NHS LANARKSHIRE CLINICAL BLOOD TRANSFUSION SPECIAL REQUIREMENTS GUIDELINE

TARGET AUDIENCE	Board Wide
PATIENT GROUP	For Patients who Require Blood Transfusion Special Requirements

Clinical Guidelines Summary

This guideline is for all staff involved in authorising, supplying and administering blood and blood components throughout NHS Lanarkshire (NHSL). It should be used in conjunction with the NHSL Clinical Transfusion Policy. The aim of the Clinical Transfusion Policy is to ensure that the right blood is given to the right patient at the right time, every time.
This guideline focuses on those patients who have a special requirement for transfusion and it aims:

To provide healthcare professionals with clear guidelines on when Cytomegalovirus (CMV) seronegative components, irradiated components or other special requirements for transfusion are indicated:

- To outline the process of notification to the Hospital Transfusion Laboratory (HTL), of patients with special requirements
- To outline how this information will be disseminated across NHS Lanarkshire
- To outline how errors should be reported if they arise.

Advice on blood transfusion may be obtained from:

- Biomedical Scientist (BMS) staff in the HTL
- Haematology Medical Staff
- Transfusion Practitioner.

This guideline has been prepared for the NHSL Overarching Transfusion Committee (LanTaG) and represents current standards. It will be reviewed every two years to accommodate future changes in the provision of health care in NHSL and in the provision of blood and blood components.

Reason For Special Requirements and Identification of Patients

- Special requirements cover a range of additional specifications or processing of standard blood components

- In case of emergencies, if appropriate blood components meeting the patient's specific transfusion requirements are not available, then standard blood components must be issued to avoid unnecessary transfusion delays

The most commonly requested special requirements in practice are CMV seronegative components and irradiated components.

CMV Seronegative Components

Cytomegalovirus (CMV) belongs to the herpes family and in the healthy population causes a self-limiting illness. It is cell associated and therefore can be transmitted in cellular blood components (red cells, platelets and granulocytes). Typically, it causes a subclinical illness similar to infectious mononucleosis (glandular fever). In immunocompromised patients it can result in potentially fatal pneumonitis or disseminated CMV infection. For this reason, CMV seronegative components should be used for a selected group of patients, listed below.

The requirement for CMV seronegative blood components has been reviewed by the Advisory Committee on the Safety of Blood, Tissue and Organs (SaBTO) [1]. Universal leucodepletion, introduced by the UK blood services in 1999 primarily as a vCJD risk reduction measure, results in a three-log depletion of white cells. This is generally accepted to render these components "CMV safe".

CMV seronegative components should continue to be used where leucodepletion is not possible (granulocyte transfusions) or where the potential severity of the consequences of CMV infection, and/or the difficulty in monitoring for infection are considered too great (IUT and transfusions in neonates up to 28 days post EDD, elective transfusions in pregnancy).

Pregnant women, where possible, should receive CMV seronegative components.

There is no requirement for this for emergency transfusions in pregnancy.

As CMV is a common virus and the prevalence of anti-CMV in the UK adult population is 50-60%, it is not possible to provide CMV seronegative components for all recipients. Components that have been leucocyte depleted to less than 5 x 10^6/unit have a significant reduction in the risk of CMV transmission.

IgA Deficiency

Primary IgA deficiency, defined as selective IgA < 0.07g/l in adults, with normal levels of IgG and IgM, not secondary to other causes, is relatively common (1:500 Caucasians). 20-40% of these individuals have anti-IgA-antibodies although these are a poor predictor of possible transfusion reactions. Patients with IgA deficiency may have allergic or anaphylactic reactions to blood components, however severe transfusion reactions in this group of patients are extremely rare (1: 20,000 – 1: 47,000 transfusions).[2.]

Most IgA deficient patients with or without anti-IgA antibodies will not experience severe reactions with standard components. Plasma reduced or IgA deficient components can be supplied, however this may lead to a delay in transfusion and the consequences of the delay should be balanced against the risk of a reaction.

Patients with IgA deficiency receiving a transfusion should be closely monitored in a clinical area where severe allergic and anaphylactic reactions can be managed.

In cases where there is a history of severe allergic/anaphylactic transfusion reactions, the use of components from an IgA deficient donor should be considered if it will not cause significant delays. Transfusion requirements for patients with IgA deficiency should be discussed with the local Haematologist.

Irradiated Components

Irradiation is the only known method of preventing Transfusion Associated Graft versus Host Disease (TaGvHD). This is a rare but fatal complication of blood transfusion. It results from engraftment and clonal expansion of HLA compatible donor lymphocytes. Clinically, TaGvHD presents with fever, rash, diarrhoea, hepatitis and pancytopenia 4-30 days after transfusion. This complication of transfusion is eliminated by inactivation of donor lymphocytes by irradiation. The risk associated with individual transfusions depends on the number and viability of contaminating lymphocytes, susceptibility of the host's immune system to their engraftment and the degree of immunological disparity between donor and recipient.[3,4,5.]

As new treatments are developed there may be additional therapeutic agents for which irradiated components are required. If there is any concern about the need for irradiated components, authorisers of blood components should first check with the pharmacist or haematologist.

Hepatitis E Seronegative Components

All blood and blood components supplied by SNBTS are hepatitis E negative and no longer require to be requested as a special requirement.

The table below identifies the patients who have requirements for CMV seronegative and irradiated components and the length of time these are required.

Condition	Cytomegalovirus (CMV) Seronegative	Irradiated	Duration for special requirements
Neonates up to 28 days post EDD	✓	✓ *	28 days post EDD
Intrauterine Transfusion (IUT)	✓	✓ **	For 6 months after 40 weeks gestation
Neonatal Exchange Transfusion (ET)	✓	✓	
All donations from first or second degree relative		✓	
Severe T lymphocyte immunodeficiency syndromes including Di George and Severe Combined Immunodeficiency	✓†	✓†	
Recipients of CAR-T Therapy		✓	For 2 weeks prior to harvest until 3 months following CAR-T cell infusion §
Recipients of allogeneic haemopoietic stem cell transplantation (HSCT)		✓	From three months pre transplant to 6 months after transplant or while patient is immunosuppressed µ
Recipients of autologous haemopoietic stem cell transplantation (HSCT)		✓	From transplant until 6 months post-transplant
Stem cell harvesting		✓	From mobilisation or 2 weeks before the harvest (whichever is earlier) until harvest is completed
All haematological recipients of alemtuzumab (Campath, anti-CD-52)		✓ ***	Lifelong
All patients with Hodgkin's lymphoma		✓	Lifelong
All patients treated with purine analogues, e.g. fludarabine, cladribine, deoxycoformycin, clofarabine, bendamustine		✓	Lifelong
All patients with aplastic anaemia treated with immunosuppressive therapy (until lymphocyte count >1.0 x10^9/L)		✓	Lifelong
Patients with aplastic anaemia (potential stem cell transplantation)		✓	From diagnosis where there is a high likelihood of proceeding to allogeneic HSCT
Pregnant women (In an emergency standard leucocyte-depleted products should be given to avoid delay)	✓		Until delivery

Leucodepleted CMV seropositive components (CMV safe) may be used for the above patient groups in the situation of life-threatening haemorrhage.

CMV seronegative components should only be used for CMV negative patients or those in whom CMV status is unknown.

*Top up transfusions in infants aged <6 months do not require irradiation unless there has been a previous IUT or if the donation is from a first or second-degree relative

**The requirement for irradiation after IUT remains until 6 months after 40 weeks gestation

***The use of irradiated blood components is not indicated following treatments with alemtuzumab using the schedule currently recommended for MS or vasculitis or indicated for patients undergoing solid organ transplantation

† Whilst a diagnosis of severe T lymphocyte immunodeficiency is considered all components transfused should be irradiated and CMV seronegative whilst further tests are being undertaken. Adults and children > 2 years without a significant history of infection do not need irradiated cellular blood components unless there is a significant history consistent with a severe T lymphocyte associated immunodeficiency.

§ Conditioning regimens for CAR-T therapy often include purine analogues so this should be checked and considered as part of the special requirements review

µ In addition to the > 6 months from transplant date the following criteria must also be met:

i) The lymphocyte count is >1.0 x 10^9/L
ii) The patient is free of active chronic GvHD
iii) The patient is off all immunosuppression

Lifelong irradiated components may be considered.

Plasma Reduced Components

Plasma-reduction (previously known as washing) of cellular components (red cells and platelets) reduces levels of potentially harmful substances, e.g. serum proteins (IgA), antibodies, additive solutions, electrolytes (K+) etc. The process results in some cell losses and takes several hours to complete. Plasma reduced components have a reduced shelf life.

The indications for plasma reduced components include:

- Recurrent and / or severe allergic reactions or febrile reactions to transfusion which are not abolished by the use of leucodepleted components
- IgA deficient patients, as long as provision of plasma-reduced components does not cause unacceptable delays. Of note, in cases with a history of severe allergic/anaphylactic transfusion reactions, transfusion with components from an IgA deficient donor should be considered if this would not introduce an unacceptable delay
- neonates with T-activation and haemolysis following transfusion of standard blood components, should receive platelets suspended in additive solution if they require platelet transfusions (following discussion with a haematologist and where a delay in provision would not cause harm)
- patients with unexplained hypotensive transfusion reactions
- maternal platelets for transfusion to neonates with neonatal alloimmune thrombocytopenia (NAIT)

Lifelong transfusion requirements (including patients with haemoglobinopathies)

For a small number of patients with high life-long transfusion requirements, e.g., thalassaemia or sickle cell, the use of phenotyped blood should be considered to reduce the risk of the patient developing antibodies. These patients may require extended crossmatched blood or sickle negative (HbS negative) blood. The blood bank should be informed of patients with these diagnoses, so that appropriate components can be supplied.

If there is any doubt as to whether or not a patient has a requirement for special blood components, please discuss with the on-call Haematologist at your local site.

Notification To The Laboratory Of Patients With Special Requirements

Once a patient has been identified as having a requirement for special blood components, the Special Requirements of Blood Transfusion Laboratory Request Form, used throughout NHSL (see appendix 1), should be printed from the intranet at the webpage below:

Home - Blood Transfusion

The fully completed form should be sent to the local Blood Bank. The information held on this form will be shared with all Blood Banks throughout NHS Lanarkshire.

The Consultant responsible for the patient should ensure that the information on special requirements of transfusion is marked in the patient's electronic record (Clinical Portal and Trakcare as appropriate).

The form should be signed by the Consultant in charge of the patient's care and a copy forwarded to the Blood Bank. If the patient has been identified as having special blood component requirements out with core working hours and a consultant is not available, the requirement can be requested on a regular transfusion form and the special requirements form forwarded at the earliest possible opportunity.

The information will not be disseminated throughout the Health Board Blood Banks until a Consultant signed copy of the special requirements form is received by the hospital Blood Bank.

If the need for the special blood components changes, an updated form should be forwarded to the hospital Blood Bank so their records can be amended.

Laboratory Dissemination of Information

As patients regularly transfer between hospital sites it is important that their transfusion requirement information is available throughout the Health Board Blood Banks. Once a consultant signed form is received at a local Blood Bank, the form will be scanned and emailed to the Blood Bank senior BMSs so that the computer systems can be updated accordingly (as per the Blood Bank Special Requirements SOP) and a hard copy retained for reference if LIMS is inaccessible.

Patient Counselling and Consent

It is not a legal requirement in the United Kingdom that written consent is obtained before a transfusion of blood components; however, it is considered a required standard of good transfusion practice to ensure that the patient/parent/carer receives adequate information regarding the transfusion[6]. This discussion should include information about the risks and benefits of transfusion as well as information relating to available alternatives, for example, iron supplementation and must be documented in the case records. Nursing and medical staff, therefore, have a professional duty to

ensure that they have adequate knowledge of transfusion related issues or that they can access the information and support required by patients undergoing a transfusion.

Patient Information Leaflets (PILs) are available specifically for patients who require irradiated components (ordered via NHSL central stationery stores) and all patients receiving irradiated components should be given these before their first transfusion. They should also be counselled and told to inform nursing and medical staff of this requirement before any future transfusions. Patients should be given a card to carry documenting their special transfusion requirement. An adhesive sticker, taken from the information leaflet, should be placed on the front of case records where these exist, detailing the requirement. It is the responsibility of the authorising practitioner to ensure these steps are undertaken.

Incident Reporting

There have been 13 reported cases of TaGVHD since 1996 but no cases after 2001. 2 cases have been reported in leucodepleted components (1998-99 and 2000-01) indicating that while leucodepletion significantly reduces, it does not eradicate the risk of this condition. It is important therefore that appropriate components are provided for patients at risk.

Errors do occur and the Serious Hazards of Transfusion (SHOT) [7] report 2022 showed 209 cases where special requirements were not met, an increase from 173 in 2021. Of the 209 cases, 100 occurred in the clinical setting and 109 within the laboratory setting. 69% of the incidents within the clinical setting involved patients who required irradiated components but did not receive them. Of the remaining cases, specific phenotype of red cells, use of a blood warmer and the requirement for CMV seronegative components were missed It is important that any errors are documented appropriately to ensure that steps can be taken to avoid them in the future. If it becomes apparent that a patient has failed to receive appropriate components the hospital Blood Bank must be informed immediately. The incident will be fully investigated and reported on Datix and to SHOT.

Duty of Candour

Duty of Candour was formally introduced in Scotland during 2018 [8].

Duty of Candour requires professionals and organisations to be open and honest with patients where there have been failings in their care. This legal requirement means when unintended or unexpected events happen, that result in death or harm as defined in the Act [7,8] that the people affected understand what has happened, receive an apology, and that organisations learn how to improve for the future. A Duty of Candour event is when an individual has received treatment or care that has resulted in an unintended or unexpected event, which, in the reasonable opinion of a registered health professional, results in death or harm as defined in the Act [8,9].

Some serious transfusion incidents may fall into this category. Please refer to NHSL Duty of Candour Policy for further support and guidance.

References/Evidence

1. Advisory Committee on the Safety of Blood, Tissues and Organs (SaBTO)
Microbiological safety guidelines (publishing.service.gov.uk)

2. The transfusion management of patients found to be IgA deficient
Scottish National Blood Transfusion Service Policy Record NATP Clin 034 02 (2018)
https://www.nss.nhs.scot/media/1023/transfusion-management-of-patients-found-to-be-iga-deficient.pdf

3. Clinical Blood Transfusion. Chapter 16 Postgraduate Haematology Sixth Edition. P268-300. Hoffbrand AV, Catovsky D, Tuddenham EDD, Green AR.

4. Guidelines on the use of irradiated blood components prepared by the British Committee for Standards in Haematology blood transfusion task force
British Journal of Haematology 2020, 191, 704-724
Guidelines on the use of irradiated blood components | British Society for Haematology (b-s-h.org.uk)

5. Guideline on Transfusion for Fetuses, Neonates and Older Children.
British Journal of Haematology 2016, 175, 784-828
https://b-s-h.org.uk/guidelines/guidelines/transfusion-for-fetuses-neonates-and-older-children/

6. Guidelines from the expert advisory committee on the Safety of Blood, Tissues and Organs (SaBTO) on patient consent for blood transfusion.
https://www.gov.uk/government/publications/blood-transfusion-patient-consent

7. Serious Hazards of Transfusion
http://www.shotuk.org/

8. 2018 No. 57 - Scottish Statutory Instruments - National Health Service Social Care Social Work - The Duty of Candour Procedure (Scotland) Regulations 2018
http://www.legislation.gov.uk/ssi/2018/57/made/data.pdf

9. Scottish Government – Healthcare Standards – Duty of Candour
http://www.gov.scot/policies/healthcarestandards/duty-of-candour/

Transfusion Transmitted Infection. Chapter 13. Practical Transfusion Medicine. Third Edition. P122-145. Murphy MF, Pamphilon DH.

Appendices

1. Governance information for Guidance document

Lead Author(s):	Moira Caldwell, Transfusion Practitioner
Endorsing Body:	Overarching Transfusion Committee (LanTaG)
Version Number:	01
Approval date	01/07/24
Review Date:	01/07/26
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Consultation Process/Stakeholders:	• NHSL Clinical Leads • NHSL Directors • Chief Nurses • Overarching Transfusion Committee (LanTaG) members
Distribution:	• Corporate Guidelines Team • All in NHS Lanarkshire

CHANGE RECORD			
Date	**Lead Author**	**Change**	**Version No.**
		e.g. Review, revise and update of policy in line with contemporary professional structures and practice	1
			2
			3
		.	4
		Removal of Sodium Chloride for bladder irrigation	5

Insert Clinical Guideline Title

Special Requirements of Blood Transfusion Laboratory Request Form

This form should be completed for **all** patients who have special requirements for blood components. A copy should be sent to Blood Bank and a copy filed at the front of the patients' clinical notes. It is the responsibility of clinicians to update Blood Bank on any changes to special requirements. A minimum annual review is required. Additional forms are available from the transfusion page on FirstPort.

Patient Details *(Addressograph label if available)*	**Referring Consultant**
Surname:	Consultant:
First Name(s):	Hospital:
DOB:	Location:
CHI Number/ TL Number:	Contact Number:
Sex:	

Blood Component Requirements (Please tick (✓) in **white** column as appropriate, see below table for haemoglobinopathy patients and plasma reduced components)

	CMV Seronegative	Irradiated
Neonates up to 28 days post EDD		
Intrauterine Transfusion (for 6 months after 40 weeks gestation)		
Neonatal Exchange Transfusion (ET)		
All donations from first or second degree relative		
Severe T lymphocyte immunodeficiency syndromes including Di George and Severe Combined Immunodeficiency		
Recipients of allogeneic haemopoietic stem cell transplantation (HSCT)		
Recipients of autologous haemopoietic stem cell transplantation (HSCT)		
Stem cell harvesting (minimum 7 days prior)		
Recipients of alemtuzumab (Campath, anti CD-52) with CLL/other lymphoproliferative disorder		
T cell harvesting (minimum 7 days prior) and for minimum 3 months post infusion of CAR T-cells		
All patients with Hodgkins lymphoma		
All patients treated with purine analogues, e.g. fludarabine, cladrabine, deoxycoformicin, clofarabine, bendamustine		
Patients with aplastic anaemia treated with ALG/ATG therapy		
Patients with aplastic anaemia (potential stem cell transplantation)		
Pregnant woman		

Haemoglobinopathy Patient (Full Rhesus and Kell matched, HbS negative components required)	Document indication here:
Requirement to use blood warmer when transfusing RBCs (cold active RBC antibody)	Document indication here:
Plasma Reduced Components (washed red cells) Please see Special Requirement Guideline	Document indication here:

Alert recorded on: Portal □ Trakcare □ (Responsibility of the Consultant named below)

Consultant Signature: _____ Print name: _____ Date: _____

Review of Blood Component Requirements *(Tick as appropriate)*

CMV Seronegative □ Irradiated □ Plasma Reduced (Washed) □ Other □

Reason for change: _____ Effective from (date):_____

Consultant Signature: _____ Print Name: _____

Date: _____ Review Date: _____

For Laboratory Use Only *(Tick as appropriate)*

Information transcribed into LIMS System □

BMS Signature: _____ Date: _____

Print Name: _____