earliest possible opportunity as results may be affected by colloid or crystalloid infusion.

Antenatal Screening

All requests for Antenatal Pathology Screening Tests (Haematology, Blood Transfusion, Clinical Chemistry and Microbiology) should be made using either:

- The Regional Antenatal Pathology Request Form with integrated Family Origin Questionnaire (booking bloods only)

or

- The Trust Antenatal Pathology Request Form. This form can also be used to request prophylactic anti-D immunoglobulin.

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These forms should not be used for non routine tests (e.g. βHCG), or for Group & Save and/or Crossmatch requests. For Group & Save and/or Crossmatch requests a purple Blood Transfusion request form must be used.

If patient is booked at the RVI a separate request form and FBC sample for haemoglobinopathy screening must be sent. Testing is carried out at **booking** and between **28-34 weeks** gestation.

RhD negative women must also be tested at delivery for Prevention of Haemolytic Disease of the Newborn (HDN) and to assess their suitability to receive prophylactic anti-D immunoglobulin.

Routine antenatal anti-D prophylaxis (RAADP) is offered to all non-sensitised RhD negative women at 28 – 30 weeks gestation.

Where atypical antibodies are detected during antenatal screening any additional testing and further action required will be notified by the laboratory and/or NHS Blood Transfusion Service in Newcastle.

Anti-D Immunoglobulin

The table below shows the minimum dosage recommended by current guidelines – however only one dose of Anti-D is stocked – 1500iu – which is sufficient to cover all situations (up to a fetomaternal bleed of 12ml).

Tests to assess a patient's suitability to receive prophylactic anti-D immunoglobulin are required.

NICE guidance on routine antenatal anti-D prophylaxis is available on

http://www.nice.org.uk/guidance/index.jsp?action=byId&o=12047

Minimum Dosage Required	Pregnancies less than 20 weeks gestation	250iu
	Pregnancies equal to or greater than 20 weeks gestation	500iu
	Routine antenatal anti-D prophylaxis (RAADP) – single dose regime given at 28-30 weeks gestation	1500iu
	Post delivery – fetal maternal bleed < 4mls	500iu
	Fetal maternal bleed greater than 4mls	Dosage will be advised by laboratory

Use in RhD negative women in the following circumstances:

Miscarriage

- All miscarriages greater than 12 weeks
- Abortion less than 12 weeks in the following circumstances:
  - Therapeutic
  - Spontaneous where instrumentation has been used
  - Threatened abortion where pregnancy continues

Use During Pregnancy After Sensitising Episode

- E.g. amniocentesis, CVS, external cephalic version, antepartum haemorrhage, abdominal trauma

Routine Antenatal Anti-D Prophylaxis (RAADP)

- All non-sensitised RhD negative women at 28 – 30 weeks

Pre-delivery testing
Mother's RhD and antibody status must be known.
Pink topped specimen and transfusion request form required.
In pregnancies continuing beyond 20 weeks a FBC (purple EDTA) specimen must be sent for Kleihauer Testing.

Routine antenatal prophylaxis
Routine 28 week bloods must be taken before the dose of anti-D is given.

Post-delivery testing

Pink topped specimen + FBC (purple EDTA) specimen from **both** mother and baby (cord blood), together with a transfusion request form.

Following confirmation of a patient's suitability to receive anti-D immunoglobulin the appropriate dose will be issued by the laboratory. Where a bleed of greater than 4mls is detected, follow up testing is required – the laboratory will inform you of the samples and timing required.

Anti-D should be given within 72 hours of delivery or a potentially sensitising episode following completion of any necessary testing. Where failure to administer anti-D within 72 hours occurs please discuss each case with Consultant Haematologist.

Note: Where a mother (whether RhD negative or positive) is known to have atypical red cell antibodies, where it is suspected a baby may have HDN, or where there is a past history of a baby affected by HDN, take the appropriate samples and contact the Consultant Haematologist/Transfusion Laboratory for advice.

Anti-D is stocked at NSECH and at HGH. For HGH requests the anti-D can be issued remotely from NSECH – contact the transfusion laboratory to arrange issue. All other issue of Anti-D requests are facilitated via NSECH.

Investigation of a Suspected Transfusion Reaction

Please refer to the Trust Blood Transfusion Procedure TT06 – Management of Blood Component Reactions and Adverse Events which is available on the Trust Intranet via the following link:

Blood Transfusion: Trust Transfusion Procedures

Discuss each case with Blood Transfusion staff and Consultant Haematologist.

Cases requiring investigation should be referred to the laboratory on the "Investigation of Blood Transfusion Reaction" form together with the appropriate specimens/units. The form is available from the transfusion laboratory or via the intranet – link below:

Blood Transfusion: Blood Transfusion Documents

Further information can be found in “HANDBOOK OF TRANSFUSION MEDICINE”

http://www.transfusionguidelines.org.uk/index.aspx?Publication=HTM&Section=9

Blood Ordering for Planned Procedures

It is essential that the type of operation is clearly stated in the request form as well as the hospital where the operation will take place.

Many operations rarely use blood so there is no need to crossmatch as a routine. A group/antibody screen and retain sample should be used for procedures where transfusion is rarely required.

A range of procedures carried out on the base sites (HGH, NTGH, WGH) have been identified as requiring a current active sample available in the transfusion department at NSECH.

Further information can be found in the Trust wide Guideline ‘Pre-operative Group and Save for Base Site Surgery’

Community Hospitals

Transfusion of red cells and platelets can take place within the community hospital setting – all requests need to be co-ordinated with the transfusion laboratory at NSECH. On the day of transfusion the laboratory will arrange for the component to be sent to the required hospital – each unit being sent in a validated transport container. Each container is accompanied by a cold chain record which must be completed at each stage and then returned to the laboratory. The completed tracesafe label should be returned to blood transfusion at NSECH via internal post and a scanned copy of the transfusion chart emailed to transfusion-nsech@nhct.nhs.uk.

Training and Competency Assessment

All staff must be trained and competency assessed prior to any involvement in the transfusion process – further information can be found in Trust Transfusion Policy CG11.

All staff must attend blood safety training at induction. Thereafter all staff must undergo blood safety training on at least a 2 yearly basis – this can be completed on-line or via the blood safety workbook. Departmental training can also be arranged with the transfusion practitioners.

Competency assessments are role-specific:

Competency	**Role**	**Frequency**
Blood collection	Porters and Oncology HCAs only	Every 2 years
Obtaining a venous sample for transfusion*	All staff who take transfusion samples	One-off competency unless involved in an incident
Blood administration*	All qualified nursing and medical staff who administer blood components	One-off competency unless involved in an incident

* a combined competency (including consent and prescribing) is available for medical staff.

For further information on training and competency assessment or support on any aspect of the process please contact the transfusion practitioners.