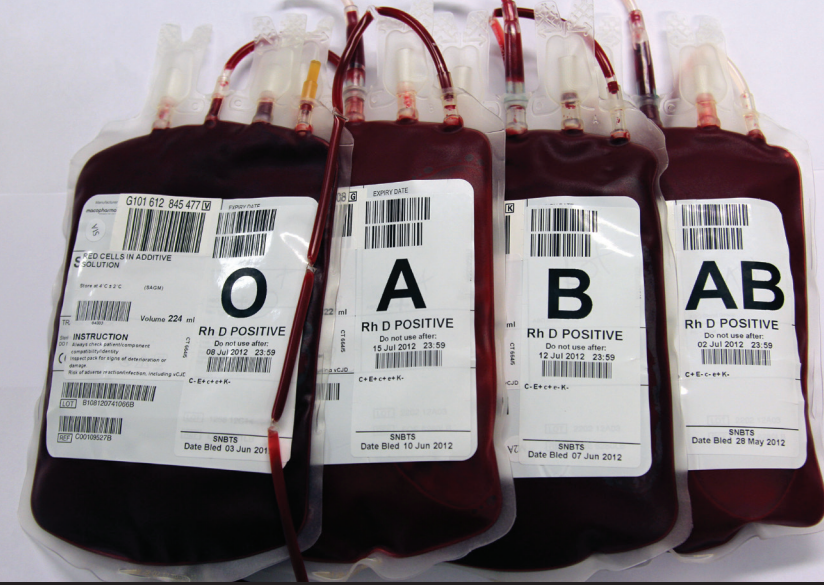


Blood Transfusion Manual

Department of Transfusion Medicine
Aberdeen

12th Edition
2013

SCOTTISH NATIONAL BLOOD TRANSFUSION SERVICE

NHS National Services Scotland

Blood Transfusion Manual

Department of Transfusion Medicine
Aberdeen
12th Edition
2013

NHS
National
Services
Scotland

IMPORTANT INFORMATION

Blood Bank ext. (5)52322 / (5)52512

Blood Sample Identification

UNLABELLED / MISLABELLED samples will NOT BE ACCEPTED

The SNBTS Zero Tolerance Policy is in place (Appendix 1)

Addressograph labels must not be used on sample tubes
Label the form and sample with:

- **Patient's full name (first name and surname)**
- **Date of Birth**
- **Community Hospital Index (CHI)** or **A&E Number (TN)**
- **Gender, Ward, Hospital**
- **Date & Time sample was taken and signature of person taking sample on sample and form**

On the Request form include:

- Clinical Condition
- Time and Date the blood is needed
- The requesting doctor's name / bleep number / signature name

Please ensure details on request form and sample are correct and identical, otherwise unnecessary delays will be incurred whilst a repeat sample is provided (para 1.4.5).

Blood Samples required (pages 6-7)

Group & Screen and / or Crossmatch	7ml EDTA
Children / Paediatric	4.5ml EDTA
Baby / Neonatal Blood Group and DAT	1-1.5ml EDTA

Edition - (12th) 2013, 2008, 2005, 2002, 2001, 2000, 1997, 1996, 1994,1993, 1992, 1991

Emergency Request (page 17)

Specialist advice may be sought from the BTC Duty MO*

Blood Availability

Please inform Blood Bank if blood is required urgently (e.g. Massive Bleeding Protocol; Appendix 2.1 page 73).

A routine crossmatch takes approximately **one hour** from receipt of sample.
Group specific blood may be issued within approximately **20 minutes** from time of receipt.

Alternatively

Group O negative blood available from blood storage fridges in*:

Accident & Emergency -	**ARI**	**Labour Ward -**	**AMH**
Surgical Block (BU / Ward 14) -	**ARI**	**Mail Room -**	**WE**
G Theatres -	**ARI**	**Dr Gray's, Elgin -**	**DGH**
ECC -	**ARI**		

*If O negative blood is required for RACH it is available from A&E (ARI)

Blood Components / Products

For provision of blood components (Platelets, Fresh Frozen Plasma, Cryoprecipitate), the Blood Bank must be contacted.

For provision of blood products (see page 48-50) contact NHS Grampian Pharmacy at (5)53223 (Mon to Fri 9am-5pm); all other times contact on-call pharmacist via ARI switchboard (0845 456 6000).

Note: Human prothrombin complex concentrate is available from the Blood Bank (5)52322 / (5)52512 or 01224 (8)12474.

Help and Advice For specialist advice see Staff Directory (page 4-5)

*** Duty Medical Officer contactable via the BLOOD BANK (24 hours) on ext. (5)52322 / (5)52512 or 01224 (8)12474**

PROCEDURE FOR OBTAINING BLOOD

To Activate the NHS Grampian Protocol for Massive Bleeding *(Appendix 2, p73-80)*

ARI Blood Bank: (5) 52322 / (5) 52512
Dr Gray's Elgin (DGH): All emergency calls must be via Blood Bank BMS ext. 67479 / 67320
On-Call BTC Duty MO is available for advice via the Hospital Blood Bank

Red cells needed immediately	Send a patient crossmatch sample before Transfusion. Advise Blood Bank. Use emergency O RhD-negative red cells from designated fridge (pages 34-35).
Red cells needed in 20 minutes	Send a patient crossmatch sample. Advise Blood Bank. ABO and RhD group-specific red cells available for collection from Blood Bank within 20 minutes of receipt of sample.
Red cells needed in 60 minutes	Send a patient crossmatch sample. Advise Blood Bank. ABO and RhD group, antibody screen and crossmatch will be carried out. Red cells available for collection within 60 minutes of receipt of sample.
FFP	Can be ordered via Blood Bank as per protocol. Normally available 25-30 minutes after request to allow time for thawing.
Platelets	Can be ordered via Blood Bank as per protocol. Normally available in 10 minutes.
Cryoprecipitate	Can be ordered via Blood Bank if fibrinogen is less than 1.0 g/l, via the BTC Duty MO. Normally available in 25-30 minutes.

COMPONENTS IN AN EMERGENCY

NOTE
O RhD - negative, K- negative blood should be used for all female patients of childbearing potential, until group – specific is available or for anyone whose plasma is known to contain anti-D.

O RhD - positive blood may be given in an emergency to male patients and women of post-childbearing age or known to be RhD - positive.

Inform Blood Bank immediately if emergency blood is used so that it can be replaced.

Uncontrollable Bleeding
Activation of Massive Bleeding Protocol (MBP) ARI ext. 2222, DGH 67320
For continued bleeding ext. 50522.
See flowchart pages 73 & 75.
Appendix 2.

Is patient on Warfarin?
Massive life/ limb / sight threatening bleed due to warfarin should be treated with PCC.
(Page 81, Appendix 3
Contact On-Call BTC Duty MO via Blood Bank (ext. (5)52322 / (5)52512).

SAMPLE LABELLING CRITERIA
Label the form and sample with:

Patient's first name + surname
Date of Birth, Gender
CHI, Ward, Hospital
Date & Time sample was taken
Signature of person taking sample on sample tube and form
See 6 steps for Positive Patient Identification pages 9-12.

See 'Important Information' Page I-IV.

UNLABELLED/MISLABELLED samples will NOT BE ACCEPTED

If the patient's name and/or Date of Birth are not known (e.g.unconscious), the request form and sample **MUST carry the A&E Number (a unique hospital number i.e. TN no.), Gender** and the location of the patient. This is also applicable in the event of a Major Accident. At hospital admission all patients will be identified by a unique **Major Accident** number provided by A&E Department.

NOTE: Clinicians need to allow the time it takes for blood components to be collected from hospital Blood Bank to reach clinical area.

Inform Blood Bank immediately if anticipating uncontrollable bleeding to activate "NHS Grampian Protocol for Massive Bleeding"
http://intranet.grampian.scot.nhs.uk/foi/files/NHS_Grampian_Massive_Bleeding_Protocol_for_Adults_v2_Oct12__2_[1][1].pdf

CONTENTS

SECTION V

SECTION VI

GENERAL INTRODUCTION

The Aberdeen & North East Scotland Blood Transfusion Centre (BTC) is part of the Scottish National Blood Transfusion Service (SNBTS). SNBTS is a division of NHS National Services Scotland (NSS).

SNBTS is organised into functional directorates. The Directorates represented in Aberdeen include:-

CLINICAL DIRECTORATES

1.1 Medical

- Dr M A Greiss, Consultant in Transfusion Medicine, is in charge of Therapeutic Plasma Exchange and clinical immunohaematology, which includes the blood bank service, antenatal serology, reference red cell serology and molecular clinical diagnostics.
- Dr J Ibojie, Associate Specialist, whose main role is in clinical apheresis, including haematopoietic stem cell collection and therapeutic venesection. He is also the TRALI co-ordinator for SNBTS.
- Prof M A Vickers, Consultant Haematologist, a Lead Clinician and in charge of the Academic Transfusion Medicine Unit (ATMU), haematopoietic stem cell collection, cellular therapies and molecular immunohaematology, Research, Development & Innovation (RD&I).

The three medical staff also provide an out-of-hours service for transfusion medicine advice.

The Aberdeen & North East Scotland Blood Transfusion Centre provides both clinical and laboratory support for other hospital blood banks including Dr Gray's Elgin, Gilbert Bain Lerwick, Balfour Hospital Kirkwall and Albyn Hospital Aberdeen.

1.2 Laboratory

Mr Douglas Clark, BMS 4 is the Clinical Laboratory Manager; the laboratories are in three main sections: -

Blood Banking: Mrs Jane Burnett, BMS 3 is the Laboratory Department Head. This section provides the blood bank service, antenatal serology and has a reference laboratory service for investigative red cell serology.

Molecular Immunohaematology (MI): Mrs Fiona Sellers, BMS 3, is the Laboratory Department Head. This section's main roles are platelet and granulocyte immunohaematology, molecular blood grouping.

Cellular Therapies: Mr Nicolas Robinson, BMS 3, is the Laboratory Department Head. This section provides stem cell processing support in addition to the development of new cellular therapy products.

1.3 Cell Separator Unit/Nursing

Mrs Helen Clark, Senior Nurse Manager; Ms Lynn Fyfe is the Clinical Team Manager (nursing) in this section where the main function is clinical apheresis including haematopoietic stem cell collection, venesection and therapeutic plasma exchanges.

OTHER DIRECTORATES

2. Quality

Mr Neil Fraser, BMS 3 is Quality Manager in this Directorate and is responsible for ensuring that all departments comply with necessary regulatory standards and legislation, as well as overseeing all laboratory or donor-related incidents.

3. Research Development & Innovation and National Reference Work

Prof Mark Vickers is head of ATMU and is supported by two clinical scientists, Dr Sylvia Armstrong-Fisher and Dr Michael Moss.

4. Tissue Services

Dr Philip Yates is Consultant. This Directorate is responsible for the collection and processing of tissues for use therapeutically.

5. Supply Chain

Mrs Lynne Willdigg: Donor Services Manager. This Directorate is responsible for organising blood donor sessions throughout Grampian and ensuring that there are ample donors recruited to maintain continuing supply of blood. This is supported by two Senior Nurse Managers; Mrs Helen Clark and Mrs Deborah McNaughton.

Useful contacts	Phone number

STAFF DIRECTORY

ABERDEEN BTC

Laboratory / Services	Telephone	Bleep
Direct Dial Lines		
Blood Bank (24 hours)	01224 552322 01224 552512 / (8)12474	
NHS Grampian (24 hours)	0845 456 6000	
Blood Transfusion Centre	01224 685685	
Fax		
Blood Bank Laboratory	01224 662200	
Reception	01224 695351	
Enquiries / Requests		
Blood Bank (24 hours)	(5)52322 / (5)52512 / (8)12474	
Duty Medical Officer	(5)52322 / (8)12474 (via blood bank)	
Antenatal / Obstetric Service	(5)52322 / (8)12474	
Red Cell Special Investigation	(8)12477	
Molecular Immunohaematology	(5)52058	
Clinical Immunology Laboratory	(5)52058	
Bone Bank	(8)12448 / (5)52322 / (8)12474	
Therapeutic Apheresis	(8)12436 / (5)51370	

ONLY FOR MASSIVE BLEEDING PROTOCOL
(MBP Ext: 2222) AND
POST - ACTIVATION PROTOCOL **50522**

Medical Staff	Telephone	Bleep
Dr Michel A Greiss (Consultant)	(8)12420	2871
Prof Mark A Vickers (Consultant)	(8)12401 / (8)12402	3349
Dr Joe Ibojie (Associate Specialist)	(8)12409	2872
Dr Philip Yates (Consultant)	(8)12413	
Nursing Staff		
Mrs Helen Clark (Senior Nurse Manager)	(8)12444	
Clinical Apheresis Nurses	(8)12436 / (5)51370	
Transfusion Practitioner (TP) Nurse	(8)12427	
Dr Gray's TP	(5)67940	
Laboratory Staff		
Mr Douglas Clark (Clinical Laboratory Manager)	(8)12404	
Mrs Jane Burnett (Lab Head - Blood Bank)	(8)12476	
Mrs Fiona Sellers (Lab Head - MI)	(8)12472	
Mr Nicolas Robinson (Lab Head - CTL)	(8)12465	
Mr Neil Fraser (Quality Manager)	(8)12485	
Supply Chain		
Mrs Lynne Willdigg (Donor Services Manager)	(8)12454	

Dr Gray's Hospital, Elgin	0845 456 6000
Laboratory (Blood Bank 24 hours)	(5)67479 / (5)67320

SAMPLE REQUIREMENTS FOR BLOOD TRANSFUSION AND SEROLOGICAL INVESTIGATIONS

Investigation	Laboratory	Request Form Type	Blood Samples
BLOOD BANK			
• Group and Screen and/or Crossmatch (p13-14)	Blood Bank	Blood/Blood Component	7ml EDTA
• Cord blood	”	Delivery - (orange form)	4.5ml EDTA
• Baby Group + DAT / delivery samples	”	Delivery - (orange form)	1-1.5ml EDTA
• Children			4.5ml EDTA
• Transfusion reactions (p42-43)	”	Blood/Blood Component	7ml EDTA#
ANTENATAL / OBSTETRIC			
• Group and Screen (p52)	Blood Bank	Blood Group Serology/ Investigation	7ml EDTA
• Antibody Monitoring (p52)	”	”	7ml EDTA
• Kleihauer (p64)	”	Blood/Blood Component	7ml EDTA
IMMUNOHAEMATOLOGY (Serological)			
• Extended Blood Group Phenotyping (p65)	Blood Bank	Blood Group Serology/Investigation	7ml EDTA
• Red Cell Antibody Investigation (p65)	”	”	7ml EDTA
• Auto-immune Haemolytic Anaemia (AIHA) Screen (p65)	”	Blood/Blood Component	7ml EDTA
• DAT Direct Antiglobulin (Coombs) Test (p65)	”	”	7ml EDTA
• Cold Agglutinin Screen (p65)	”	”	***
• Donath-Landsteiner Test (p65)	”	”	***
MOLECULAR IMMUNOHAEMATOLOGY			
• Molecular blood group genotyping (DNA)	MI	Blood Group Serology/ Investigation	4.5ml EDTA
• Platelet Alloantibody Screen ITP/PTP (p66)			2 x 7ml Clotted + 2 x 4.5ml EDTA*

Investigation	Laboratory	Request Form Type	Blood Samples
MOLECULAR IMMUNOHAEMATOLOGY			
• Platelet Autoantibody Screen (p66)	”	”	7ml Clotted + 4.5ml EDTA *
• Granulocyte Alloantibody Screen (p66)	”	”	2 x 7ml Clotted + 4.5ml EDTA *
• Granulocyte Autoantibody Screen (p66)	”	”	7ml Clotted + 4.5ml EDTA *
• CD4 (p67)	”	”	4.5ml EDTA **
• NIPD (p57)	”	”	2 x 7ml EDTA from mother + 2 x 7ml EDTA from partner
• Neutrophic Function Test	”	”	4.5ml EDTA
• Paroxysmal Nocturnal Haemoglobinuria (PNH) (P65)		”	7ml EDTA
• ABO and Rh Molecular Blood Grouping			4.5ml EDTA
• Transfusion Related Acute Lung Injury (TRALI) donor or patient investigation			3 x 7ml Clotted + 2 x 4.5ml EDTA*
• Patients receiving immunoglobulin therapy IVIgG and pre-treatement blood sample for storage			7ml Clotted 2ml IVIgG in plain tube

TISSUE TYPING FOR ONWARD DESPATCH TO EDINBURGH OR DUNDEE BTS

For all transplant related blood tests please refer to the SNBTS Histocompatability & Immunogenetics Laboratory User Manual: **www.scotblood.co.uk/about-us/publications.aspx**

TISSUE TYPING FOR ONWARD DESPATCH TO DUNDEE

Dosease Association	HLA typing	1 x 4.5ML EDTA

STEM CELL / ABMT			
• CD34 PBSC (p65)	”	”	7ml EDTA

***Consult with BTC Duty Medical Officer (Ext. (5)52322 / (5)52512 or (8)12474**
****Available to Infectious Diseases Unit**
*****By arrangement with BTC**
 # Immediate Post-Transfusion samples plus all blood packs (used and unused)

Clinical Notes / Comments

SECTION I

BLOOD BANK SERVICES (Ext. 52322 / 52512 / (8)12474)

LABORATORY HOURS

(See also Delivery & Distribution of Matched Blood to Grampian Hospitals - pages 31-33).

ARI Blood Bank Laboratory operates a 24 hour service (Ext. 52322 / 52512 / (8)12474).

DGH Blood Bank Laboratory operates a 24 hour service (Ext. 67320 / 67479).

1. GENERAL INFORMATION

1.1 The Role of the Duty Medical Officer (MO)

A BTC On-Call MO is available at all times to deal with clinical situations that require advice. This may include release of certain blood components, products and arrangement of special investigation procedures. The Duty MO can be contacted via the Blood Bank Ext. 52322 / 52512 / (8)12474.

1.2 Patient Identification Guide

Six steps for positive Patient Identification

In order to improve patient safety and to comply with guidelines on the "Administration of Blood and Blood Components and the Management of Transfused Patients", which were prepared by the British Committee for Standards in Haematology (1999), **unlabelled / wrongly labelled samples WILL NOT BE ACCEPTED in accordance with the SNBTS ZERO TOLERANCE POLICY** Appendix 1.

SIX STEPS FOR POSITIVE PATIENT IDENTIFICATION

POSITIVE PATIENT ID FOR BLOOD TRANSFUSION SAMPLING

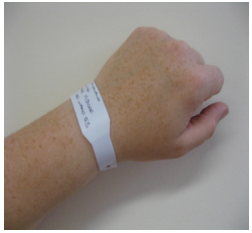
NHS Grampian 'procedure for blood and blood component transfusion' **MUST** be followed. For further information contact the Transfusion Practitioner on ext. (8)12427

STEP 1

USE AN OPEN QUESTION TO POSITIVELY IDENTIFY PATIENT

WHAT IS YOUR NAME?

WHAT IS YOUR DATE OF BIRTH?



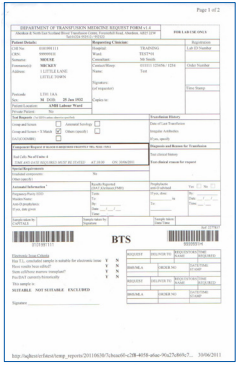
CHECK THESE DETAILS AGAINST PATIENT'S ID BAND

STEP 2

CHECK THAT THE DETAILS ON ID BAND MATCH REQUEST FORM

CHECK

- **FIRST NAME**
- **SURNAME**
- **DATE OF BIRTH**
- **CHI**
- **GENDER**



STEP 3

DRAW BLOOD INTO PURPLE TOPPED EDTA VACUTAINER

DO NOT USE PRE-LABELLED TUBES

STEP 4

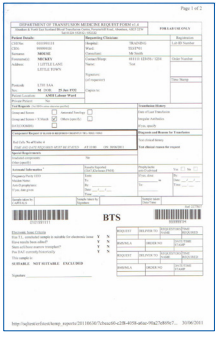
LABEL BLOOD SAMPLE BY HAND AT THE BEDSIDE

WITH

PATIENT'S FULL NAME
(First Name and Surname)
DATE OF BIRTH
CHI: COMMUNITY HOSPITAL INDEX
or
TN: A&E NUMBER
GENDER,
WARD, HOSPITAL
DATE & TIME SAMPLE WAS TAKEN
SIGNATURE OF PERSON TAKING SAMPLE ON SAMPLE TUBE AND FORM

STEP 5

ENSURE PATIENT DETAILS ON BLOOD TUBE AND REQUEST FORM ARE IDENTICAL



STEP 6

WRITE THE TIME AND DATE OF DRAWING SAMPLE ON THE REQUEST FORM

SIGN THE REQUEST FORM TO INDICATE WHO DREW SAMPLE

1.3 Biohazard (Danger Of Infection)

All blood samples are potentially infectious; however, some are more hazardous than others.

The sample and request form MUST be clearly marked with a **"Danger of Infection"** label (black letters on yellow background). The request form and sample MUST be in separate compartments of a polygrip bag.

Postage/Transport of High Infectious Risk Samples

Ensure caps are tightly fastened.

Secure cap with tape.

Wrap sample in absorbent tissues.

Seal in plastic bag or enclose within plastic mailing container.

Affix yellow **"Danger of Infection"** label to outside of package.

Place within second plastic bag (e.g. polygrip) keeping the paperwork separate from the sample.

Telephone the appropriate laboratory to inform them that a **high infectious risk** sample is on its way.

Send via routine delivery (see also para 1.6).

1.4 Request Form and Blood Samples for Crossmatch

Six step procedure for positive patient identification for blood transfusion sampling (pages 10-12)

1.4.1 Complete a REQUEST FOR BLOOD / BLOOD COMPONENTS / BLOOD GROUP & SCREEN form (either electronically or hard copy) stating clearly the clinical condition, the time and date the blood is needed. The requesting doctor's bleep number, name and signature must be included to facilitate communication.

1.4.2 The sample must be 7ml, in EDTA.

1.4.3 Whenever possible the patient should be asked to identify himself/herself verbally, and the information given checked against the information on their ID band.

1.4.4 The collection of the blood, dispersal into sample tubes and labelling of the sample tubes must be carried out as one continuous, uninterrupted event involving one patient only.

Addressograph labels must not be used on blood sample tubes.

1.4.5 The **minimum acceptable labelling** on the form and sample is: 1. Patient's full name (first name and surname) 2. Date of birth (DoB) 3. CHI number 4. Gender, Ward, Hospital (*DoB must be given separately, not extrapolated from CHI number, which must be given fully, otherwise samples will not be processed.* See also para 1.5). In addition, the date and time sample was taken, are also required on the request form.

This facilitates delivery of the required blood component. The request form must also be signed by the requester and the person taking the sample.

1.4.6 Unlabelled / Mislabelled

Unlabelled / Mislabelled samples will NOT BE ACCEPTED. Discrepancies between the information on the sample tube and the request form will result in unnecessary delays while a fresh sample and request form are obtained.

1.4.7 The sample tube must not carry the details of another patient, even if these have been scored out (obliterated) and the sample relabelled.

The BTC adheres to mandatory regulations (four points of identification) for the exacting Good Manufacturing Practice Standards (GMP) of labelling samples and request forms; Appendix 1.

1.4.8 Neonatal Samples

At the time of the first request for blood for a baby less than 4 months old, a maternal sample (7ml EDTA) is required in addition to the baby's blood sample (1-1.5 ml EDTA).

Neonates rarely make antibodies in response to blood transfusion, however the maternal sample will be screened for antibodies which are likely to be in the baby's plasma (passively acquired). The infant's sample is used to determine the ABO and RhD groups and for the Direct Antiglobulin Test (DAT). This is to make sure that there is no clinically significant antibody coating the baby's red cells. In subsequent requests for blood components a repeat of the baby's blood sample is not required.

1.4.9 Phlebotomists

Attention is drawn to the guidelines for phlebotomists drawn up by the Royal College of Pathologists (1989). A properly constituted team of phlebotomists who have been properly trained, who have signed an undertaking which makes their responsibilities absolutely clear, and who are responsible to a member of the consultant staff of the hospital, may be trusted with the collection of blood sample(s) for transfusion, provided they follow the practices detailed in para 1.4.

- The requesting Medical Officer must sign the request form; the person taking the blood (who may be the Medical Officer or a phlebotomist) must initial the sample container, and write his / her full name on the request form.
- In the event of unconscious patients, the request form must be signed and the sample taken by the same Medical Officer (see 1.5).

1.5 Accident & Emergency (A&E) Patients

If the patient's name and/or date of birth are not known (e.g. patient is unconscious), the request form and sample **MUST carry the A&E number (a unique hospital number), gender (F/M)** and the location of the patient. This is also applicable in the event of a Major Accident. At hospital admission all patients will be identified by a unique **Major Accident** number provided by A&E Department (i.e. TN number). Advise Blood Bank that sample is on its way.

1.6 Transport of Samples

Samples and requests should be sent in a double compartment (Polygrip) sample bag. **Only one patient's sample(s) and request form must be enclosed in each bag.**

1.6.1 Samples will be collected by the portering service or BTS driver from the pick-up points at the specified times. Woodend Hospital (WE) and Aberdeen Maternity Hospital (AMH) from the refrigerator(s) twice daily, at **0700** and **1300** hrs (Monday-Friday) and at **0700** hrs on Saturdays. Outwith these times, arrangements for collection and delivery must be made by the ward staff (pages 31-33).

1.6.2 In Community Hospitals, the ward / clinic staff must make arrangements for the collection and delivery of the blood samples.

1.7 Urgent Requests

Telephone the Blood Bank (ARI ext. 52322 / 52512 / (8)12474, DGH ext. 67320 / 67479) before despatching the samples. This will help to speed up the response. For further details on obtaining urgent supplies of blood see pages 33-35.

2. LABORATORY PROCEDURE FOR PROVIDING BLOOD

2.1 Group and Screen (G&S)

This test is to determine the patient's ABO and RhD groups and to screen for the presence of atypical red cell antibodies in the plasma.

The G&S samples are stored at +4°C for 7 days from the date of withdrawal, in case a subsequent request for conversion to a compatibility test (crossmatch) is received. A fresh blood sample will not be required unless the patient has been transfused and more than 48 hrs has elapsed since the transfusion. **In the interest of conservation of valuable blood stocks the BTC always encourages the G&S procedure whenever appropriate (MSBOS pages 25-29).**

If atypical red cell antibodies are identified, 2 units of crossmatched blood may be made available, dependant on the clinical need. The sample should be provided with plenty advance notice of clinical procedure. The BTC will automatically issue an "antibody card" to the patient via the consultant / GP in charge of the case.

2.2 Crossmatch / Compatibility Test

This is the selection of suitable units of red cells for compatibility test. If red cell antibodies have been identified, a more lengthy procedure is performed and finding compatible blood may be difficult and time-consuming. Whenever patient's plasma is known to contain atypical antibody(ies), advance warning must be given to the blood bank whenever possible.

2.3 Blood Ordering and Availability

Red Cell Concentrate Supplemented (RCCS) or Red Cell Concentrate (RCC) is routine issue. Special requirements (e.g. platelets) by prior discussion/request via BTC Duty MO.

To ensure that the specimen used for compatibility testing is representative of a patient's current immune status, serological studies should be performed using blood collected no more than 3 days in advance of the actual transfusion when the patient has been transfused or pregnant within the preceding 3 months, or when such information is uncertain or unavailable. The 3 days includes the de-reservation period, e.g. if the sample was 1 day old, the blood would have to be transfused within 2 days.

Whole Blood is not available.

2.3.1 Emergency Request

Note: a pre-transfusion blood sample from the patient is required to confirm blood group.

Specialist advice may be sought from the BTC Duty MO. Blood availability depends on the degree of clinical urgency.

- A routine crossmatch takes approximately **one hour** from receipt of sample.
- **In an URGENT clinical situation:-** ABO & RhD group specific blood may be rapidly matched if the patient's blood group is known and no clinically significant antibody has been reported, and will be available approximately **20 minutes** from the time of request.
- **IN EVENT OF MASSIVE BLEEDING** Group O RhD negative (rr) blood is available from specific blood storage refrigerators (pages 33-35).

Or alternatively: **Group O unmatched blood can be issued within 10 minutes of request from the Blood Bank.**

MASSIVE BLEEDING PROTOCOL **see page 73 (Appendix 2)**

2.3.2 Elective Request

- For G&S (refer to paragraph 3.2) provide sample **AT LEAST 24 HOURS** in advance of clinical procedure.
- For elective transfusion procedures, give **AT LEAST 24 HOURS NOTICE** and state the time the blood is required.
- When this much notice is not possible, blood is routinely processed in two batches to make it available as follows:

Samples received at BTC	Blood matched by
0900hrs	1400hrs
1230hrs	1730hrs

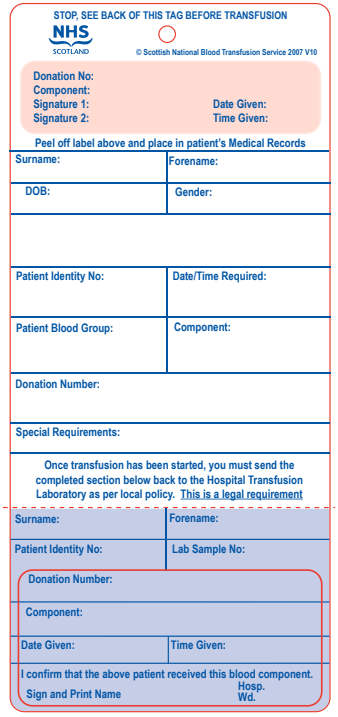
This timing depends on priority/urgent clinical situations. Please note Blood Bank enquiry numbers (52322 / 52512 / (8)12474) should be used mainly for clinical urgency. For DGH, ext. 67479 / 67320.

2.3.3 Compatibility Label (CL)

The compatibility label is generated in the Blood Bank. It is attached to the blood bag and contains the following patient information:

Surname, Forename, Date of Birth, Gender, Number / Patient Identification Number, Ward and Hospital.

The patient's blood group, component type and date required are also included on the label. The unique donation number is printed on the compatibility label; this number must match exactly with the number on the blood bag label.


STOP, SEE BACK OF THIS TAG BEFORE TRANSFUSION

NHS SCOTLAND

© Scottish National Blood Transfusion Service 2007 V10

Donation No:
Component:
Signature 1: Date Given:
Signature 2: Time Given:

Peel off label above and place in patient's Medical Records

Surname:	Forename:
DOB:	Gender:
Patient Identity No:	Date/Time Required:
Patient Blood Group:	Component:
Donation Number:	
Special Requirements:	

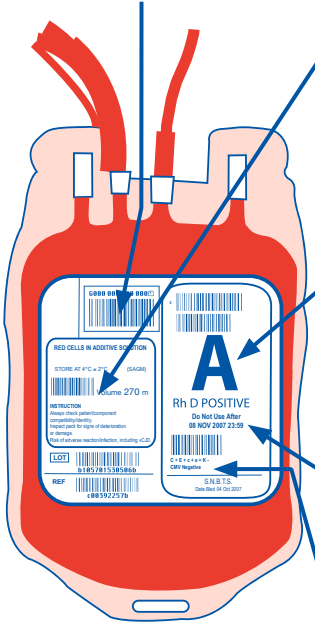
Once transfusion has been started, you must send the completed section below back to the Hospital Transfusion Laboratory as per local policy. This is a legal requirement

Surname:	Forename:
Patient Identity No:	Lab Sample No:
Donation Number:	
Component:	
Date Given:	Time Given:

I confirm that the above patient received this blood component.
Sign and Print Name Hosp. Wd.

2.3.4 Unique Donation Number

This is the unique number assigned to each blood donation by the transfusion service and allows traceability from donor to patient. All donations bear the 14 digit (ISBT128) donation number. The unique donation number on the blood bag must match exactly the number on the compatibility label.



Cautionary Note

This section of the label gives instructions on storage conditions and the checking procedure you are required to undertake when administering a blood component. It also includes information on the component type and volume.

Blood Group

Shows the blood group of the component. This does not have to be identical with the patient's blood group but must be compatible. **Group O patients must only receive group O red cells.**

Expiry Date

The expiry date/time must be checked - do not use any component that is beyond the expiry date.

Special Requirements

This shows the special features of the donation, e.g. CMV-negative.

3. BLOOD ORDERING SCHEDULES

3.1 Paediatric Transfusion

Exchange Transfusion

Special arrangements apply. Please contact the Blood Bank in advance to make arrangements. For exchange transfusions, maternal and baby samples are required (see page 23 for details). Only semi-packed red cells are suitable for exchange transfusions.

Top-ups for Neonates and Infants

CMV-seronegative cellular components will be provided for all infants up to one year old. Paedipacks will be provided for all infants, who require top-up transfusions.

Blood Requirements for Surgical Procedures on Neonates / Infants

Use RCC / RCCS, dependant on clinical need, follow the same criteria as top-ups (see above).

Fresh Frozen Plasma and Cryoprecipitate

Neonates and children born after 1 January 1996, should be treated with Fresh Frozen Plasma (FFP) and Cryoprecipitate that has been virally inactivated with Methylene Blue Treatment (MBT) and imported from outside the UK (page 46); alternatively Octaplas may be issued / used (page 46).

NEONATAL ALLOIMMUNE THROMBOCYTOPENIA (NAIT)

NAIT is a transient, but potentially life-threatening thrombocytopenic disorder, limited to fetal and neonatal life. It is caused by maternal IgG alloantibodies that cross the placenta resulting in the premature destruction of platelets bearing paternally - derived platelet antigens (analogous to haemolytic disease of the fetus & newborn).

NAIT occurs in approximately 1 to 1.5 / 1000 live births and the commonest cause is anti-HPA1a. Special samples (pages 7 & 66) for laboratory investigations are required.

For advice on clinical indications, contact On-Call Duty MO via the Blood Bank (52322 / 52512 / (8)12474).

For Summary Table of Blood and Blood Components for Neonates and Infants up to One Year old, see page 23.

BCSH Guideline: 'Transfusion guidelines for neonates and older children'. BrJ Haemotol (2004), ***124,*** *433-453.*

BCSH Guideline:'Guidelines for the use of fresh frozen plasma cryoprecipitate and cryosupernatant'. BrJ Haemotol (2004), ***126,*** *11-28.*

These and other guidelines available at: ***www.transfusionguidelines.org.uk*** *and at* ***http://intranet.grampian.scot.nhs.uk*** *click on the* ***hospital portal*** *link* ***http://nhsgintranet.grampian.scot.nhs.uk/portal/hospitalportal/pages/default.aspx*** *then click on the* ***Blood Transfusion.***

SUMMARY FOR NEONATES AND INFANT TRANSFUSIONS

Reason / means of Transfusion	Specificity of selected unit(s)	Comments and / or additional requirements
Post-Intrauterine Transfusion	Paedipack (RCC)	Must be compatible with maternal plasma and blood must be irradiated prior to use
Massive Transfusion 1. Exchange transfusion in case of HDFN 2. Cardiac Bypass 3. ECMO	Hct 0.50 - 0.60 Prepared and issued within 5 days	Must be compatible with maternal plasma if it contains a clinically significant antibody
Transfusion of newborn infants (0-4 months)	Paedipack or RCCS	If no maternal antibody and infant is DAT negative – no crossmatch required
Transfusion of older infants (4-12 months) Massive Transfusion (as above)	RCCS	Crossmatch against infant's plasma
NAIT	HPA antigen-negative platelets	Lack antigen against which maternal antibody directed

All blood for transfusion of infants less than one year is:

I) CMV seronegative
II) from accredited donors, i.e. from donors who have given blood at least twice within the last 2 years.

Note: Where neonate has received intrauterine transfusion(s), blood for exchange transfusions **and** top-up transfusions **must** be irradiated. For all other exchange transfusions, the blood should be irradiated, provided this does not lead to an unacceptable delay in the provision of blood.

3.2 Maximum Surgical Blood Ordering Schedules (MSBOS)

3.2.1 Operational Details

The guidelines represent the standard orders for the following list of **elective** operations (pages 25-29). They have been prepared in order to allow the most efficient utilisation of blood stocks and laboratory facilities, and are the result of a consensus between NHS Grampian surgeons, anaesthetists and the BTC. Clinical staff have the option of changing these orders when increased blood needs are likely e.g. anaemic patients or other complicating factors. A telephone call to the Blood Bank or a **clear indication of the reason(s)** on the request form is all that is required.

3.2.2 Conversion of a “Group and Screen” request to a “Crossmatch” is effected by a telephone call to the Blood Bank giving the patient's full details and the number of units and when they are required.

3.2.3 The Blood Bank staff will record the details of the requester (doctor's full name and bleep/ext. no.).

3.2.4 All blood samples sent to the BTC will be held for seven days, after which time they will be discarded.

BLOOD ORDERING SCHEDULES

1. GENERAL SURGERY MSBOS

OPERATION	GROUP AND SCREEN	UNITS MATCHED
Cholecystectomy / Lap - Chole	✔	
Colonic Resection - Anterior Resection		2
Colonic Resection ----------	----------	----------
Colonic Resection - Hemicolectomy		2
ERCP	✔	
Gastrectomy		2
Hiatus Hernia Repair	✔	
Laparotomy	✔	
Liver Biopsy	✔	
Mastectomy - simple	NIL	NIL
Mastectomy ----------	----------	----------
Mastectomy - radical		2
Oesophagectomy		2
Rectal Polypectomy	NIL	NIL
Splenectomy		2
Thyroidectomy	✔	
Vagotomy	✔	

2. CARDIOTHORACIC SURGERY MSBOS

OPERATION	GROUP AND SCREEN	UNITS MATCHED
Angioplasty	✔	
Aortic Aneurysm - elective resection		4
Aortobifemoral Graft		5
CABG		4
Cardiac Valve Replacement		5
Lobectomy-Pneumonectomy		3
Oesophagectomy		4
Pericardectomy		4
Pleurectomy	✔	
Thoracotomy ---------- (Hiatus Hernia)	---------- ✔	2 ----------
Tracheostomy	NIL	NIL

3. SPECIALITY SURGERY MSBOS

OPERATION	GROUP AND SCREEN	UNITS MATCHED
3.1 GENITO URINARY SURGERY		
Cystectomy - radical		4
Nephrectomy		2
Pyelolithotomy	✔	
TURP	✔	
3.2 NEUROSURGERY		
Craniotomy ---------- Craniotomy ---------- - Aneurysm - Meningioma	✔ ---------- ----------	---------- 3 ---------- 3
Laminectomy	✔	
Spinal Decompression	✔	
Spinal Decompression - for Tumour		2
3.3 OTOLARYNGOLOGY		
Laryngectomy		2
Mandibular Resection		2
Neck Dissection		2
Parotidectomy	✔	
3.4 PLASTIC SURGERY		
Breast Reduction	✔	
Face Lift	✔	

4. ORTHOPAEDIC SURGERY MSBOS

OPERATION	GROUP AND SCREEN	UNITS MATCHED
Amputation	✔	
Bone Biopsy	✔	
Decompression (including Laminectomy)	✔	
Fracture Neck of Femur - intertrochanteric		2
Fracture Neck of Femur - subcaptial (Hasting's Arthroplasty)		3
Osteotomy - Tibial	✔	
Osteotomy - Pelvic		3
Spinal fusion	✔	
Total hip replacement	✔	
Total knee replacement	✔	

5. OBSTETRICS AND GYNAECOLOGY MSBOS

OPERATION		GROUP AND SCREEN	UNITS MATCHED
5.1 OBSTETRICS			
Caesarean Section*	- low risk	✔	
	- high risk		2
(e.g. placenta praevia; severe pre-eclampsia; maternal anaemia; previous CS)			
Manual removal of placenta		✔	
5.2 GYNAECOLOGY			
Cone Biopsy		✔	
Ectopic Pregnancy*	- low risk	✔	
	- high risk		2
D & C		NIL	NIL
Hysterectomy*	- abdominal	✔	
	- vaginal	✔	
	- radical		4
Laparoscopy		NIL	NIL
Lymphadenectomy		NIL	NIL
Myomectomy			2
Ovarian*	- cystectomy	✔	
	- Carcinoma		2
PFR		✔	
Radical Vulvectomy			4
STOP/TOP/ERPOC		✔	
Tubal Surgery		✔	

*** Specify type of operation on Request Form**

4. EMERGENCY TRANSFUSION OF UNMATCHED BLOOD

4.1 Group O RhD- negative blood is available for emergency use, but it should only be transfused in massive bleeding cases when there is no time for an emergency compatibility test. Although the transfusion of unmatched blood carries a risk, this must be weighed against the danger of not giving the patient a transfusion at all. The risks of unmatched blood are increased when the patient has had a previous blood transfusion or pregnancy, or is known to have a red cell antibody.

4.2 A male who has not been transfused may be given group O RhD-positive blood (whatever his ABO, RhD group).

4.3 A female (< 60 yrs old) capable of having children, should be given group O RhD- negative, Kell-negative blood.

4.4 For locations of units of group O Rh-D negative, Kell-negative blood for emergency use, see pages 33-35.

NOTE: When this blood is removed from the blood storage refrigerator, the Blood Bank (52322 / 52512 / (8)12474), (Dr Gray's Hospital ext. 67479, outwith normal working hours, contact duty BMS via switchboard) MUST be notified immediately. The purpose of this call is to enable us to replace the blood as soon as possible for the next emergency use.

4.5 The Blood Transfusion Centre issues antibody cards to all patients for whom an atypical red cell antibody of clinical importance has been detected. This card indicates the patient's blood group (ABO & RhD) and that his/her plasma contains alloantibodies. When possible, the patient should be asked whether he or she possesses such a card, and the advice on the card conveyed to the Blood Bank.

4.6 If a patient's plasma contains anti-c, or anti-e, the Emergency RhD- negative blood (which for transfusion purposes has phenotype C- D- E- c+ e+ K-) SHOULD only be used after discussion with the BTC MO. In all such cases, contact Blood Bank for advice (for Aberdeen Hospitals: ext. 52322/ (8)12474 and for DGH ext. 67479).

4.7 Before the emergency transfusion of unmatched blood is commenced, a 7ml EDTA blood sample must be taken from the patient. The full name (first name, surname), DOB, gender, CHI number or A&E / TN number must be written on the sample tube, the request form, and also on the traceability label attached to the unit of blood. The patient's sample must be sent to Blood Bank. The completed blue section of the traceability label must be sent to the Blood Bank as it is a regulatory requirement. THIS IS IMPORTANT, otherwise the recipient of blood may be exposed to further unnecessary risks, and the transfusion records will be incomplete (see para 9.2.1 / page 40).

5. DELIVERY & DISTRIBUTION OF MATCHED BLOOD TO GRAMPIAN HOSPITALS

5.1 Aberdeen Royal Infirmary (ARI)

Deliveries by the BTC porter are made to ARI blood storage refrigerators twice a day Monday to Friday at **0730** and **1315**hrs. The **Request Form** for routine deliveries **must** be completed and be at the collection point by **0700**hrs. At all other times arrangements must be made for matched blood to be collected from the **BLOOD BANK** by portering services.

The person collecting the blood must bring a completed Blood Porter Collection Slip, (or the patient's notes or patient's addressograph label) as a form of the patient's ID.

Provision of inaccurate patient data on this slip may result in unnecessary delay in provision of blood.

Guidelines - The administration of blood and blood components and management of transfused patients.
(*Ref: Trans. Med. 1999, 9; 227-238).*

5.2 Aberdeen Maternity Hospital (AMH)

At all times matched blood must be collected from the Blood Bank by the AMH porter (as para 5.1).

5.3 Royal Aberdeen Children's Hospital (RACH)

A RACH porter will deliver blood to the blood storage refrigerator as required. RACH staff will make arrangements for delivery of matched blood.

5.4 Woodend Hospital (WE)

The BTC driver visits Woodend at **0700**, Monday to Saturday. Matched blood is delivered to the blood storage refrigerator, where blood samples for grouping and crossmatching are picked up. Arrangements for delivery of matched blood outwith the stated times are made by the Blood Bank.

5.5 Dr Gray's Hospital, Elgin

Ward staff make arrangements for collection of matched blood from the Blood Bank storage refrigerator; one unit at a time, collected as instructed by local procedures.

5.6 Blood Deliveries to Community Hospitals

See also Transfusion Procedures (page 39 para 9).

- Delivery by BTC driver, in SNBTS - supplied insulated box(es). These boxes are specially designed and can be used to store blood for up to 8 hours as detailed on Blood Fridge Register (BFR).
- Maximum 2 units per delivery.
- Unit(s) must remain in box (with special cool-packs) until removed for transfusion.
- Any units that have not been removed from insulated box by time recorded on BFR must **not** be transfused. Unwanted units must **not** be returned to BTC and are to be disposed of via NHSG waste disposal routes.

- Inform BTC of any unused units that have been discarded. If units are discarded, ensure the compatibility labels state that the unit was not transfused and return the compatibility labels to BTC.

Note: Document on the blood fridge register when the units were removed from controlled storage. Once the patient has received the transfusion, the two practitioners who positively identified the patient, sign the pink sticker and affix to the prescription and recording form. The blood fridge register and the completed blue section of the compatibility label are returned to BTC in the transport box.

6. BLOOD STORAGE AND LOCATIONS IN GRAMPIAN HOSPITALS

Blood left for 24 hours only from the time / date required.

Contact Blood Bank for advice.

Blood for transfusion within Aberdeen hospitals must always be stored in designated blood storage refrigerators and transported in insulated boxes prior to use. **Blood must not be kept more than 30 minutes in these boxes**.

Blood Fridge Register (BFR)

Blood must be booked into and out of the blood storage refrigerators as per local procedures. If the blood has been removed from the blood storage refrigerator for more than 30 minutes and **NOT** transfused, it may **NO LONGER BE SAFE**. Such blood **MUST NOT** be returned to the blood storage refrigerator, but must be clearly labelled as having been **OUTWITH STORAGE CONDITIONS** and returned to the Blood Bank laboratory as soon as possible.

In AMH, insulated boxes will be found adjacent to the blood storage refrigerator for use by the Obstetric Staff and for transport of blood to the Labour Ward Theatre.

The overwrap bag of the units **must not be opened until immediately prior to** transfusion as this may result in the unit(s) having to be discarded.

6.1 Blood For Emergency Use

Units of **O RhD-NEGATIVE** for **EMERGENCY USE** will be found in the BLOOD STORAGE REFRIGERATORS as **indicated:**

Refrigerator Location	Emergency Blood (Units) **O RhD-Neg**
ABERDEEN ROYAL INFIRMARY (ARI)	
Emergency Care Centre (ECC 4th Floor)	**4**
Phase II - Accident and Emergency	**4**
Phase II - G Theatres (Lower Ground Floor)	**4**
Special Block - Ward 14 (BU)	**4**
ABERDEEN MATERNITY HOSPITAL (AMH)	
Labour Ward Corridor	**6**
includes - Neonatal Blood ♦ (for top-up only)	**(1)**
WOODEND HOSPITAL (WE)	
Mail Room in Communications Centre	**4**

All emergency blood is RhD-negative, Kell-negative (phenotype C- D- E- c+ e+ K-) see also para 4.6, page 30.

When the Emergency Blood is taken, the Blood Bank must be notified immediately on ext. 52322 / (8)12474.

♦ A single unit of blood (4 paedipacks) is available as emergency for a neonate. If a paedipack is used for an infant, the rest (i.e. 3 paedipacks) are to be returned to the Blood Bank as soon as possible where they will be reserved for that infant (pages 21 & 45).

6.2 Blood Storage and Locations in Dr Gray's Hospital, Elgin

For advice contact the duty BMS Blood Bank (ext. 67479 / 67320).

Blood For Emergency Use

Units of **O RhD-NEGATIVE** for **EMERGENCY USE** will be found in the BLOOD STORAGE REFRIGERATORS as **indicated:**

Refrigerator Location	Emergency Blood (Units)
DGH'S LABORATORIES (Top Drawer)	**O RhD-Neg**
Emergency use only and also suitable for obstetric patients	**4**

All emergency blood is RhD-negative, Kell-negative (phenotype C- D- E- c+ e+ K-) see also para 4.6 page 30.

When the Emergency Blood is taken, the Blood Bank at Dr Gray's must be notified immediately on ext. 67479 / 67320.

7. COLLECTION OF MATCHED BLOOD

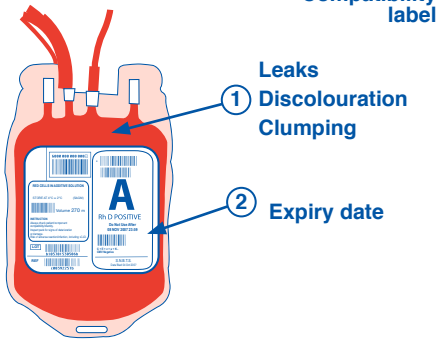
The staff member removing blood from the hospital's blood storage refrigerator must have documentation containing the patient's details (surname, forename, date of birth and CHI number). This is by means of a collection slip, **(or the patient's notes or patient's addressograph label).** In the interest of conservation of valuable blood stocks, the BTC always proposes that not more than 1 unit of blood should be removed from the storage refrigerator at anyone time.

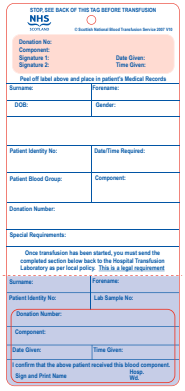
8. COMPATIBILITY LABEL (CL)

The compatibility label (CL) is attached to blood components issued by the BTC in order to meet the legal requirements outlined in the UK Blood Safety and Quality Regulations 2005. The following "6 step guide to transfusion" will assist you in using the system. If you require further assistance or information please contact Aberdeen Blood Bank ext. 52322 / 52512 / (8)12474 and/or Dr Gray's Blood Bank ext. 67479.

SIX STEP GUIDE TO TRANSFUSION

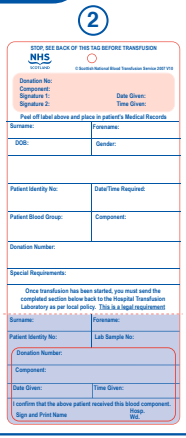
STEP 1





If there is ANY discrepancy - DO NOT transfuse

STEP 2

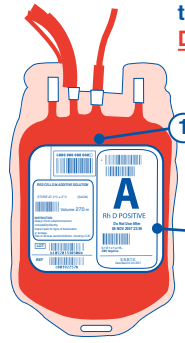


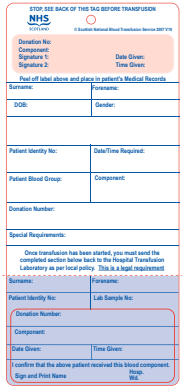
Ask the patient to tell you their full name and Date of Birth.
Check 1 against the ID band verbally.

Check 2 ID band against compatibility label on the component.
If there is ANY discrepancy DO NOT transfuse; if you are interrupted STOP and start the checking procedure again.
Do not leave the patient until the transfusion has commenced.
In event of unconscious patient check for unique Major Accident Number or Admission Number (e.g. UP no.)

STEP 3

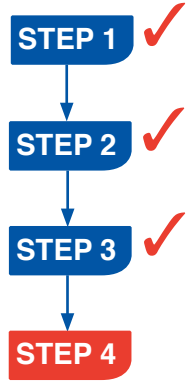
Check that the correct label is attached to the blood bag. If there is ANY discrepancy DO NOT transfuse.





If the checks are satisfactory, complete the pink portion of the label IMMEDIATELY BEFORE commencing transfusion.

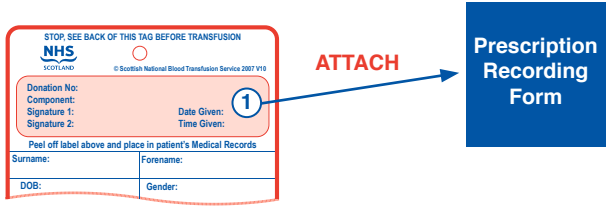
STEP 4



COMMENCE THE TRANSFUSION...

STEP 5

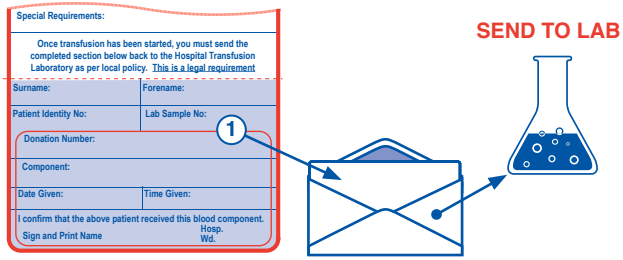
Once the patient has been exposed to the transfusion



Peel off the completed pink portion and attach it to the Prescription and Recording Form - remember to sign to say you have undertaken the patient ID checks.

STEP 6

Once the patient has been exposed to the transfusion



Sign and complete the blue "return to laboratory" portion of the label. Tear off and place in the container provided for return to Blood Bank.

9. TRANSFUSION PROCEDURES

The prescription of blood and blood components is the responsibility of the Medical Officer in charge of the patient.

Any individual undertaking any of the tasks within the transfusion process must ensure that they are aware of these procedures and act in accordance with them. They must have valid transfusion training and competency assessment appropriate to their role.

To minimise the risk of bacterial proliferation, blood must not be removed from the blood storage refrigerator until transfusion is ready to commence.

From the moment of removing the bag of blood from the cold storage facility and puncturing it with the administration set, the maximum time taken for transfusing a bag of blood should not exceed 4 hours. This will also depend on clinical decision.

If the unit has been out of the blood fridge for more than 30 minutes, it is still suitable to transfuse to the intended patient, as long as the transfusion will be completed within the recommended 4 hours of removal from the blood fridge. The rational is that once the bag of the blood is out of controlled temperature storage, the component warms up and the risk of bacterial proliferation increases with time. There is a greater risk in a warm ambient atmosphere even a short period of exposure may increase the risk of bacterial proliferation. A further important concern is the effect of temperature on the quality of red cell units.

What is the maximum time that a unit of red blood cells can be safely left out of controlled temperature storage?
(*Ref: Trans med rev, 2012; 26- 209-223).*

NOTE:

It is important that any bag of blood, which is removed from cold storage for more than 30 minutes, should be transfused within the 4 hours, otherwise it must be discarded (i.e. if the bag is unopened return to Blood Bank, however, if the bag was opened, discard it according to the NHSG policy and ensure return of blue tag to Blood Bank for traceability).

9.1 Before a Transfusion

Check the compatibility label, and the blood bag(s) carefully against patient's details on address label/patient's notes when a unit of blood is removed from a blood storage facility. You should also check this again **at the bedside against the patient's ID band**.

Check particularly that:

9.1.1 The surname, first name, date of birth, gender and CHI / TN on the patient's identification ID band and the traceability tag correspond exactly to those of the patient to whom the blood is to be given. The patient (if conscious) should be asked, "What is your name and date of birth?" not "are you Mr / Mrs Smith?"

9.1.2 The donation number and blood group on the compatibility label is the same as the number and blood group printed on the blood pack label (on some occasions a different compatible blood group may be issued to the patient).

9.1.3 The blood is within the expiry date printed on the blood pack label.

9.1.4 The blood bag has no damage / leaks or any abnormalities.

9.1.5 If patient has special transfusion requirements (e.g. irradiated components).

- Only by careful attention to all these details will it be ensured that the patient receives the correct blood.
- Do **NOT** add drugs or calcium - containing solutions (e.g. Ringer's Lactate, Hartmann's) to bags of blood. However, this should not preclude the clinician from giving any essential medicine by another route.

9.2 After a Transfusion

9.2.1 In the case of any bag of blood transfused which is labelled **"EMERGENCY USE ONLY"** (and which is transfused) the full details of the patient to whom it has been administered - Surname, First Name, Date of Birth, Gender, CHI No., Ward and Hospital - must be entered on the label attached to the bag, and the label(s) returned to the Blood Bank. When the emergency blood is used please inform the Blood Bank immediately on ext. 52322 / 52512 / (8)12474.

9.2.2 Compatibility Label (CL)

It is a legal requirement that an accurate record of the transfusion process is kept, as follows:

1. A record is made in the notes of the decision to transfuse and the indication. This should be approved by MO's signature.
2. A record is kept of who prescribes the blood.
3. A record is kept of who checks patient ID and cross checks with details on blood bag and the CL.
4. A record is kept of the donation number by affixing the pink section of CL in the patient's notes.
5. Time and date of transfusion of each unit (start and finish).
6. Blue section of CL returned to the Blood Bank as soon as possible after completion of transfusion.

9.3 The Blood Administration Set

Specific blood administration set with integral filters (170μm), can be used for up to 12 hours. The number of units that can be transfused with a single administration set will depend on the speed of transfusion. At the end of the transfusion it is unnecessary to flush the administration set to extract the final 10mls of blood. If the transfusion is to be interrupted e.g. 2 units of red cells to be transfused followed by albumin and then a further 2 units of red cells, a new administration set is required after each "block" of red cells even though the total transfusion period is less than 12 hours. In this example, an administration set would be required for the first two units of red cells and another for the second two units of red cells.

NOTE:

There are different administration giving-sets for RCCS, and another giving-set for Platelets, Fresh Frozen Plasma and Cryoprecipitate.

9.4 Subsequent Transfusion

If a transfusion has been completed and a further transfusion is to be given after 48 hours has elapsed, a fresh blood sample from the patient must be sent to the Blood Bank together with a completed request form.

9.5 Postponement or Cancellation of a Transfusion

If a transfusion is postponed, the Blood Bank (ext. 52322 / (8)12474; Dr Gray's ext. 67479) must be informed as soon as possible, as matched blood will only be held for up to 24 hours, unless special arrangements have been made for an extension with Blood Bank staff.

Unused bags of blood must be left at all times in the blood storage refrigerator, even when no longer required for a patient, and **NEVER** discarded.

10. TRANSFUSION REACTIONS

Should an unfavourable reaction occur during a transfusion, the transfusion should be stopped, clerical check undertaken and the patient's blood pressure, pulse rate and temperature recorded. In the event of any transfusion reaction, the patient's doctor should weigh the transfusion reaction against the patient's need for the transfusion.

Allergic reactions are not uncommon. Minor urticarial skin reactions, in the absence of other symptoms or signs, need not prevent continuation of the transfusion. More serious reactions are associated with rigor, lumbar pain, faintness, headache and a rise in temperature above + 38°C. **In these cases, the transfusion must be STOPPED.**

The clinician must exercise his / her clinical judgement to determine whether the expected benefits of continuing the transfusion outweigh the risks of a reaction becoming severe. Specialist advice may be sought from the BTC Duty Medical Officer, who may be contacted on NHS Grampian bleep 2346 during working hours or via the Blood Bank (ext. 52322 / (8)12474) outwith working hours.

When a transfusion has to be stopped because of a reaction, the Blood Bank should be informed by telephoning 52322 / (8)12474. For Dr Gray's contact BMS ext. 67479.

The following should be sent **IMMEDIATELY** to the Blood Bank:

(1) The unit(s) of blood with its contents, and the CL attached to it.

(2) The administration set, still in place in the outlet port of the pack and the regulating clamp firmly closed.

(3) Any used and unused units of blood issued for the patient.

(4) A post-transfusion sample of blood (7ml EDTA) together with a completed request form, giving details of the reaction, indicating the degree of urgency of further transfusion(s).

If bacterial contamination of the blood component is suspected, blood cultures from the patient, together with the unit of blood should be sent directly to the hospital microbiology laboratory from the ward, (i.e. to avoid any potential further contamination).

11. USE AND AVAILABILITY OF BLOOD AND BLOOD COMPONENTS / PRODUCTS

The following blood components are routinely available on request:

Components (all blood components are leucodepleted)

- CMV - seronegative cellular components
  (for indications see Appendix 4 - page 83)
- Irradiated cellular components
  (for indications see Appendix 5 - page 84)
- Cryoprecipitate (page 46)
  - Cryoprecipitate - MBT

  Fresh Frozen Plasma (FFP) (page 46)
  - FFP - SD for the treatment of TTP (e.g. Octaplas)
  - FFP - MBT

Platelet Apheresis, (single donation)
- adult dose or paediatric split

Platelet Pooled, (multiple donations)

All platelet units are supplied irradiated

Washed cellular components
- (this component is prepared on demand only. Specialist advice is required).

PCC-Prothrombin Complex Concentrate (Beriplex). Available from the Blood Bank Ext. 52322 / 52512 / (8)12474.

Products (page 47-50)

Human Albumin 20%

Human Albumin 4.5%

Normal immunoglobulins (IM & IV)

Specific immunoglobulins (e.g. anti-D, anti-Zoster)

C1 Inhibitor (Non-licensed product for routine use).

These products are obtained from NHS Grampian Pharmacy at (5)53223 (Mon to Fri 9am-5pm); all other times contact on-call pharmacist via ARI switchboard (0845 456 6000).

In addition see **www.transfusionguidelines.org.uk**

For details of the blood/blood components and products see pages 45 - 50.

SUMMARY OF BLOOD COMPONENTS AVAILABLE AT BLOOD TRANSFUSION CENTRE

Blood Component	Main Indication for Use	Description
Red Cells in Additive Solution (RCCS)	To increase oxygen transport by increasing red cell mass	Red cells from which most of the plasma has been removed and the cells re-suspended in 100ml of an optimal additive solution containing Sodium Chloride, adenine, glucose and Mannitol. PCV of 0.50-0.70%. Shelf-life 35 days at +4°C. Transfusion to be completed within 4 hours from the moment the bag is removed from cold storage facilities
Red Cell Concentrate (RCC) packed cells	To increase oxygen transport by increasing red cell mass	Whole blood less 200 ml ± 10% plasma: PCV / Hct of 0.50-0.60%. A component for exchange or large volume transfusion of neonates; should be used within 5 days of issue and kept at +4 to +6°C from preparation
Paedipack	For neonates & infants	Multiple pack system to provide small volume red cell transfusions for top-up only, by apportioned leucocyte depleted RCC / RCCS unit into 4 containers (Paedipacks). This system is used to avoid multiple donor exposure and decrease donor-related risk. A single unit of blood (4 paedipacks) is assigned to a patient, however if the clinical need exceeds the volume in current assigned unit, additional units are assigned as needed to meet each patient's transfusion requirement (see page 21)
Washed Cellular Components (red cells or platelets)	In patients who develop antibodies and react to plasma constituents of transfused blood (e.g. Anti-IgA)	Red cells / platelet apheresis from a single donation, centrifuged free of plasma and resuspended in saline. PCV of 0.65-0.75%. Residual protein < 0.5g per unit. To be used within 14 days from the time of preparation. Special notice and discussion required with BTC
Platelet Apheresis - Split donation - Whole donation	Bleeding due to thrombocytopenia or platelet function defect	Platelet content > 240×10^9. Shelf-life 5 days at +22°C with continual agitation. Give via platelet-giving set or fresh blood administration set. DO NOT REFRIGERATE. Use immediately on receipt

SUMMARY OF BLOOD COMPONENTS AVAILABLE AT BLOOD TRANSFUSION CENTRE (continued)

Blood Component	Main Indication for Use	Description
Platelet Pooled	As for platelet apheresis	A pool derived from 4 (or 5) buffy coats contained in a volume of up to 300ml of plasma. Platelet content of each pool > 240 x 10^9. Shelf-life 5 days at +22°C with continual agitation. Give via platelet-giving set or a fresh blood administration set. DO NOT REFRIGERATE. Use immediately on receipt
Fresh Frozen Plasma (FFP)	Replacement of coagulation factors not available as specific concentrates. Plasma exchange for TTP/HUS	Each bag contains approx. 220ml plasma from whole blood separated and frozen within 8 hours of collection. Shelf-life 24 months at -30°C. FVIIIc > 0.7 IU/ml. USE IMMEDIATELY, after thawing. Transfusion must be complete within 4 hrs of thawing
Octaplas Human Plasma in solvent detergent (SD)	Used as normal FFP. It is mainly for patients with TTP	Each bag contains 200 ml plasma from non-UK donors. This component could also be used for children born after 1st January 1996
FFP-Methylene Blue Treated (MBT) virus inactivated + Octaplas	as FFP	Neonates and children born after 1st January 1996 should be treated with Fresh Frozen Plasma that has been virally inactivated with Methylene Blue Treatment and imported from US. Use IMMEDIATELY after thawing. Transfusion must be complete within 4 hrs of thawing. FVIIIc > 0.5 IU/ml. (pages 21, 43)
Cryoprecipitate	Fibrinogen deficiency	Each bag contains > 70 IU Factor VIII and > 140 mg Fibrinogen. Shelf-life 24 months at -30°C. Use Factor VIII concentrate whenever possible. USE IMMEDIATELY after thawing. Infusion must be complete within 4 hrs of thawing
Cryoprecipitate (MBT) virus inactivated	Fibrinogen deficiency	Neonates and children born after 1st January 1996, should be treated with cryoprecipitate that has been virally inactivated with MBT and imported from US. Each bag contains >70 IU Factor VIII and >140 mg Fibrinogen. Shelf-life 24 months at -30°C. Use Factor VIII concentrate whenever possible. USE IMMEDIATELY after thawing. Infusion must be complete within 4 hrs of thawing

SUMMARY OF BLOOD PRODUCTS AVAILABLE AT BLOOD TRANSFUSION CENTRE (continued)

Blood Product	Main Indication for Use	Description
Beriplex	• Haemophilia B (Christmas Disease) • Rapid reversal of oral anticoagulant overdose - Warfarin • Factor II and X deficiency	Beriplex: PCC Contents after reconstitution: (IU/ml) Factor II: 20-48, FVII: 10-25, FIX: 20-31, FX: 22-60 IU/ml Further active ingredients: IU/ml Protein C: 15-45; Protein S: 12-38 Store: Do not store above +25°C

SUMMARY OF PLASMA PRODUCTS AVAILABLE FROM NHS GRAMPIAN PHARMACY at (5)53223 (Mon to Fri 9am-5pm); all other times contact on-call pharmacist via ARI switchboard (0845 456 6000).

All plasma products have been prepared from pooled units of human plasma collected from non-UK, voluntary, non-remunerated donors resident in the EU or USA.

Blood Product	Main Indication for Use	Description
Human Albumin Solution (4.5%)	• Blood volume expansion • Plasma exchange	Supplied in bottles of 100ml and 400ml isotonic solution containing 42.5-47.5 g/L plasma protein (of which 95% is albumin). Formulated to contain 8mmol/L Sodium Octanoate and 130-150mmol/L Sodium Chloride and < 2mmol/L Potassium Citrate. Expiry date on label (3 year shelf-life). Store at temperature not exceeding +25°C
Human Albumin Solution (20%)	• Severe hypoalbuminaemia i.e. Serum albumin <20 g/L • Ascites for drainage/ Hepatorenal Syndrome • Or Spontaneous Bacterial Peritonitis	100 ml bottle of concentrated serum 190-210 g/L containing 200 g/L plasma protein, (of which not less that 95% is albumin). Expiry date on label (3 year shelf-life). This solution is HYPERONCOTIC and equivalent to 400 ml of plasma and should be given SLOWLY. Store at temperature not exceeding +25°C
Normal Human Immunoglobulin (Intramuscular - IM)	• Passive immunisation (viral infections) • Hypogamma-globulinaemia • Hepatitis A passive immunisation • Measles prophylaxis	250mg IgG per 1.5 ml in aqueous solution. Expiry date on label (3 year shelf-life). Store at +2°C to +8°C
Human immunoglobulin (IgG) for intravenous or subcutaneous use (IVIg / SCIg)	• See National Guideline - primary or secondary immunodeficiency - immunomodulatory therapy of a range of autoimmune and inflammatory disorders	Bottles or vials containing liquid phase IgG of variable concentration for IV/SC use

PHARMACY continued

Blood Product	Main Indication for Use	Description
Human Anti-D Immunoglobulin (IM)	• Prevention of sensitisation to RhD antigen in susceptible individuals(Special memorandum applies)	250 IU (50μg), 500 IU (100μg) and 1500 IU (300μg) IgG anti-D per vial in aqueous solution. Expiry date on label (3 year shelf-life). Store at +2°C to +8°C
Human-Tetanus Immunoglobulin (IM)	• Passive immunisation in susceptible individuals	250 IU of IgG anti-tetanus per vial. The measured potency of the product is stated on the vial label in IU/ml. Expiry date on label. Store at +2°C to +8°C
Human-Hepatitis B Immunoglobulin (IM)	• Passive immunisation in susceptible individuals exposed to Hepatitis B	500 IU of IgG anti-HBs per vial. Expiry date on label. Store at +2°C to +8°C Dose: Age 0-4 yrs 200 IU Age 5-9 yrs 300 IU Adults and children aged 10 yrs or more 500 IU
Human Varicella-Zoster Immunoglobulin (IM)	• Passive immunisation in susceptible individuals exposed to chicken pox	250 mg of IgG anti-Varicella-Zoster per vial. Expiry date on label. Store at +2°C to +8°C Dose: Age 0-5 yrs 1 vial (250mg) Age 6-10 yrs 2 vials (500mg) Age 11-14 yrs 3 vials (750mg) Age 15 yrs or more 4 vials (1000mg)
Human-Rabies Immunoglobulin (IM)	• Passive immunisation in susceptible individuals exposed to rabies infection	500 IU of IgG anti-Rabies per vial. Expiry date on label. Store at +2°C to +8°C Dose: 20 IU/ Kg body weight for both adults and children

PHARMACY (continued)

NAMED-PATIENT BASIS ONLY

The following products are available on a named-patient basis only. They require specific administration and release procedures and supplier's instructions must be followed.

Plasma Product	Main Indication for Use	Description
C1- Inhibitor 500 units NAMED-PATIENT BASIS ONLY	Treatment of acute attacks and short term prophylaxis of hereditary angio-neurotic oedema	C1- Inhibitor in a purified, concentrated and stabilised form. Each vial contains 500 units. Store at +2°C to +8°C. Expiry date on label ISSUED ON A NAMED-PATIENT BASIS ONLY

THESE PLASMA PRODUCTS MUST BE STORED PROTECTED FROM LIGHT AT TEMPERATURES AS STATED.

DO NOT FREEZE.

ALWAYS CONSULT THE DATA SHEET TO FOLLOW SUPPLIER'S INSTRUCTIONS AND CHECK THE EXPIRY DATE BEFORE USE.

SECTION II

ANTENATAL / OBSTETRIC SERVICE

LABORATORY HOURS

Working hours - Aberdeen BTC:
0900 - 1700: Monday to Friday (Ext. 52322)

INTRODUCTION

The main role of this service is to provide the clinicians with the laboratory tests to aid prevention of Haemolytic Disease of the Fetus and Newborn (HDFN). This includes ABO and RhD grouping and antibody screening.

1. ORDERING OF REQUEST FORMS

"REQUEST FOR BLOOD GROUP SEROLOGY / INVESTIGATION" forms are supplied as pads of 50 forms and a pad can be ordered by completing the 'tear off' order slip found within the existing pad. Send the order by Royal Mail post or by internal mail to BTC. The order will normally be returned within 5 working days. In the event of an urgent request, telephone (5)52322 / 52512 / (8)12474 stating your request for a pad of forms and the address to which it is to be sent.

2. COMPLETION OF REQUEST FORMS

2.1 Patient's details: surname, first name, DoB, gender, CHI and address (see page 71), and also signature of person taking sample on sample tube and form.

2.2 Report destination and requesting doctor's name (rubber stamp or block capitals).

2.3 If patient is PRIVATE indicate this in the appropriate section. This form can be used for requesting Category 2 non-clinical blood groups.

2.4 State clearly if it is an antenatal booking sample request, indicating whether the patient is prim/multigravidae, history of transfusion(s) and if her plasma contains any clinically significant antibody(ies) which are associated with HDFN. Give as many clinical details as available which could help in processing the request, e.g.

a) indicate if patient has been administered prophylactic anti-D Ig and if so when.
b) if submitting a partner's (father) sample for phenotype please give details of the pregnant partner. This form may also be used for investigations related to immunohaematological disease.

2.5 For a patient with or suspected of having a high risk infection (e.g. Hepatitis B, C or HIV).

Test	Sample Required
Antenatal request	7ml EDTA (see below 3.1)
BEFORE Anti-D prophylaxis	
Blood Group & Antibody Screen	7ml EDTA
Kleihauer Test	4.5ml EDTA
At delivery (Maternal)	2 x 4.5ml EDTA
At delivery (Cord)	4.5ml EDTA

3. BLOOD SAMPLES REQUIRED AND FREQUENCY OF TESTS

3.1 Antenatal Blood Samples

- **Booking Sample**
  7ml EDTA blood sample.
- **Subsequent Sampling (excluding delivery)**
  7ml EDTA (unless specified otherwise).

3.2 Frequency of Tests

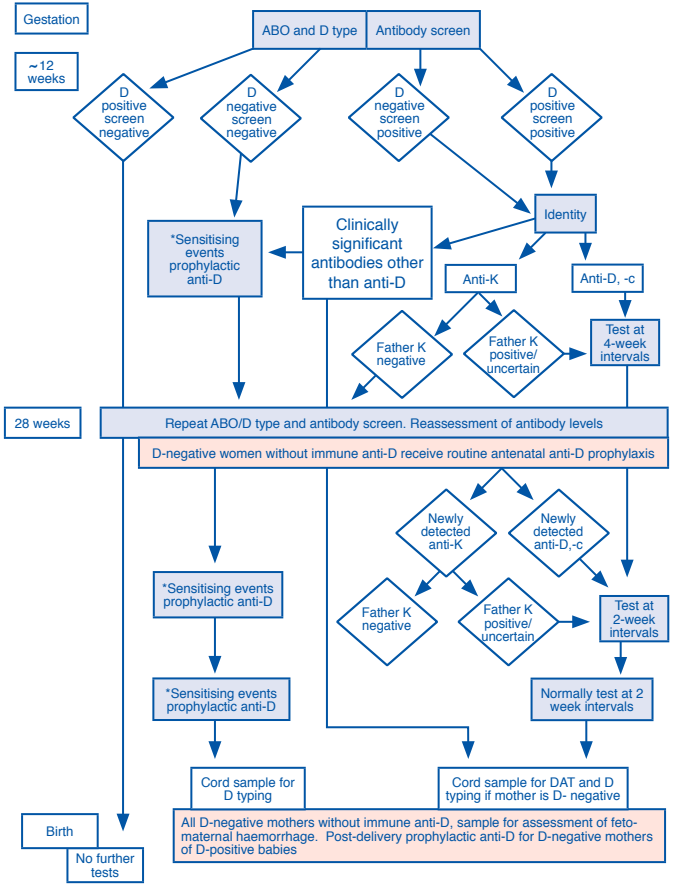
"Suggested Frequency of Antenatal Testing" (see Table page 53 and Flow Chart page 54).
"Protocol for the management of alloantibodies in pregnancy (e.g. anti-Kell)" (see page 55).

SUGGESTED FREQUENCY OF ANTENATAL TESTING

	Gestation In Weeks				Delivery		Notes
*	Booking §	28-30			Mum §§	Baby §§§	
RhD Pos.	●	●			❍	❍	+ any further tests as requested by Laboratory
RhD Neg.	●	●			●	●	
**	Booking §	Monthly until 30 weeks	Fortnightly from 30-36 weeks	Weekly from 36 weeks onwards	Delivery Mum §§	Delivery Baby §§§	Notes
All Groups	●	●	●	●	●	●	+ any further tests as requested by Laboratory

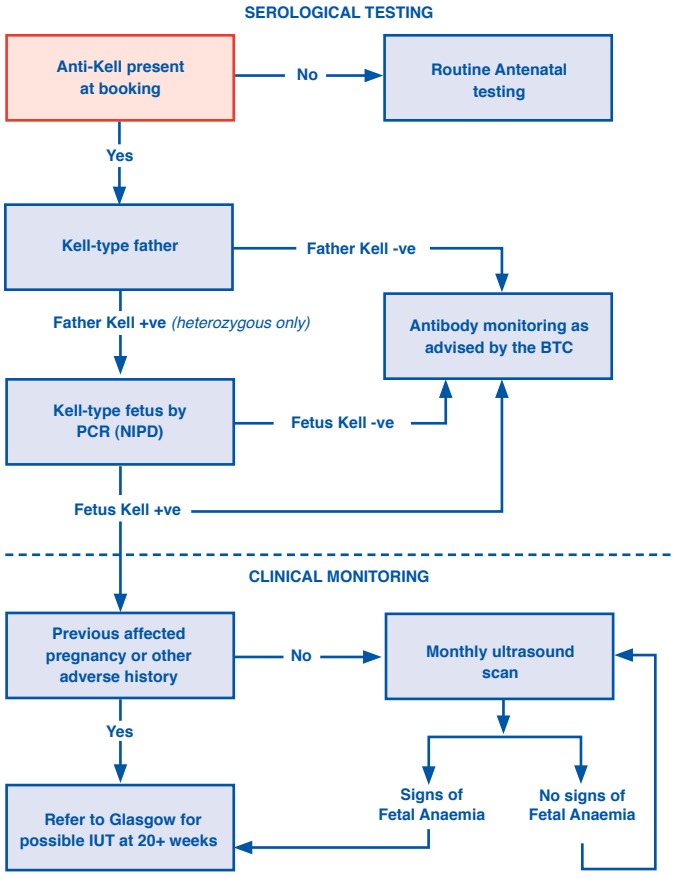
● Sample required **(page 52, para 3)**.
❍ Sample required when the antibody(ies) **other than D** is / are associated with HDFN.
§ For ABO, RhD group; red cell antibody screen.
§§ Confirmation of blood group / antibody screen; estimation of FMH in RhD-neg. mothers (see page 60).
§§§ For ABO, RhD group and DAT.
* All patients **except** those with anti-D, anti-c or Kell-related antibodies.
** Antibody associated with **severe** HDFN e.g. D, c, and Kell-related antibodies. Delivery in Specialised Hospital is advised when there is a possibility / risk of a transfusion problem and / or HDFN.
Delivery samples should consist of : a) maternal, b) cord blood (and labelled **"baby of maternal surname, gender, baby's DOB and CHI"**) (see page **63**).

SAMPLES AND TESTING REQUIRED IN A VIABLE PREGNANCY



* After 20 weeks, Group, screen and Kleihauer test are required.
Modified from *Transfusion Medicine 2006*, **17**, 252 - 262

PROTOCOL FOR THE MANAGEMENT OF ALLOANTIBODIES IN PREGNANCY (e.g. ANTI-KELL)



4. REPORTING OF RESULTS

On completion of laboratory tests, results will be sent to individual GP's with a copy to the appropriate Consultant / Ward and any further reports as requested.

4.1 Immunohaematology Report

The upper form contains a computer-generated report of the patient's results. This part of the form is affixed to the patient's notes. Do not detach the lower form until the repeat sample is sent to BTC.

4.2 Repeat Request for Serological Investigation in Pregnancy

The lower form contains a computer-generated request form containing patient details for repeat samples within the same pregnancy. Complete additional / amended details as required, detach from upper form and send to BTC with a fresh patient sample.

4.3 Telephone Reporting

On receipt of a blood sample in the case of threatened abortions / miscarriages etc., a telephone report will advise the RhD group and whether prophylactic anti-D is necessary. To avoid the danger of transcription errors, the ABO status will NOT be given.

The time, date and name of the person to whom the advice is given will be recorded in the patient notes at BTC.

5. ANTIBODY CASES

5.1 Antibody Update

Antenatal patients previously shown to have clinically significant red cell antibodies require regular monitoring of antibody titre (pages 52-55). Recommendations for follow-up will be included on the report form. It is advisable that all such cases are referred for delivery at AMH or Dr Gray's Hospital, where the full transfusion support of the BTC will be available.

5.2 Anti-D or Anti-c Titre / Quantification

Where alloimmune anti-D /-c has been identified in a patient, this will be reported initially as an antibody titre but will then be quantified in International Units (IU/ml) for pregnancies where it is suspected HDFN may result. Quantification testing is carried out in the SNBTS Gartnavel (Glasgow) laboratories.

5.3 Antibody Cards

In the event of a patient developing antibodies during pregnancy, an antibody card, which they are advised to carry at all times, will be issued directly to the patient's home address. The GP will already have been updated with any serological changes.

5.4 Paternal Samples

Antenatal patients who have been shown to have clinically significant atypical antibodies, require determination of the partner's red cell phenotype (see para 2.4 page 51) unless already known. This investigation may indicate whether or not the fetus is likely to be at risk from HDFN.

5.5 DNA Genotyping of Fetus / NIPD

Where a woman has an antibody (e.g. anti-D, -c or -K) which may cause serious HDFN (representing a risk of IUD), and the father is predicted to be heterozygous for the relevant antigen by phenotyping (routine blood grouping), or is unknown, the genotype of the baby may be determined by DNA typing of the fetus using the maternal plasma. This will identify whether or not the baby is at risk of HDFN by determining the corresponding antigen. This procedure is known as NIPD (non invasive prenatal diagnosis). For advice on clinical indication contact Dr. M.A. Greiss (8)12420.

6. RhD PROGRAMME

The objective of the RhD programme is to prevent HDFN due to anti-D. It is therefore essential to determine the RhD group and to screen for immune anti-D in all women who are capable of having

children. This will decide the eligibility for anti-D prophylaxis. For indications see Tables 1 & 2 (page 60).

6.1 Dosage and Administration

100-125 IU (20-25µg) of intramuscular anti-D Ig (preferably into the deltoid muscle) is capable of suppressing immunisation by 1-1.25ml of RhD-positive red cells.

For successful immunoprophylaxis, anti-D Ig should be given as soon as possible after the sensitising event, but always within 72 hours. If for some reason, it is not given within 72 hours, every effort should still be made to administer the anti-D Ig, since a dose given within 9-10 days may provide some protection.

Prophylaxis for Sensitising Events before Delivery

A dose of 250 IU (50µg) of anti-D Ig is recommended for prophylaxis following sensitising events up to 20 weeks gestation. When bleeding continues intermittently after 12 weeks gestation, anti-D Ig should be given at approximately 6 weekly intervals. For all events after 20 weeks, 500 IU (100µg) anti-D Ig should be given, followed by a Kleihauer test to identify FMH > 2 ml red cells; additional anti-D Ig should be given as required (see page 64, para 6.7). A further dose will be required at delivery of an RhD positive infant even if antenatal prophylaxis has been given and the Kleihauer test is negative.

6.2 Protocol for Antepartum Anti-D Prophylaxis

The routine antenatal anti-D prophylaxis (RAADP) protocol has been drawn up to comply with the Guidelines - Recommendations for the use of anti-D immunoglobulin for Rh prophylaxis (Transfusion Medicine 1999, 9; 93-97 and, The Royal College of Obstetricians and Gynaecologists Guideline No 22 October 1999) **www.nice.org.uk**.

All RhD- Negative Women eligible for the RhD prevention programme have:

- no RhD antibodies.
- antibodies other than anti-D, e.g.: E, c, Kell, and Duffy.

Exclusion Criteria

- women with pre-existing immune anti-D.

Administration

If an RhD-negative woman meets the above criteria, she will automatically be eligible for the RAADP; this protocol should be explained to her. The BTC will also forward an RhD-negative Card directly to the patient.

A single dose of 1500 IU anti-D Ig is administered at approximately 28 weeks gestation.

The anti-D Ig dosage depends upon the availability of the anti-D Ig product.

Antibody screening is still carried out as per BTC protocol at 28 weeks, by taking an EDTA blood sample prior to administration of anti-D Ig, to check for antibodies other than anti-D.

Please annotate in the Special Features column of the antenatal notes that the woman has been given prophylactic anti-D Ig.

PLEASE INFORM THE BTC, VIA REQUEST FORM, IF / WHEN ANTI-D Ig WAS ADMINISTERED.

NOTE:

During other times of potentially sensitising episodes e.g. PV bleeding at any gestation, anti-D Ig is administered in the usual way as in Tables 1 & 2 (page 60). The Kleihauer test is only to be carried out on the blood sample taken prior to anti-D administration when there is bleeding after 20 weeks gestation (see page 64 para 6.7 and Table 3).

GUIDELINES FOR THE USE OF ANTI-D Ig FOR Rh PROPHYLAXIS

Those eligible are RhD-negative women with no antibodies or antibodies other than anti-D.

Table 1

Recommendation:
All RhD-negative women with no pre-existing immune anti-D are eligible for RAADP.
A single dose of 1500 IU is administered at 28 weeks gestation.
HOWEVER IN ADDITION:-
Events, following which anti-D Ig must be given to all RhD-negative women with no allo anti-D and / or with antibodies other than anti-D:

- delivery of an RhD positive infant
- abortion (see Table 2)
- invasive prenatal diagnosis
  - amniocentesis
  - chorionic villus sampling (CVS)
  - fetal blood sampling (FBS)
- other intrauterine procedures
  - insertion of shunts
  - embryo reduction
- antepartum haemorrhage (APH)
- external version of the fetus
- closed abdominal injury
- transplacental haemorrhage (TPH)
- ectopic pregnancy*
- intrauterine death (IUD)*
- stillbirth*

* If the RhD type of the infant has not been determined or is in doubt, and / or the mother is to be discharged.

Dose: before 20 weeks gestation → 250 IU (50µg)
after 20 weeks gestation → 500 IU (100µg) ■
Or a single dose of 1500 IU at any time during the pregnancy.

■ in conjunction with a Kleihauer test to assess the size of any TPH (see Table 3, page 64).

Table 2

Prophylactic anti-D following abortions to all RhD-negative women with no RhD antibody and / or with antibodies other than anti-D:

- therapeutic termination of pregnancy
- spontaneous abortion followed by instrumentation
- spontaneous complete or incomplete abortion after 12 weeks gestation
- threatened abortion before 12 weeks
  - when bleeding is heavy or repeated or is associated with abdominal pain, in particular, if these events occur as gestation approaches 12 weeks
- threatened abortion after 12 weeks - all women are eligible; in addition:
  - when bleeding continues intermittently after 12 weeks gestation, anti-D Ig should be given at approx. 6 weekly intervals, and after 20 weeks gestation assess the size of TPH (see Table 3, page 64).

6.3 Issue of RhD-Negative Card to RhD-Negative women

This card is issued only to RhD-negative women capable of childbearing, who have no immune anti-D in their blood. This card will be sent to the patient with instructions to carry it at all times and to show it at any hospital admission. She will be advised to read the card and to report to her GP/hospital in the event of bleeding at any time during pregnancy. If patient details change, inform BTC to issue an updated card.

6.4 Issue and Collection of Anti-D Ig

Anti-D Ig stocks

Held in AMH (Labour Ward), ARI (Wards 42 & 43), Dr Gray's Hospital (Wards 1, 3 & 5). Most GPs and Community Hospitals also hold anti-D Ig stock.

GP's and Maternity Units

Note: Stocks of anti-D Ig are available from NHS Grampian Pharmacy at (5)53223 (Mon to Fri 9am-5pm); all other times contact on-call pharmacist via ARI switchboard (0845 456 6000). It is **important** that Pharmacy is informed whenever anti-D is required to replace your stock.

6.5 Advice on Anti-D Ig Administration

In accordance with the criteria in Tables 1 & 2 (page 60) anti-D Ig will be advised for patients by a member of BTC staff as follows:
Anti-D will be advised by a member of the BTC staff by a telephone call to the GP or midwife in charge of the patient.

AMH

a) During pregnancies:- at weekends and public holidays the BTC BMS will advise anti-D Ig to the ward staff in the form of a telephone message, which contains the patient details and whether she does or does not require anti-D Ig. BTC will maintain a record of date, time and the name of the ward staff (i.e. clinical members of staff) receiving the advice. Note: Rubislaw Ward will receive clinical reports delivered by BTC driver (Monday - Friday) to AMH receptionist.

b) At delivery:- a BTC driver delivers clinical reports with anti-D advice daily (Monday - Friday) to the AMH receptionist, who distributes them to the appropriate ward. These reports contain details of patients for whom anti-D Ig prophylaxis is advised or not advised.

ARI

Clinical reports for anti-D advice are delivered daily (Monday - Friday) to Wards 42/43 Reception, by a member of the BTC staff. The reports contain details of patients who are advised / not advised anti-D Ig prophylaxis.

However at the weekend or on public holidays:- the BTC BMS will advise anti-D Ig to the ward staff in the form of a telephone message, which contains the patient details and whether she does or does not require anti-D Ig. BTC will maintain a record of date, time and the name of the ward staff (i.e. clinical members of staff) receiving the advice.

Dr Gray's Hospital

Advice on anti-D Ig prophylaxis will be given by phone by a BMS member of the Aberdeen BTC staff to the ward staff in charge of the patient. BTC will maintain a record of date, time and name of the ward staff (i.e. clinical members of staff) receiving the advice.

6.6 Maternal Deliveries (Hospitals/Home)

"Suggested Frequency of Antenatal Testing" (see Table page 53).

Despatch of delivery samples

At delivery, samples from the mother and baby should be sent to BTC from the following cases:-

1. All RhD-negative women.
2. All women whose blood group is unknown (e.g. concealed pregnancy).

a) Delivery samples from RhD-negative women should be accompanied by an anti-D Ig form (orange form) and sent to BTC.

1. AMH - BTC staff will collect samples from the AMH refrigerator twice daily, at 0700 and 1300 (Monday to Friday and at 0700 on Saturday).
2. Dr Gray's and outlying hospitals - samples should be sent to BTC by either taxi or hospital van.
3. Home Deliveries - the attending midwife should deliver samples to BTC or the AMH blood sample refrigerator.

b) The same arrangements apply when the mother is RhD-positive and her plasma contains antibodies that could be associated with HDFN. 'Department of Transfusion Medicine request form' should accompany these blood samples.

Delivery Blood Samples should consist of:-

Maternal Blood

Two venous samples (2 x 4.5ml EDTA) of maternal blood (both labelled with the full details of the mother) taken soon after the third stage of labour. These samples are for blood group serology and Kleihauer test.

Cord / Baby Blood

An umbilical cord sample of 4.5 ml of blood in an EDTA tube, labelled with the Baby's maternal surname, Baby's Hospital CHI, DOB and Gender. This sample is for ABO, RhD grouping and DAT.

6.7 Kleihauer Test

This test estimates the size of the feto-maternal haemorrhage (FMH), necessitating additional anti-D Ig by detecting fetal cells in the maternal circulation. This test may also be requested for clinical management of specific situations, as indicated in Table 3 below. Up to 50% of large FMH's occur after normal deliveries. However, the clinical circumstances described in Table 3 are more likely to be associated with a large FMH and a Kleihauer test should be undertaken as soon as possible after the diagnosis has been made.

In the case of an FMH greater than 2ml of RhD-positive fetal cells, an additional screening test is recommended to accurately quantify the FMH volume and assess the need for additional doses of anti-D Ig. Flow cytometry (FC) assays have been shown to be sensitive, rapid, reliable and accurate in detection and quantification.

Table 3
Indications for Kleihauer, or alternative tests:

• delivery of an RhD-positive infant	• bleeding after 20 weeks gestation
• traumatic deliveries including caesarean section	• twin pregnancies (at delivery)
• manual removal of the placenta	• abdominal trauma during the third trimester (e.g. RTA)
• unexplained hydrops fetalis	• sinusoidal fetal heart rate tracing associated with FMH
• intrauterine deaths (IUD)	• stillbirths

The Kleihauer test is not used for FMH diagnosis, but solely to determine if an extra anti-D Ig dose is advised/required.

SECTION III

IMMUNOHAEMATOLOGY INVESTIGATIONS

LABORATORY HOURS

Working Hours - Aberdeen BTC:
0900-1700: Monday to Friday (Ext. (8)12477)

INTRODUCTION

The main role of the service is to provide the clinicians with the laboratory tests for cold / warm Autoimmune Haemolytic Anaemia (AIHA) and other immunohaematological conditions. Special samples may be required (see pages 6-7), therefore it is necessary to contact the BTC or in certain situations the BTC Duty MO may contact the GP/clinician to arrange a mutually convenient time for the collection or despatch of the appropriate blood samples.

The following tests are available:

- Cold haemagglutinin screen (by special arrangement)
- DAT - Direct Antiglobulin (Coombs) Test for complement C3 and IgG (7ml EDTA sample)
- Donath-Landsteiner antibody test (by special arrangement)
- Extended Blood Group Phenotyping (7ml EDTA)
- Red cell auto- and alloantibody screen (7ml EDTA).

SECTION IV

MOLECULAR IMMUNOHAEMATOLOGY (MI)

LABORATORY HOURS

Working Hours - Aberdeen BTC:-
0900-1700: Monday to Friday (Ext. (8)12461)

INTRODUCTION

Services provided to clinicians by this laboratory include:

- Molecular Immunohaematology
- Platelet and Granulocyte Immunohaematology
- Other investigations.

Molecular Immunohaematology

Molecular blood group genotyping for management of pregnancies at risk of HDFN and investigation of blood group anomalies.

Tests are available for : *• RHD • RHCE • KELL • ABO • FY • KIDD • MNS*

For advice on clinical indications and authorisation contact Dr. M. Greiss (8)12420.

Platelet and Granulocyte Immunohaematology

This laboratory offers diagnostic services including the investigation of:

Test	Sample Requirements
• Autoimmune Neutropenia	1 x 7ml clotted +1 x 4.5ml EDTA
• Neonatal Alloimmune Thrombocytopenia	Mother 2 x 7ml clotted + 2 x 4.5ml EDTA Father: 3 x 4.5ml EDTA Baby: EDTA sample
• Platelet Refractoriness	2 x 7ml clotted + 2 x 4.5ml EDTA
• Post-transfusion Purpura (PT) / ITP	2 x 7ml clotted + 2 x 4.5ml EDTA
• TRALI (Appendix 6, page 88)	3 x 7ml clotted + 2 x 4.5ml EDTA

The above tests MUST be authorised by the hospital Consultant in consultation with the BTC Duty MO via Blood Bank, 52322 / 52512 / (8)12474.

Other Investigations

- **Neutrophil function testing** by quantitative DHR (dihydrorhodamine 123) test. Special samples and laboratory investigations are required (page 7), and clinical assessment is necessary. For advice on clinical indications contact Professor M Vickers on (8)12401/12402.
- **Lymphocyte subsets** for monitoring of HIV-positive patients (CD3, CD4, CD8, CD19, CD56). Samples require testing within 24hrs of withdrawal.
- **PNH** investigation by flowcytometry (CD14, CD16, CD55 and + FLAER CD59). Samples require testing within 24hrs of withdrawal.

Support of Solid Organ Transplantation

All non-urgent samples should be sent to the Aberdeen BTC for forwarding to the Edinburgh BTC which provides the laboratory testing service. Edinburgh BTC can be contacted on tel. 0131 242 7528. Please refer to SNBTS Histocompatibility & Immunogenetics Laboratory User Manual for sample requirements.
www.scotblood.co.uk/about-us/publications.aspx

Note: Emergency HLA typing / compatibility testing

This service is restricted to solid organ transplantation and is available only to organ donor transplant coordinators (nhsg.predialysisandtransplantnurses@nhs.net) and is provided by the Edinburgh BTC (tel. 0131 242 7528). ***Blood samples must be sent directly to Edinburgh BTC, Royal Infirmary of Edinburgh, 51 Little France Crescent, Edinburgh EH16 4SA - after contacting the Edinburgh Laboratory.***

HLA and Disease Associations

All samples should be sent to Aberdeen BTC for forwarding to **Dundee BTC** which provides the laboratory testing service. Dundee BTC can be contacted on tel. 01382 645 166.

This service is restricted to HLA-B*27, HLA-B*5701 Abacavir-sensitivity in HIV-positive patients and HLA-DR and DQ association in

Narcolepsy patients only. No other investigations are available unless by special arrangement.

Sample requirements are: HLA typing 1 x 4.5ml EDTA (page 7).

Support for Haematopoietic Stem Cell Transplantation

All samples should be sent to Aberdeen BTC but only after special arrangement due to the complexity and length of time needed to undertake the tests.

Aberdeen BTC will forward the samples to **Edinburgh BTC** which provides the laboratory testing service. Edinburgh BTC can be contacted on tel. 0131 242 7528.

The following tests are available for potential haematopoietic stem cell recipients and donors and MUST be authorised by the Haematology Consultant:

- HLA typing
- HLA antibody screening and identification

For sample requirements see page 7.

Peripheral Blood Stem Cells and Donor Lymphocytes

Aberdeen BTC in conjunction with the staff on the Haematology Ward ARI / RACH undertakes peripheral blood stem cell and donor lymphocyte collection, processing, storage and infusion. It is strictly by prior arrangement. Any requests are placed through the Haematology BMT coordinator, Haematology Consultants or through the Stem Cell Consultant in the BTC. All patients or donors require a clinical assessment and mandatory virology testing and patient/donor consent prior to the stem cell collection. When testing mobilised patients for CD34 level, the samples are sent to the Cellular Therapies laboratory (8)12462 / (8)12465 as early as possible on the day.

SECTION V

CLINICAL CELL SEPARATOR SERVICE

SERVICE HOURS

Working Hours - Aberdeen BTC:
0900-1700: Monday to Friday (Ext. 51370)

Within the Aberdeen BTC there is a fully equipped cell separator unit (including resuscitation facilities) staffed with trained personnel where therapeutic haemapheresis may be carried out. Procedures that can be performed include:

- Erythrocytapheresis (red cell exchange)
- Leucopheresis
- Peripheral Blood Stem Cell (PBSC) harvests
- Therapeutic Plasma Exchange (TPE)
- Plateletpheresis
- Therapeutic venesection

Although procedures are usually carried out in the cell separator unit, if the patient's condition precludes this, the procedure may be carried out in the Intensive Care Unit. Before apheresis is carried out clinical assessment of the patient will be made to ensure that there are no medical contraindications to the procedure. For advice on clinical indications and which investigations are required contact the On-Call MO for BTC via the Blood Bank (ext. 52322 / 52512 / (8)12474).

Cytotoxic T-cell Lymphocytes (CTL)

Anti-Epstein-Barr virus cytotoxic lymphocytes (EBV-CTLs).

Aberdeen BTC provides blood donor-derived anti-EBV CTLs for the treatment of EBV-associated lymphomas, mainly in the post-transplant setting. Any potential patient should be discussed with Professor M Vickers on (8)12401 / 12402.

SECTION VI

BONE BANK

SERVICE HOURS

Working Hours - Aberdeen BTC:
0900 - 1700: Monday to Friday
To contact the Bone Bank Co-ordinator page 07699 736763.

Requests for surgical bone can be made by completing a “Request for Bone Products Form” obtainable from the Orthopaedic Ward or by telephoning Ext. 52322 / 52512. Minimum details required will be the patient’s full name, date of birth, CHI, gender and RhD group, the quantity of bone required (small or large) and the type of operation. The hospital, ward, theatre of destination, date and time of the planned procedure should also be provided. All requests must be directed to Bone Bank, Blood Transfusion Centre, Foresterhill Road, Aberdeen.

APPENDIX 1

The Scottish National Blood Transfusion Service (SNBTS) Zero Tolerance Policy

Following the publication of the NHS Quality Improvement Scotland (QIS) Clinical Standards for Blood Transfusion in 2006, QIS recommended that every NHSS Board should introduce a 'zero tolerance' policy for pre-transfusion samples.

The British Committee for Standards in Haematology (BCSH) also strongly recommended zero tolerance in their updated Guidelines on the administration of blood components in 2009.

The Scottish National Blood Transfusion Service (SNBTS) has implemented a zero tolerance policy for labelling of blood samples from patients potentially requiring blood transfusion (e.g. Blood Bank and antenatal samples).

Zero tolerance in terms of sample labelling/request form completion requires the following mandatory points of patient identification:-

- **Last name**
- **First name**
- **Date of Birth (must be given separately from CHI number)**
- **CHI number**
- **Gender**
- **Signature or initials of person taking the sample**

Samples/request forms which do not comply
WILL NOT BE ACCEPTED.

Amendments to mislabelled samples/forms
WILL NOT BE ACCEPTED.

Rejection of such requests may cause delay in provision of blood components for transfusion.

APPENDIX 1 (continued)

Accident & Emergency (A&E) patients

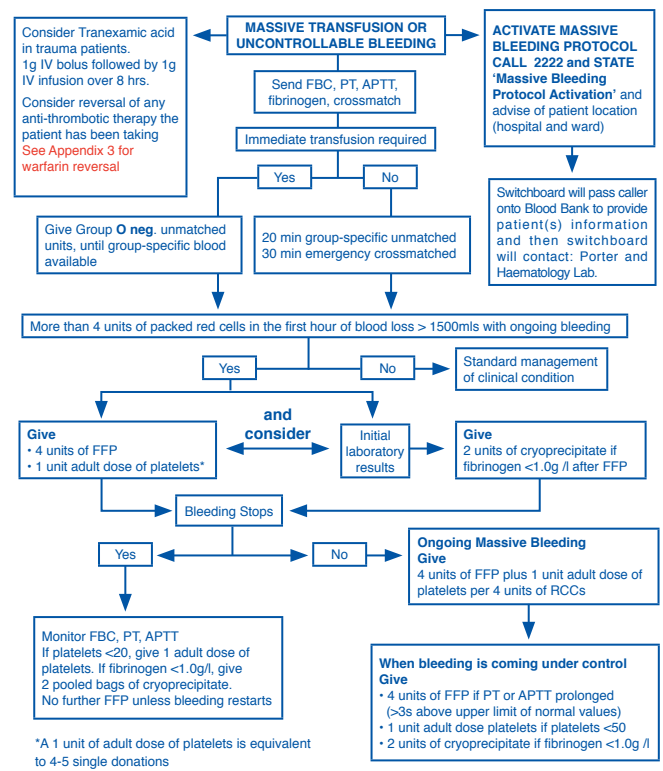
If the patient's name and/or date of birth are not known (e.g. patient is unconscious), the sample and request form **MUST** carry the A&E number (a unique hospital number), gender (F/M) and location of the patient.

This is also applicable in the event of a Major Accident. At hospital admission all patients will be identified by a unique Major Accident number provided by the A&E department (i.e. UP/TN number).

APPENDIX 2 Massive Bleeding Protocol

APPENDIX 2.1

Adult Massive Bleeding Protocol Flow Chart: Aberdeen



*A 1 unit of adult dose of platelets is equivalent to 4-5 single donations

Any communication with Blood Bank after the initial activation call, phone 50522

REMEMBER TO ADVISE BLOOD BANK, PORTER AND HAEMATOLOGY LAB WHEN DEACTIVATION OCCURS

AIDE MEMOIR RE: ACTIVATION OF MASSIVE BLEEDING PROTOCOL ABERDEEN

CLINICAL DECISION MADE TO ACTIVATE MASSIVE BLEEDING PROTOCOL

↓

CALL 2222

↓

STATE "MASSIVE BLEEDING PROTOCOL ACTIVATION" and provide LOCATION OF PATIENT, HOSPITAL AND WARD.

↓

SWITCHBOARD SHALL REPEAT INFORMATION BACK TO CALLER AND PASS CALLER ONTO BLOOD BANK

↓

CALLER HOLDS THE LINE AND IS PASSED ONTO BLOOD BANK

↓

ON BLOOD BANK ANSWERING, CALLER REPEATS TO BLOOD BANK "MASSIVE BLEEDING PROTOCOL ACTIVATION …" AND PROVIDES LOCATION OF PATIENT, HOSPITAL AND WARD

↓

CALLER PROVIDES BLOOD BANK WITH PATIENT DETAILS: FORENAME, SURNAME, DATE OF BIRTH, GENDER AND CHI NUMBER. (For unidentified patients minimum data should include the unique A&E patient identifier and gender)

CALLERS NAME AND CONTACT NUMBER (It is important that the person calling has the ability to provide this information)

↓

SWITCHBOARD CONTACT A PORTER AND HAEMATOLOGY LAB

↓

ALL SUBSEQUENT COMMUNICATIONS BETWEEN CLINICAL AREAS, LABORATORY STAFF AND PORTERS SHOULD BE PRECEDED BY; "THIS CALL RELATES TO THE MASSIVE BLEEDING PROTOCOL"... AND STATE LOCATION AND NAME OF PATIENT. For Blood Bank, the dedicated massive bleeding protocol phone should be used for subsequent calls: Extension 50522

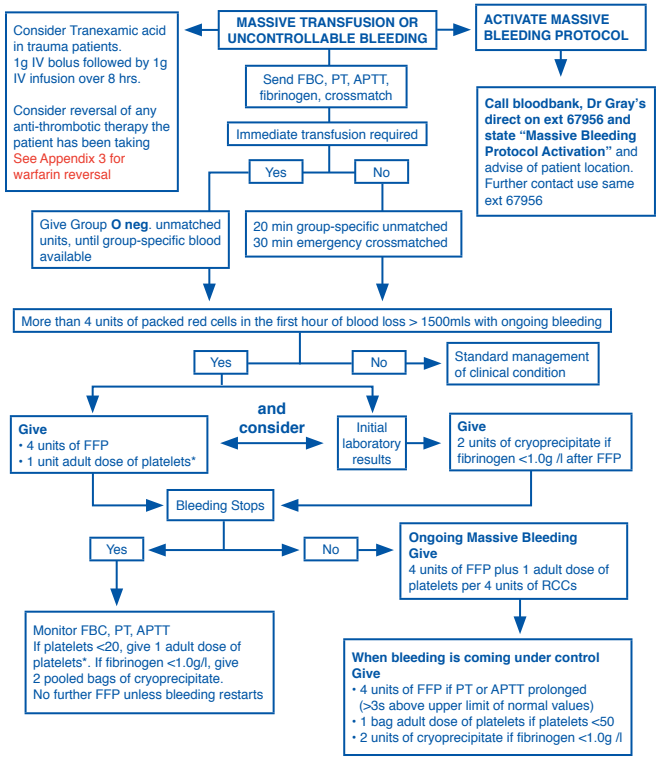
↓

Remember to advise Blood Bank, porter and Haematology Lab when deactivation occurs

This must be read in conjunction with NHS Grampian Massive Bleeding Protocol

APPENDIX 2.2

Adult Massive Bleeding Protocol Flow Chart: Dr Gray's, Elgin



*A 1 unit of adult dose of platelets is equivalent to 4-5 single donations

Any communication with blood bank after the initial activation call, phone 67956

REMEMBER TO ADVISE BLOOD BANK AND HAEMATOLOGY LAB WHEN DEACTIVATION OCCURS

APPENDIX 2.2 (continued)

Adult Massive Bleeding Protocol Flow Chart: Dr Gray's, Elgin

NOTES:

1. Once the BMS has obtained the patient's blood group / RhD status they will contact the clinician dealing with the patient and inform them of available on-site blood stock until re-supply from SNBTS.

2. Re-supply of blood / FFP will take 1.5 – 2 hours.

3. Platelet supply will take 1.5 – 2 hours. No platelet stock is held by the Blood Bank, Dr Gray's Hospital.

4. Outside core hours during the protocol, the BMS will only answer the emergency telephone ext. 67956 – no other Laboratory telephone will be answered.

5. During core hours of 8.30am to 5pm Monday to Friday, the Site Manager for Dr Gray's Hospital can be contacted via Outpatient Reception, Dr Gray's Hospital on extension 67385 (in the first instance), or via Outpatient Clinical Co-ordinator on ext. 67264 / 67987. Outside core hours Senior Manager on call via, Aberdeen Royal Infirmary switchboard, extension 0.

6. If you require any clinical advice contact the Duty Medical Officer via Aberdeen BTC on ext. 52322 / 52512 during and out of core hours.

AIDE MEMOIR RE: ACTIVATION OF MASSIVE BLEEDING PROTOCOL DR GRAY'S, ELGIN

CLINICAL DECISION MADE TO ACTIVATE MASSIVE BLEEDING PROTOCOL

↓

CALL BLOODBANK DR GRAY'S DIRECT ON EXTENSION 67956

↓

STATE "MASSIVE BLEEDING PROTOCOL ACTIVATION ..." and provide LOCATION OF PATIENT, HOSPITAL AND WARD.

↓

CALLER PROVIDES BLOOD BANK WITH PATIENT DETAILS: FORENAME, SURNAME, DATE OF BIRTH, GENDER AND CHI NUMBER. (For unidentified patients minimum data should include the unique A&E patient identifier and gender)

CALLERS NAME AND CONTACT NUMBER (It is important that the person calling has the ability to provide this information)

↓

ALL SUBSEQUENT COMMUNICATIONS BETWEEN CLINICAL AREAS, LABORATORY STAFF AND PORTERS SHOULD BE PRECEDED BY; "THIS CALL RELATES TO THE MASSIVE BLEEDING PROTOCOL ..." AND STATE LOCATION AND NAME OF PATIENT

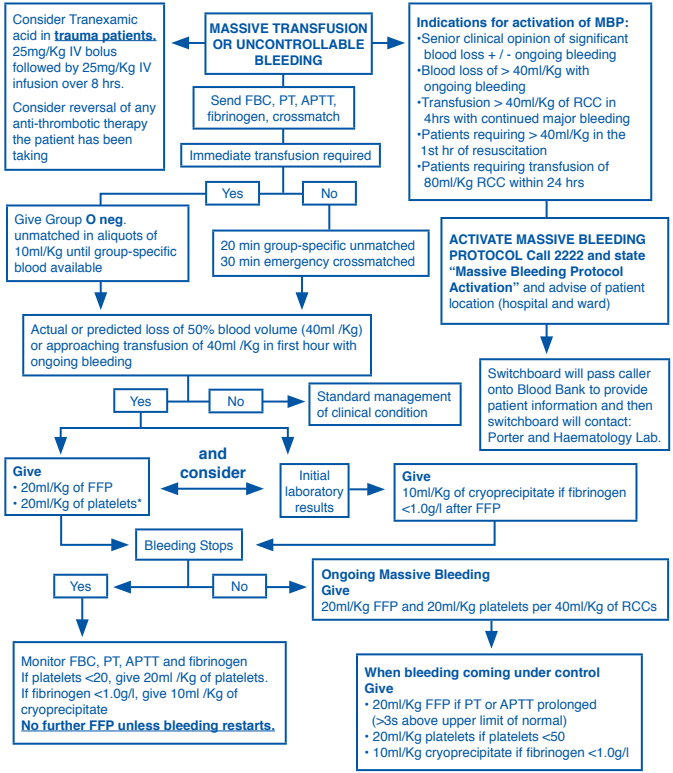
↓

Remember to advise Blood Bank, porter and Haematology Lab when deactivation occurs

This must be read in conjunction with NHS Grampian Massive Bleeding Protocol

APPENDIX 2.3

Paediatric Massive Bleeding Protocol Flow Chart: Aberdeen



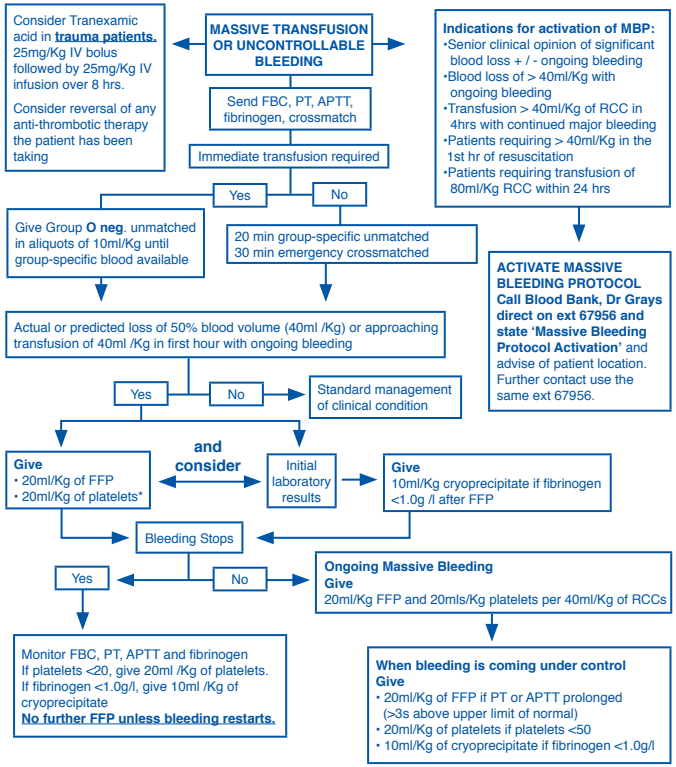
*A 1 unit of apheresis platelets is equivalent to 4-5 single donor units

Any communication with Blood Bank after the initial activation call, phone 50522

REMEMBER TO ADVISE BLOOD BANK, PORTER AND HAEMATOLOGY LAB WHEN DEACTIVATION OCCURS

APPENDIX 2.4

Paediatric Massive Bleeding Protocol Flow Chart: Dr Gray's, Elgin



*A 1 unit of apheresis platelets is equivalent to 4-5 single donor units

Any communication with Blood Bank after the initial activation call phone 67956

REMEMBER TO ADVISE BLOOD BANK AND HAEMATOLOGY LAB WHEN DEACTIVATION OCCURS

APPENDIX 2.5

Leaking / Ruptured Abdominal Aortic Aneurysm (AAA)

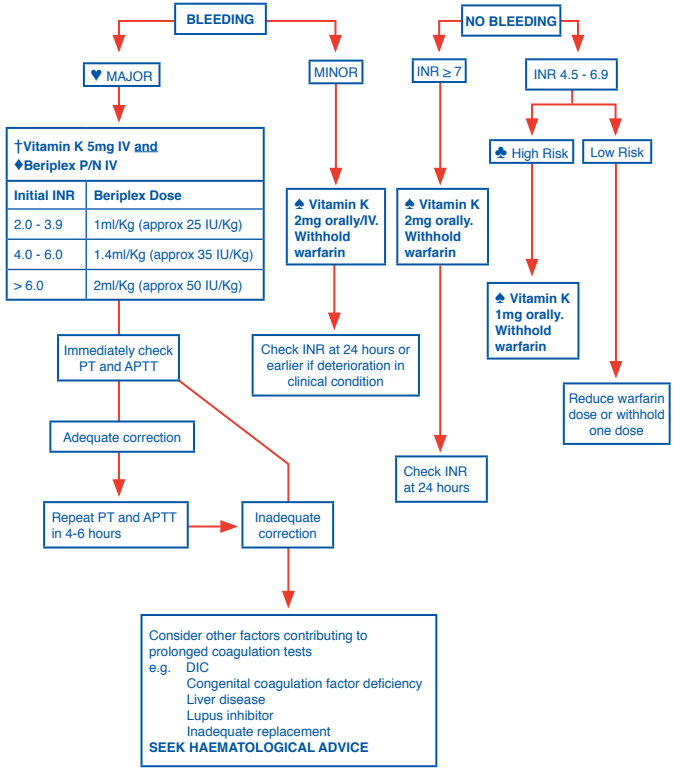
Blood Components Pack

- **Ten units of RCCS**
- **Four units of FFP and**
- **An adult dose of platelets (= 4-5 single donations)**

This could be issued in the first instance and it is possible to be repeated without BTC MO intervention.

APPENDIX 3

GUIDE TO REVERSAL OF ORAL ANTICOAGULATION ON WARFARIN CLASSIFICATION OF BLEEDING COMPLICATIONS



APPENDIX 3 (continued)

Classification of Haemorrhage

Fatal
Death due to haemorrhage (Demonstrated at autopsy, radiologically or clinically obvious)

Major ♥
Intracranial (CT or MRI documented)
Retroperitoneal (CT or MRI documented)
Intra-ocular (excludes conjunctival)
Spontaneous muscle haematoma associated with compartment syndrome
Pericardial
Non-traumatic intra-articular
Any invasive procedure required to stop bleeding
Active bleeding from any orifice plus BP≤90mmHg systolic, or oliguria or ≥20g/l fall in haemoglobin

Minor
Any other bleeding that would not influence your decision to anticoagulate a patient

Cautions

♦Beriplex P/N contains heparin and is contraindicated in patients with heparin-induced thrombocytopenia (present or previous)
Beriplex P/N is also relatively contraindicated in patients with:
1. An increased risk of thrombosis
2. Angina pectoris and after recent myocardial infarction

In all clinical situations an assessment of the likely risks and benefits of administration needs to be made.

In disseminated intravascular coagulation, prothrombin complex-preparations (e.g. Beriplex) may only be administered after termination of the consumptive state.

† Intravenous Vitamin K may rarely cause anaphylaxis. Administration should be:
- By slow IV bolus
- Withheld in patients with a history of previous severe allergic reaction to Vitamin K.

♠ Oral Vitamin K – preparation used is the preparation for injection (10mg/ml) Konakion (Roche). Dilute dose in small amount of juice/water after drawing up in an oral syringe.

♣ Standard risk patients do not require INR reversal at INR 4.5 – 6.9 but correction should be considered in "high risk" patients whose risk of bleeding is approximately 15 fold higher.

Patients at high risk of warfarin-associated bleeding:

Elderly	Previous GI bleed	Previous CVA (haemorrhagic or ischaemic)
Anaemia	Renal failure	Diabetes mellitus.

APPENDIX 4

Clinical Indications for CMV-Seronegative Cellular Blood Components

1.	All neonatal transfusions (including premature infants and infants up to the age of one year)
2.	All intrauterine transfusions / exchange transfusions
3.	Known CMV-seronegative pregnant women (emergency only)

Note:

Seronegative components will only be issued if these above patients are registered with the Blood Bank or a specific request is made on the request form.

APPENDIX 5

Guideline on the use of irradiated blood components:

Clinical Indications for Irradiation of Cellular Blood Components

Transfusion Associated Graft versus Host Disease (TA-GvHD) is an often fatal complication of blood transfusion. It is caused by transfusion of blood components containing viable immunocompetent donor lymphocytes

Both immunocompromised and immunocompetent (i.e. high risk) recipients can be affected. The use of X-irradiation or Gamma irradiation at a minimum dose of 25Gy (with no part receiving more than 50Gy) inactivates any viable T-lymphocytes and thus avoids TA-GvHD

It is not necessary to irradiate non-cellular blood components i.e. FFP & cryoprecipitate

These Guidelines outline the procedure for handling notification and registration of requests for irradiated blood components

All cases of TA-GvHD should be reported to the national haemovigilance system, Serious Hazards of Transfusion (SHOT) initiative, as should all 'near misses' where non-irradiated components are transfused to high-risk patients without incident

For all patients at risk of TA-GvHD: irradiated blood is recommended provided this does not unduly delay transfusion (e.g. Massive Bleeding)

Patients at risk of TA-GvHD should be made aware of their need for irradiated blood components and be provided with clear written information

Any problems with the operation of those procedures should be brought to the attention of the Medical Consultant in charge of the Blood Bank or the Blood Bank Head / Deputy

APPENDIX 5 (continued)

Clinical Indications for Irradiation of Cellular Blood Components

- For at-risk patients, all red cell, platelet and granulocyte concentrates should be irradiated except cryopreserved red cells after deglycerolisation. It is not necessary to irradiate Fresh Frozen Plasma, cryoprecipitate or fractionated plasma products
- **Bone marrow and haemopoietic stem cells for the purposes of transplantation must not be irradiated**

1. All donations from first- or second-degree relatives for any recipient, even if the patient is immunocompetent
2. HLA-selected platelets for any recipient, even if the patient is immunocompetent
3. All granulocyte transfusions for any recipient which must then be transfused with minimum delay
4. **Paediatric practice:**
   - All intrauterine transfusions (IUT)
   - All exchange transfusions or top-up transfusions **after** IUT, until 6 months after expected delivery date (40 week gestation)
   - Exchange transfusion with no previous IUT: irradiated blood is recommended provided this does not unduly delay transfusion
   - Top-up transfusion with no previous IUT: **irradiated blood is not required**
   - Platelet transfusions: **irradiated components only if** previous intrauterine red cell or platelet transfusion or if the donation comes from a first- or second-degree relative
   - All granulocyte transfusions
   - Congenital immunodeficiencies in infants and children: all severe primary T lymphocyte immunodeficiencies, SCID, Di George's Wiskott-Aldrich syndrome, purine nucleoside phosphorylase deficient, cell-mediated immunodeficiency, reticular dysgenesis, adenosine deaminase deficiency, MHC Class I and II deficiency, leucocyte adhesion deficiency, immunodeficiency with eosinophilia, ataxia telangiectasia, chronic mucocutaneous candidiasis

5. **Bone marrow and haemopoietic stem cell transplantation (HSCT) donors or recipients**

   - Allogeneic bone marrow or peripheral blood stem cell **DONORS**
     - **Duration for irradiated blood components:** 7 days before harvesting and at all times during the procedure until the harvest is completed
   - Allogeneic bone marrow or peripheral blood stem cell **RECIPIENTS**
     - **Duration for irradiated blood components:** from the start of conditioning chemo- or radiotherapy and while the patient remains on GvHD prophylaxis (i.e. usually 6 months or until the lymphocytes are > 1 x 10^9/L). It may be extended for a longer duration at the discretion of the haematologist e.g. chronic GvHD
   - Autologous bone marrow or peripheral blood stem cell **DONORS**
     - **Duration for irradiated blood components:** 7 days before harvesting and at all times during the procedure until the harvest is completed
   - Autologous bone marrow or peripheral blood stem cell **RECIPIENTS**
     - **Duration for irradiated blood components:** from the start of conditioning chemotherapy or radiotherapy until:
       - 3 months post-transplant or
       - 6 months post-transplant if conditioning total body irradiation (TBI) was given

6. **Lymphoma**

   - All Hodgkin's Disease: at all stages
     - **Duration for irradiated blood components: indefinitely (for life)**
   - All Non-Hodgkin's Lymphoma (NHL): at all stages
     - **Duration for irradiated blood components: indefinitely (for life)**

7. **Patients receiving the following chemotherapy or monoclonal antibodies:**

   - Purine analogues: fludarabine, cladribine, clofarabine deoxycoformycin and anti-lymphocyte globulin (ALG)
     - **Duration for irradiated blood components: indefinitely (for life)**
   - T-cell depleted agents such as alemtuzumab (CAMPATH or anti-CD52 antibody) for haematological and non-haematological indications including solid organ transplantation, multiple sclerosis and vasculitis.
     - **Duration for irradiated blood components: indefinitely (for life)**

8. **Aplastic anaemia: only if patients are receiving anti-thymocyte globulin (ATG) treatment**
     - **Duration for irradiated blood components:** there is no firm recommendation as to how long

Irradiated blood components NOT clinically indicated:

(1) Acute leukaemia: only irradiate blood components if patients have a clinical indication listed above: e.g. purine analogue therapy, HLA-matched platelets

(2) It is not necessary to irradiate components for patients with solid tumours, organ transplants or HIV (including infants and children)

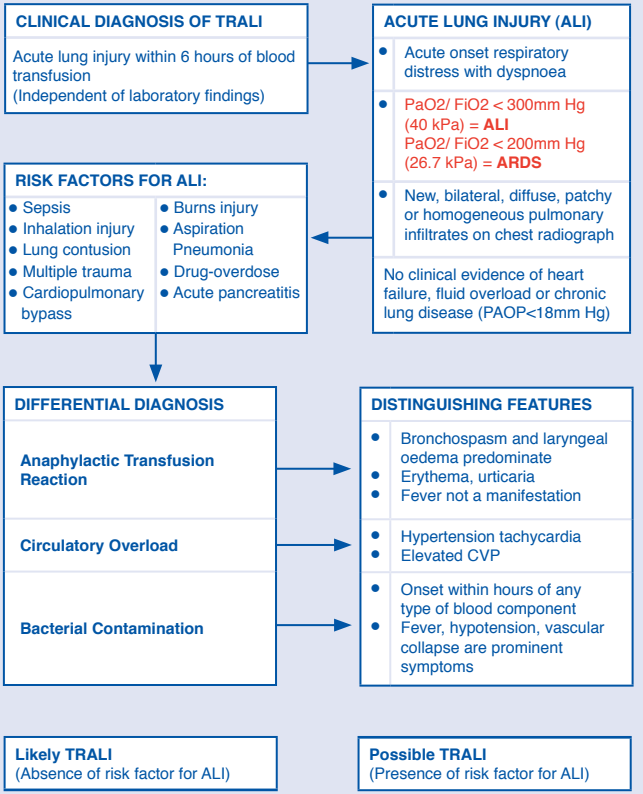
(3) It is not necessary to irradiate components for infants or children undergoing cardiac surgery unless clinical or laboratory features suggest coexisting immunodeficiency

References:

- Guidelines on the use of irradiated blood components prepared by the British Committee for Standards in Haematology Blood Transfusion Task Force. BJH 2010; 152: 35-51
- Handbook of Transfusion Medicine. Editor DBL. McClelland 4th Edition www.transfusionguidelines.org.uk

APPENDIX 6

Clinical Diagnosis of TRALI



GLOSSARY OF ABBREVIATIONS

AAA	*Abdominal aortic aneurysm*
ACD	*Acid-citrate-dextrose*
A&E	*Accident and Emergency*
AHG	*Anti-human globulin*
AHTR	*Acute haemolytic transfusion reaction*
AIDS	*Acquired Immune Deficiency Syndrome*
AIHA	*Auto Immune Haemolytic Anaemia*
ALG	*Anti-lymphocyte globulin*
ALI	*Acute Lung Injury*
AMH	*Aberdeen Maternity Hospital*
APC	*Antigen-presenting cell*
APH	*Antepartum Haemorrhage*
APPT	*Activated Partial Thromboplastin Time*
ARI	*Aberdeen Royal Infirmary*
AS	*Additive solution*
ATG	*Anti-Thymocyte Globulin*
BFR	*Blood Fridge Register*
BMT	*Bone Marrow Transplant*
BTC	*Blood Transfusion Centre*
BTS	*Blood Transfusion Service*
BU	*Bleeding Unit*
CABG	*Coronary Artery Bypass Graft*
CAD	*Cold Antibody (agglutinin) Disease*
CAS	*Cold agglutinin syndrome*
CCI	*Corrected count increment*
CD	*Clusters of differentiation*
cDNA	*Complementary deoxyribonucleic acid*
CHD (CHAD)	*Cold Haemagglutinin Disease*
CHI	*Community Health Index*
CJD	*Creutzfeldt-Jakob Disease*
CMV	*Cytomegalovirus*

CPD	Citrate-phosphate-dextrose
CPDA-1	Citrate-phosphate-dextrose-adenine-1
CP2D	Citrate-phosphate-double-dextrose
CS	Caesarean Section
CT	Computed Tomography
CTL	Cytotoxic T-cell lymphocytes
CVA	Cerebrovascular Accident
CVP	Central Venous Pressure
CVS	Chorionic villus sampling
DAT	Direct Antiglobulin Test
D&C	Dilation and curettage
DDAVP	Deamino-D-arginine vasopressin
DGH	Doctor Gray's Hospital
DHR	Dihydrorhodamine 123
DHTR	Delayed haemolytic transfusion reaction
DIC	Disseminated intravascular coagulation
DNA	Deoxyribonucleic Acid
DSTR	Delayed serological transfusion reaction
ECC	Emergency Care Centre
ECMO	Extracorporeal membrane oxygenation
EDTA	Ethylenediamine Tetraacetic Acid
ERCP	Endoscopic Retrograde Cholangiopancreatography
ERPOC	Evacuation Retained Products of Conception
FBC	Full Blood Count
FBS	Fetal Blood Sample
FcR	Fc gamma receptor
FFP	Fresh frozen plasma
FLAER	Fluorescein-labelled proaerolysin
FMH	Fetomaternal Haemorrhage
FNAIT	Fetal/neonatal alloimmune thrombocytopenia
FNHTR	Febrile nonhaemolytic transfusion reaction
G-CSF GI	Granulocyte colony-stimulating factor
GI	Gastrointestinal Unit

GM-CSF	Granulocyte-macrophage colony-stimulating factor
GMP	Good manufacturing practice
G&S	Group and Screen
GVHD	Graft vs host disease
Gy	Gray
HAV	Hepatitis A Virus
Hb	Haemoglobin
HBc	Hepatitis B core antigen
HBIg	Hepatitis B immunoglobulin
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B Virus
Hct	Haematocrit
HCV	Hepatitis C Virus
HDFN	Haemolytic disease of the fetus and newborn
Hg	Mercury
H&I	Histocompatibility and Immunogenetics
HIT	Heparin-induced thrombocytopenia
HIV	Human Immunodeficiency Virus
HLA	Human leucocyte antigen
HPA	Human platelet antigen
HSCT	Haemopoietic Stem Cell Transplantation
HTR	Haemolytic transfusion reaction
HUS	Haemolytic uremic syndrome
IAT	Indirect Antiglobulin Test
ID	Identification
IgG	Immunoglobulin
IHA	Immune Haemolytic Anaemia
IM	Intramuscular
INR	International normalised ratio
ISBT	International Society of Blood Transfusion
ITP	Immune thrombocytopenia
IU	International unit
IUD	Intrauterine Death

IUT	Intrauterine Transfusion
IV	Intravenous
IVIgG	Intravenous Immunoglobulin
IVT	Intravascular approach for IUT
LISS	Low-ionic-strength saline
LN2	Liquid nitrogen
MBP	Massive Bleeding Protocol
MBT	Methylene Blue Treatment
MHC	Major histocompatibilty complex
MI	Molecular Immunohaematology
MO	Medical Officer
MRI	Magnetic Resonance Imaging
MSBOS	Maximum Surgical Blood Ordering Schedules
NAIT	Neonatal alloimmune thrombocytopenia
NAN	Neonatal alloimmune neutropenia
NAT	Nucleic acid testing
NATP	Neonatal Alloimmune Thrombocytopenic Purpura
NEBTC	North East of Scotland Blood Transfusion Centre
NEG	Negative
NHL	Non Hodgkin's Lymphoma
NHSG	NHS Grampian
NIPD	Non-Invasive Prenatal Diagnosis
PAOP	Pulmonary Artery Occlusion Pressure
PBS	Phosphate-buffered saline
PBSC	Peripheral Blood Stem Cells
PCC	Prothrombin Complex Concentrate
PCH	Paroxysmal cold haemoglobinuria
PCR	Polymerase chain reaction
PCV	Packed Cell Volume
PFR	Pelvic Floor Repair
PNH	Paroxysmal Nocturnal Haemoglobinuria
PRP	Platelet-rich plasma
PRT	Pathogen reduction technology

PT	Prothrombin time
PTP	Post-transfusion Purpura
PTT	Partial thromboplastin time
PV	Per vagina
PVC	Polyvinyl chloride
QA	Quality assessment or quality assurance
QC	Quality control
RAADP	Routine Antenatal Anti-D Prophylaxis
RACH	Royal Aberdeen Children's Hospital
RBCs	Red Blood Cells
RCC	Red Cell Concentrate
RCCS	Red Cell Concentrate Supplemented
rFVIIa	Recombinant Factor VIIa
Rh	Rhesus Group
RhIG	Rh immune globulin
RTA	Road Traffic Accident
SCID	Severe Combined Immunodeficiency
SD	Solvent Detergent
SHOT	Serious Hazards of Transfusion
SNBTS	Scottish National Blood Transfusion Service
SOP	Standard operating procedure
STOP	Surgical Termination of Pregnancy
TACO	Transfusion-associated circulatory overload
TAGvHD	Transfusion-associated Graft versus Host Disease
TBI	Total Body Irradiation
TCR	T-cell receptor
TN	Temporary Number
TOP	Termination of Pregnancy
TPE	Therapeutic plasma exchange
TPH	Transplacental Haemorrhage
TRALI	Transfusion Related Acute Lung Injury
TTP	Thrombotic Thrombocytopaenia Purpura
TURP	Transurethral resection of the prostate

Tx	*Transfusion*
UCB	*Umbilical cord blood*
UP	*Unknown Patient*
vCJD	*Variant Creutzfeldt-Jakob Disease*
WAIHA	*Warm Auto Immune Haemolytic Anaemia*
WB	*Whole blood or western blot*
WBC	*White blood cell*
WE	*Woodend Hospital*

INDEX

E

F

G

H

I

K

L

M

N

O

P

R

S

T

U

V

W

General Notes

General Notes

General Notes

General Notes

General Notes