Complex cases and urgent blood requirements: avoiding delays in red cell transfusion

Joint Meeting of UK NEQAS BTLP and

BBTS Blood Bank Technology SIG

24th November 2022

Jennifer Laird
Consultant Haematologist
Scottish National Blood Transfusion Service

Delayed Transfusions: an increasing problem

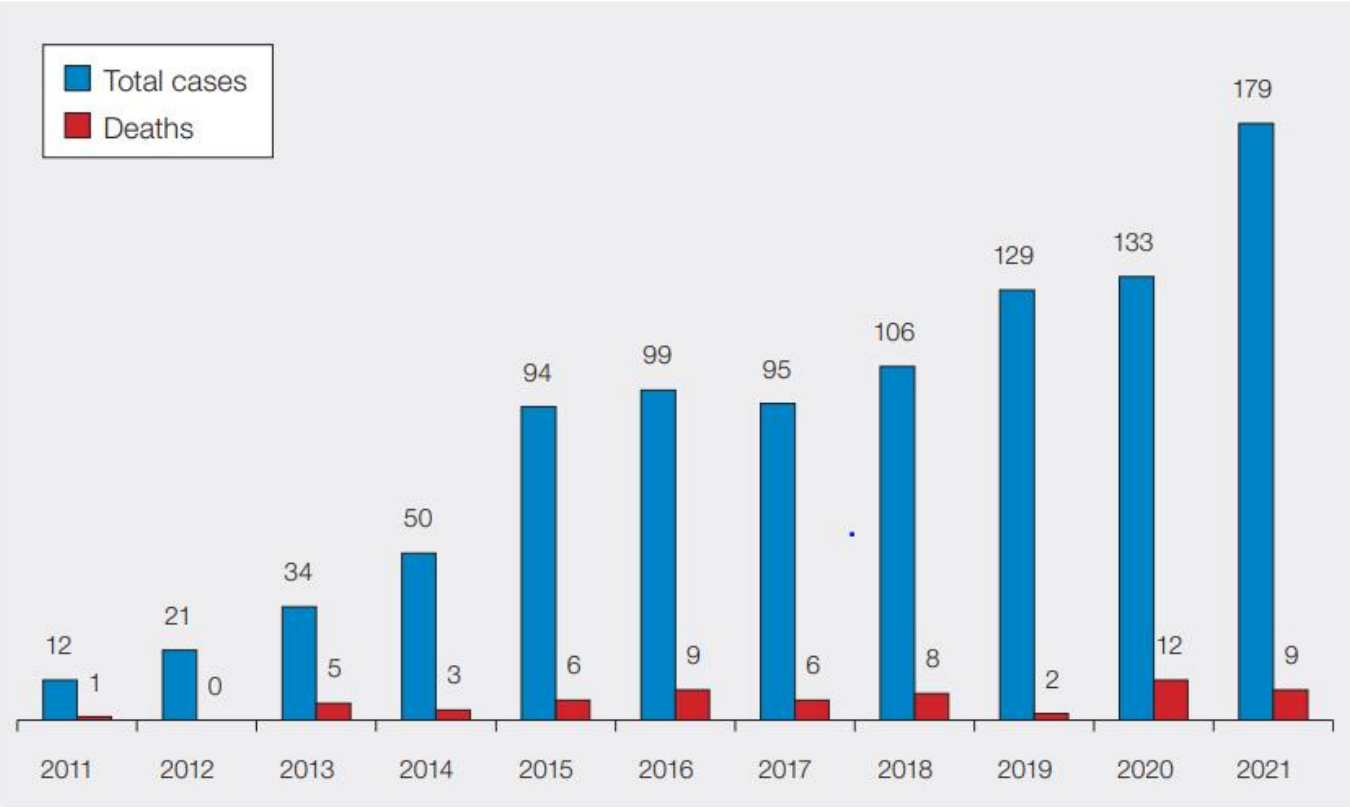
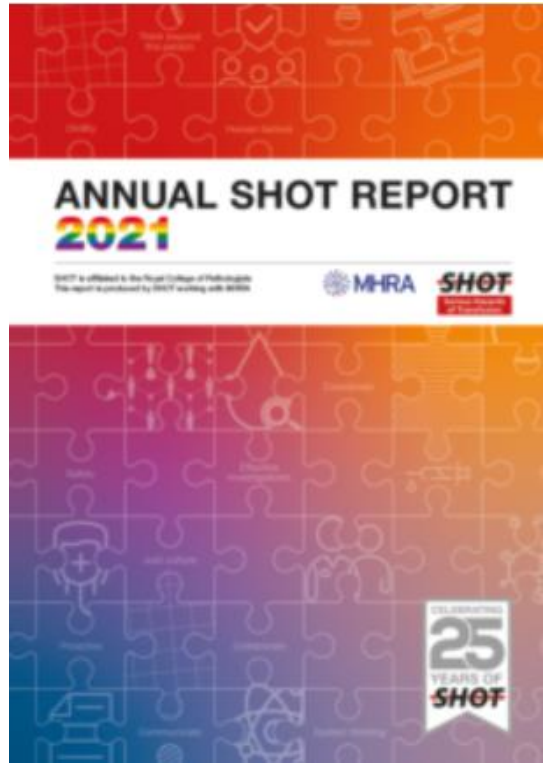


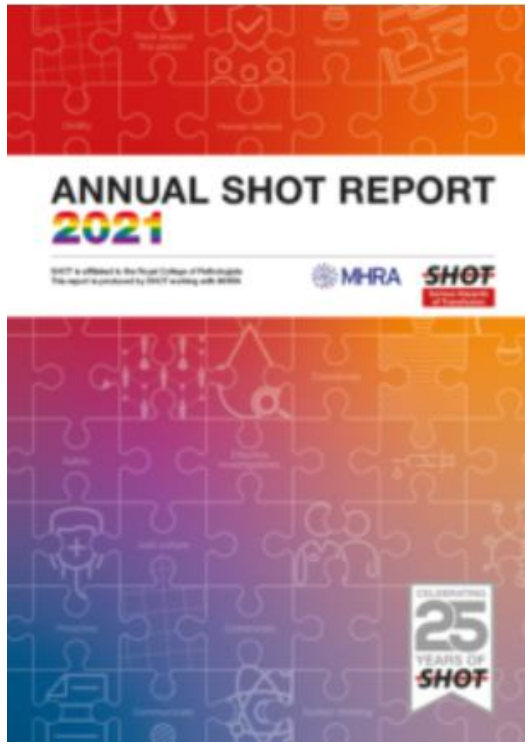
Figure 11a.1: Delayed transfusion reports and deaths by year 2011 to 2021 (n=952, deaths n=61)



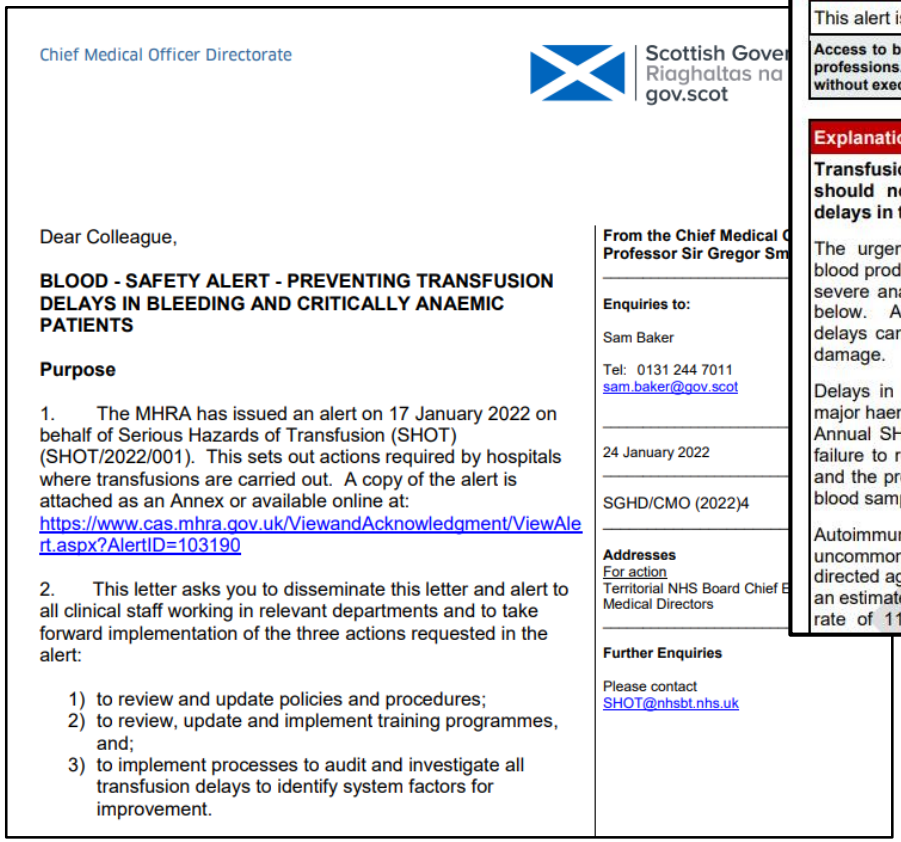
Deaths related to transfusion n=9

Delayed Transfusions: SHOT case studies

- Poor communication was cited as causative in 48% of reports
- Failures in team function were cited in 50.3% of reports
- Workload issues were contributary in 33% of reports



January 2022- SHOT/ MHRA safety alert



Chief Medical Officer Directorate

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Dear Colleague,

BLOOD - SAFETY ALERT - PREVENTING TRANSFUSION DELAYS IN BLEEDING AND CRITICALLY ANAEMIC PATIENTS

Purpose

1. The MHRA has issued an alert on 17 January 2022 on behalf of Serious Hazards of Transfusion (SHOT) (SHOT/2022/001). This sets out actions required by hospitals where transfusions are carried out. A copy of the alert is attached as an Annex or available online at: https://www.cas.mhra.gov.uk/ViewandAcknowledgment/ViewAlert.aspx?AlertID=103190

2. This letter asks you to disseminate this letter and alert to all clinical staff working in relevant departments and to take forward implementation of the three actions requested in the alert:

1) to review and update policies and procedures;
2) to review, update and implement training programmes, and;
3) to implement processes to audit and investigate all transfusion delays to identify system factors for improvement.

From the Chief Medical C
Professor Sir Gregor Sm

Enquiries to:

Sam Baker

Tel: 0131 244 7011
sam.baker@gov.scot

24 January 2022

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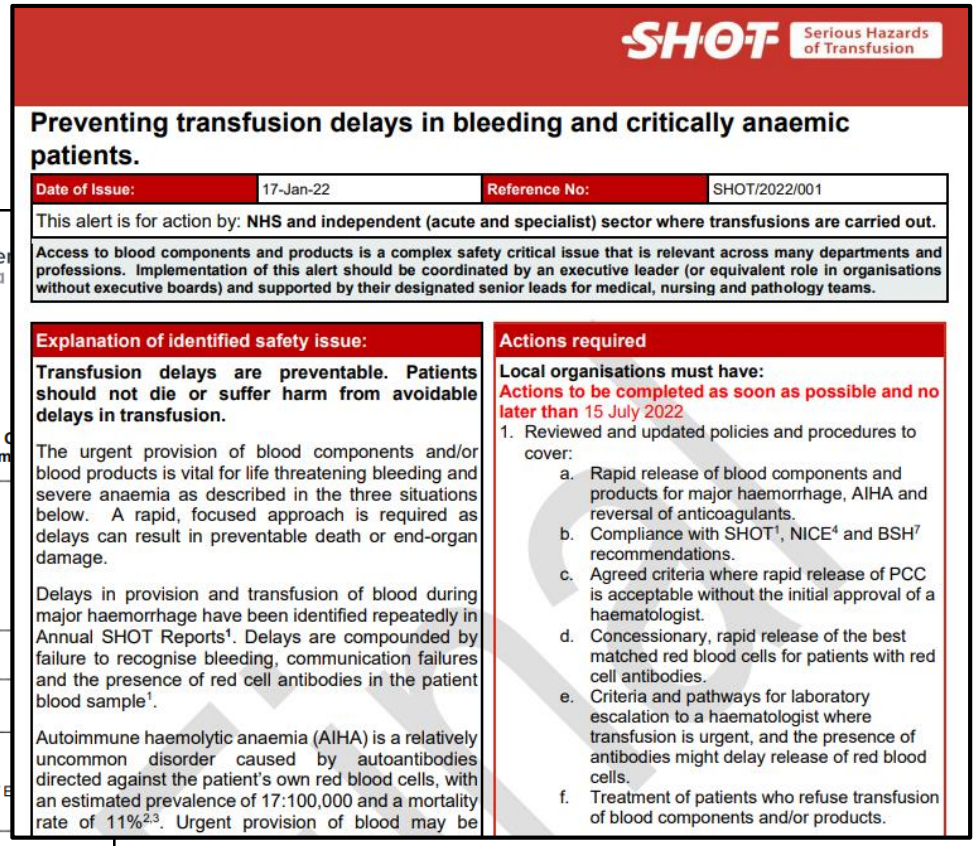
Addresses
For action
Territorial NHS Board Chief E
Medical Directors

Further Enquiries

Please contact
SHOT@nhsbt.nhs.uk



SHOT Serious Hazards of Transfusion

Preventing transfusion delays in bleeding and critically anaemic patients.

Date of Issue:	17-Jan-22	Reference No:	SHOT/2022/001

This alert is for action by: **NHS and independent (acute and specialist) sector where transfusions are carried out.**

Access to blood components and products is a complex safety critical issue that is relevant across many departments and professions. Implementation of this alert should be coordinated by an executive leader (or equivalent role in organisations without executive boards) and supported by their designated senior leads for medical, nursing and pathology teams.

Explanation of identified safety issue:

Transfusion delays are preventable. Patients should not die or suffer harm from avoidable delays in transfusion.

The urgent provision of blood components and/or blood products is vital for life threatening bleeding and severe anaemia as described in the three situations below. A rapid, focused approach is required as delays can result in preventable death or end-organ damage.

Delays in provision and transfusion of blood during major haemorrhage have been identified repeatedly in Annual SHOT Reports[1]. Delays are compounded by failure to recognise bleeding, communication failures and the presence of red cell antibodies in the patient blood sample[1].

Autoimmune haemolytic anaemia (AIHA) is a relatively uncommon disorder caused by autoantibodies directed against the patient's own red blood cells, with an estimated prevalence of 17:100,000 and a mortality rate of 11%[2,3]. Urgent provision of blood may be

Actions required

Local organisations must have:
Actions to be completed as soon as possible and no later than 15 July 2022

1. Reviewed and updated policies and procedures to cover:
   a. Rapid release of blood components and products for major haemorrhage, AIHA and reversal of anticoagulants.
   b. Compliance with SHOT[1], NICE[4] and BSH[7] recommendations.
   c. Agreed criteria where rapid release of PCC is acceptable without the initial approval of a haematologist.
   d. Concessionary, rapid release of the best matched red blood cells for patients with red cell antibodies.
   e. Criteria and pathways for laboratory escalation to a haematologist where transfusion is urgent, and the presence of antibodies might delay release of red blood cells.
   f. Treatment of patients who refuse transfusion of blood components and/or products.

Patients should not die or suffer harm from avoidable transfusion delays

Key actions to review and update policies and procedures to cover:

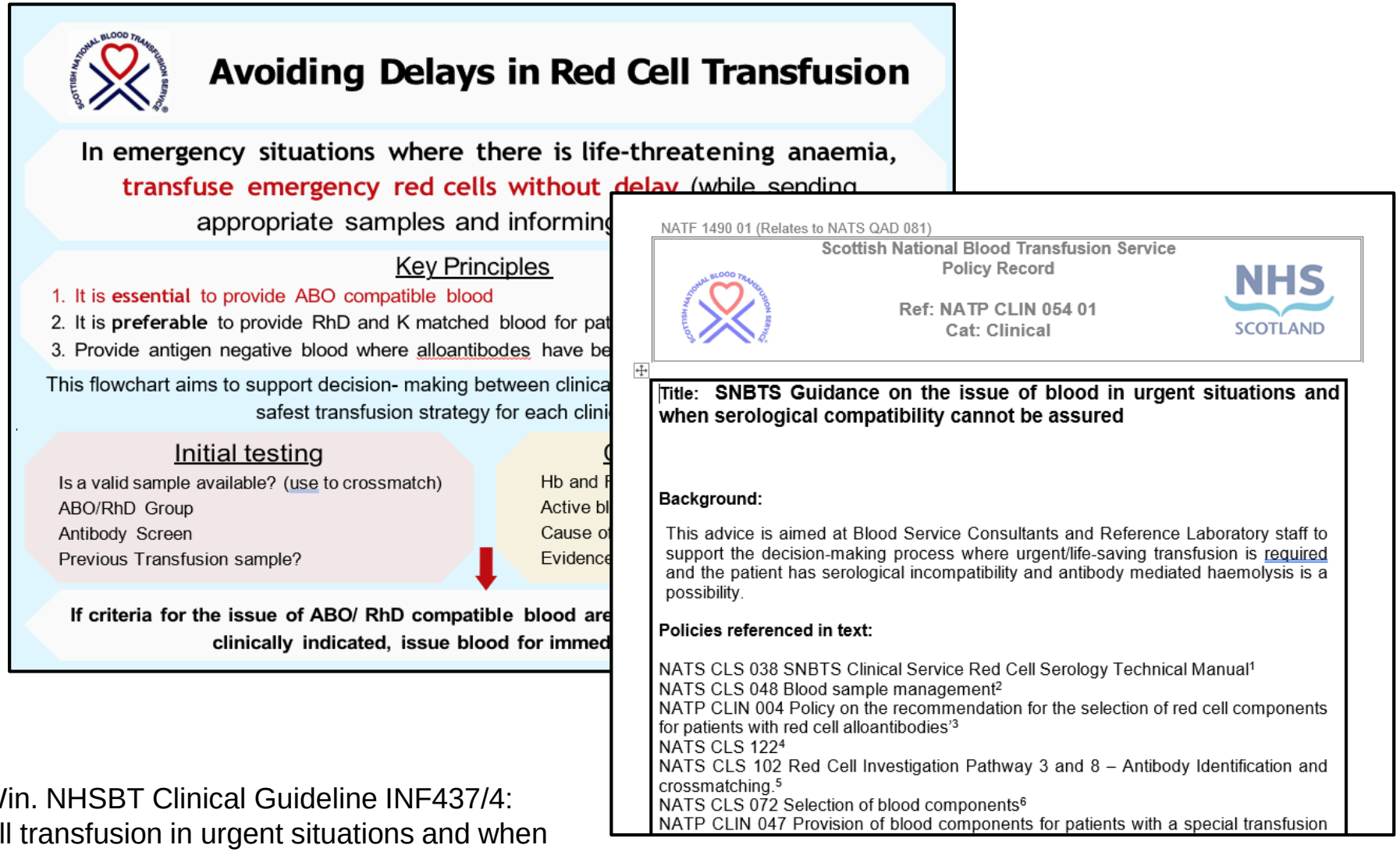
- Rapid release of blood components for major haemorrhage & AIHA
- Rapid release of best matched red cells for patients with red cell antibodies
- Criteria and pathways for laboratory escalation to a haematologist where transfusion is urgent, and the presence of antibodies might delay release of red blood cells.

SNBTS working with blood banks to avoid delays

- Good laboratory practice to avoid delay in transfusion provision

- Guidance on provision of red cells when serological compatibility cannot be assured

SNBTS guidance June 2022



Avoiding Delays in Red Cell Transfusion

In emergency situations where there is life-threatening anaemia, transfuse emergency red cells without delay (while sending appropriate samples and informing

Key Principles

1. It is **essential** to provide ABO compatible blood
2. It is **preferable** to provide RhD and K matched blood for pat
3. Provide antigen negative blood where alloantibodes have be

This flowchart aims to support decision- making between clinica safest transfusion strategy for each clini

Initial testing

Is a valid sample available? (use to crossmatch)
ABO/RhD Group
Antibody Screen
Previous Transfusion sample?

Hb and
Active bl
Cause o
Evidence

If criteria for the issue of ABO/ RhD compatible blood are clinically indicated, issue blood for immed

NATF 1490 01 (Relates to NATS QAD 081)

Scottish National Blood Transfusion Service
Policy Record

Ref: NATP CLIN 054 01
Cat: Clinical

NHS SCOTLAND

Title: SNBTS Guidance on the issue of blood in urgent situations and when serological compatibility cannot be assured

Background:

This advice is aimed at Blood Service Consultants and Reference Laboratory staff to support the decision-making process where urgent/life-saving transfusion is required and the patient has serological incompatibility and antibody mediated haemolysis is a possibility.

Policies referenced in text:

NATS CLS 038 SNBTS Clinical Service Red Cell Serology Technical Manual[1]
NATS CLS 048 Blood sample management[2]
NATP CLIN 004 Policy on the recommendation for the selection of red cell components for patients with red cell alloantibodies'[3]
NATS CLS 122[4]
NATS CLS 102 Red Cell Investigation Pathway 3 and 8 – Antibody Identification and crossmatching.[5]
NATS CLS 072 Selection of blood components[6]
NATP CLIN 047 Provision of blood components for patients with a special transfusion

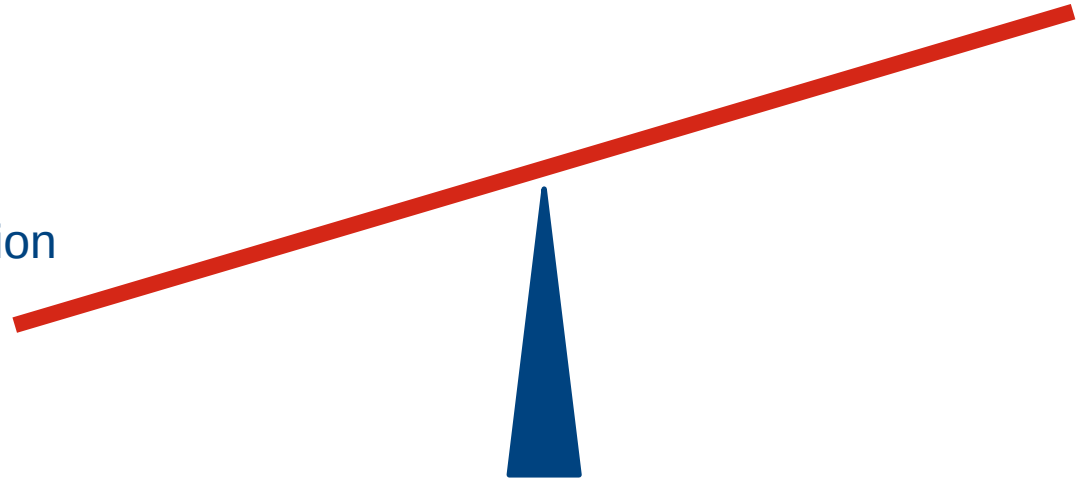
Reference: Dr Nay Win. NHSBT Clinical Guideline INF437/4: Guidelines for red cell transfusion in urgent situations and when serological compatibility cannot be assured.

SNBTS NATP CLIN 054 NATL 335

Urgent provision of blood

What are the risks of giving blood that does not fully meet specification?

How long can patient safely wait for blood?



Avoiding Delays in Red Cell Transfusion

In emergency situations where there is life-threatening anaemia, transfuse emergency red cells without delay (while sending appropriate samples and informing blood bank).

Key Principles

1. It is **essential** to provide ABO compatible blood
2. It is **preferable** to provide RhD and K matched blood for patients of child bearing potential
3. Provide antigen negative blood where alloantibodes have been identified

This flowchart aims to support decision- making between clinical and laboratory teams to reach the safest transfusion strategy for each clinical situation.

Initial testing

Is a valid sample available? (use to crossmatch)
ABO/RhD Group
Antibody Screen
Previous Transfusion sample?

Clinical Assessment

Hb and FBC (note baseline and rate of change)
Active bleeding?
Cause of anaemia?
Evidence of Critical anaemia?

If criteria for the issue of ABO/ RhD compatible blood are met and urgent transfusion is clinically indicated, issue blood for immediate transfusion

Red Cell Antibodies or Anomalous ABO/D Group

Antibody identification

- Allo- or auto-antibody?
- Single or Multiple antibodies?

Other tests

- DAT
- Red Cell Phenotype

Review historical transfusion data

- Look on LIMS, Health Records, Records from other boards

Clinical Questions

Baseline Hb and Rate of fall– Stable or deteriorating?

Previous Transfusion History, including any reactions?

Is the patient of child-bearing potential?

Any known special requirements of transfusion?

Establish clear communication between blood bank and clinical staff.
Discuss with a local haematologist
Consider support from reference laboratory or specialist in transfusion

Key information to establish

- How long can the patient safely wait for transfusion?
- How long will it take to do further tests and obtain better matched blood?
- What are the risks of giving blood that does not fully meet specifications?

If fully compatible blood cannot be provided and/or special requirements cannot be met within the time specified by the clinical team, use the following guidance to minimise delay in blood provision [6]

PRIORITY 1: Issue ABO compatible blood – Group O if ABO group cannot be established.	Rationale: No risk of acute haemolysis due to ABO incompatibility
PRIORITY 2: Issue RhD negative units to patients with child-bearing potential and those with immune anti-D[1]	Rationale: Reduced risk of allo-immunisation. Reduced risk of HDFN due to anti-D. Reduced risk of delayed haemolysis due to anti-D.
PRIORITY 3: Where possible, select blood that is negative for antigens that are the target of antibodies currently detectable by IAT at 37 degrees[1]	Rationale: Reduced risk of delayed haemolytic transfusion reactions. Advise that haemolytic reactions are unpredictable.
PRIORITY 4: where possible, select blood that is fully Rh (DCcEe) and K compatible with the patient[1]	Rationale: Most clinically-significant red cell alloantibodies will be of these specificity.
PRIORITY 5: Where possible select blood that is antigen negative for historical but currently undetectable allo-antibodies of likely clinical significance[1]	Rationale: These patients may still experience delayed HTRs due to stimulation of undetectable antibodies (i.e. anamnestic response, esp Kidd antibodies).

The following order of antigen negative selection should be applied if the urgent need for blood means fully compatible components cannot be provided

In order of decreasing priority:
D>c>C>E>e>K(k)>Jka/b>Fya/b>S/s(U)>M>N>
High Frequency Antibodies.
This is based on the frequency and severity of historic reports of incompatible transfusion.[2]

Patient factors and previous transfusion history should also be considered on an individual case basis

Consider if specific transfusion requirements can be waived when blood requirement is urgent

IRRADIATION – instead select units > 14 days old if time allows[3]
CMV – Risk reduced by leucodepletion[7]
HbS NEGATIVE – Untested units are unlikely to be HbS +ve[6]
AGE OF RED CELLS – Risk of higher potassium levels in older units and of slightly reduced red cell survival.[5]
NEONATAL SPECIFICATION[7]– additional safety of accredited donor status and additional IAT testing of these units may need to be waived in urgent situations.

NHS National Services Scotland

Clinical Questions

- Hb and rate of change
- Bleeding? Other cause of anaemia?
- **Evidence of critical anaemia?**
- Previous transfusion history
- Child bearing potential?
- Specific transfusion requirements?
- Senior Clinician/Haematologist aware?

Laboratory considerations

- Valid sample available?
- ABO/D group, antibody screen
- Antibody identification
  - Allo- or autoantibody?
- Review historical transfusion data
- Other tests- DAT, phenotype
- Specific transfusion requirements?
- Local resources

Key information to establish

- How long can the patient safely wait for transfusion ?
- How long will it take to perform further testing and provide better-matched blood?
- What are the risks of giving blood that doesn’t meet specifications?

Framework for blood provision when fully compatible blood cannot be provided in the timescale required

1. Issue ABO compatible blood (group O if group cannot be determined)

2. Issue D negative units to patients with childbearing potential and those known to have immune anti-D

3. Select blood with is negative for antigens that are the target of antibodies currently detectable by IAT at 37°C

4. Select blood which is fully Rh and K compatible with the patient

5. Select blood that is antigen negative for historical but currently undetectable allo-antibodies of likely clinical significance

Order of antigen negative selection

In order of decreasing priority:

D>c>C>E>e>K(k)>Jka/b >Fya/b>S/s(U)>M>N>

High Frequency Antibodies

Ref: Seltsam, A., Wagner, F.F., Salama, A. and Flegel, W.A. (2003), Antibodies to high-frequency antigens may decrease the quality of transfusion support: an observational study. Transfusion, 43: 1563-1566. https://doi.org/10.1046/j.1537-2995.2003.00565.x

Specific transfusion requirements

Risk assessment required if products not required in time available

- Irradiation- if not available in time, select (non-iradiated) units >14 days old if time allows – (see 2020 BSH Guidelines on use of irradiated blood products)
- CMV
- HbS negative
- Neonatal specification

SNBTS support

- SNBTS reference laboratories
- SNBTS medical team

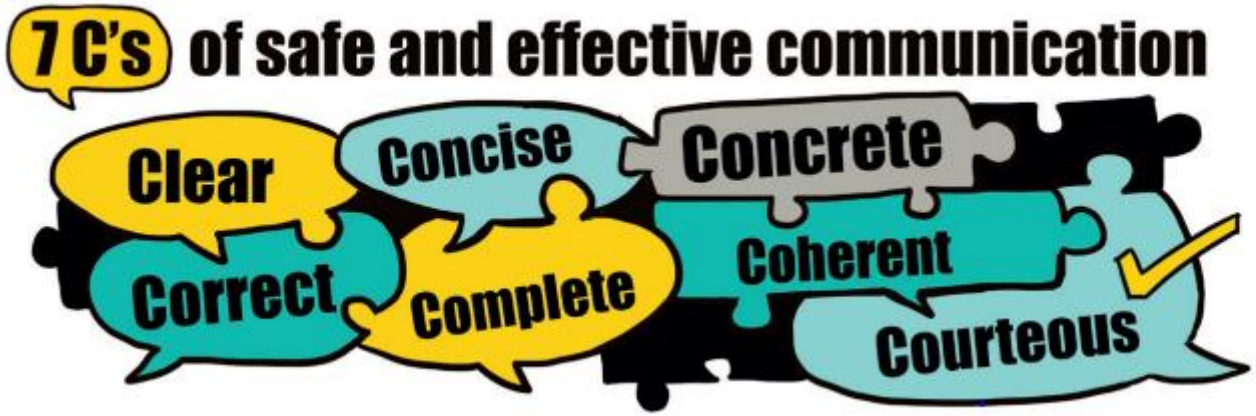
Recommended resources

SHOT Bite No. 8: Massive Haemorrhage Delays
https://www.shotuk.org/resources/current-resources/shot-bites/

SHOT Video: Delayed Transfusion in Major Haemorrhage
https://www.shotuk.org/resources/current-resources/videos/

SHOT Webinar: Every Minute Counts
https://www.shotuk.org/resources/current-resources/webinars/

UK Transfusion Guidance in Response to the Shortage of Blood Collection Tubes
https://www.shotuk.org/resources/current-resources/



SHOT
Serious Hazards of Transfusion