Greater Glasgow and Clyde Health Board

Emergency Blood Management Arrangements



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1. Background

1.1 The 2005 the Scottish Executive Health Department (SEHD) prepared an integrated plan which listed actions to be taken by both the Scottish National

Blood Transfusion Service (SNBTS) and NHSScotland (NHSS) hospitals during blood shortages[i]. This plan was aligned with NHS emergency planning arrangements and consistent with the plans already issued in the remainder of the UK.

1.2 In March 2020, during SNBTS contingency planning for COVID-19, it was identified that the original document no longer aligned to current clinical and laboratory transfusion practice in Scotland. The initial version of this document 'Integrated blood shortage plan for SNBTS and NHSS Hospitals' introduced a new framework for Emergency Blood Planning Arrangements for Scotland in response to COVID-19 contingency planning.

1.3 Now in the recovery phase from the pandemic, SNBTS and other UK blood services are encountering challenges in maintaining the blood supply, contributed to by unpredictable demand, changes in donor behaviour and staffing challenges. NHS Blood and Transplant (NHSBT) declared an amber alert in England in October 2022. This unprecedented event required mitigating actions to be undertaken by both NHSBT and NHS England hospitals to ensure blood remained available for those who needed it most. Learning from that event has informed this updated guidance which applies in Scotland only.

1.4 Following the Amber alert in England, a UK Red Alert group was formed with clinical representation from the four UK blood services. The patient categories for transfusion outlined in Appendices 2 and 3 were agreed by the group and will be adopted in all blood shortage plans to ensure uniformity of guidance for the management of shortage across the UK.

1.5 In the event of one of the other UK blood services declaring an Amber or Red alert, SNBTS will communicate its current stock position with NHSS hospitals.

2. Planning Principles

2.1 This document provides the framework of a proposed contingency plan to help ensure NHSS Hospitals and SNBTS work together to reduce the risk of blood shortages through the management of supply and demand for blood. This is to

ensure the effective use of available blood when blood stocks have fallen to very low levels and is critical to ensuring transfusion support for patients on these occasions.

2.2 The plan is designed to ensure that NHSS Hospitals and SNBTS can work within a consistent, integrated framework across NHSS, working to ensure patients have equal access to available blood based on clinical need. This will be achieved by ensuring that those patients most in need receive the available supply and further ensuring that any reduction in usage is made from those patients who will be least affected.

2.3 The key aims are to safeguard that patients who need blood can receive a transfusion regardless of their geographical location:

- That the national pool of blood components is available for all essential transfusions to all patients equally across Scotland (logistical actions).
- That overall usage is reduced to ensure the most urgent cases and those with the greatest clinical need receive the supply that is available (clinical actions).

2.4 The Integrated Blood Shortage Plan (the 'Plan') may be activated in a variety of situations which cause SNBTS and hospitals to activate their emergency blood planning arrangements (EBMA) including:

- Short-term shortages: e.g. bad weather, influenza or a COVID-19 outbreak.
- Very acute shortages: e.g. security issues which stop donors coming forward to donate blood.
- Prolonged shortage: e.g. the introduction of further measures to reduce the risk of disease transmission by transfusion.
- Increased demand due to a mass casualty incident or disease pandemic.

2.5 These situations require reduction in usage, and wastage, of the hospital stock of the implicated blood component with the result that there is reduced pressure on national stocks and more of the national 'pool' is available for essential transfusions.

2.6 The plan describes four phases that apply to shortage of either red cells or platelets, and are defined by SNBTS stock levels – **Green, Pre-Amber, Amber**

and Red. Shortage has been defined for **red cells** as follows, based on average daily issues from SNBTS during 'normal' demand, as applied to Group O and Group A inventory:

Green	3 days' or more SNBTS stock (with a target of 4-6 days' stock)
Pre Amber	Less than 3 but more than 2 days' SNBTS stock
Amber	2 days' or less SNBTS stock
Red	1 day or less SNBTS stock (Red A <0.5 days stock, Red B 0.5-1 days' stock)

2.7 It is less easy to define the stock levels for platelet shortage due to the short shelf life of the component. Below are illustrative levels of Group A and Group O platelet stock at which SNBTS are likely to act:

Green	1 day or more SNBTS stock
Pre Amber	Less than 1 day but more than 0.8 days' SNBTS stock
Amber	Less than 0.8 days' but more than 0.5 days' SNBTS stock
Red	Less than 0.5 days' SNBTS stock

2.8 Hospitals are required to establish an Emergency Blood Management Group (EMBG) with a remit to produce and manage Emergency Blood Management Arrangements (EMBA) to cover all four phases.

2.9 In the **Pre Amber** phase, hospitals will receive a notification of a potential shortage of red cells or platelets which has not yet breached the **Amber** threshold to encourage greater collaborative working between Hospital Transfusion Teams (HTTs), Hospital Transfusion Committees (HTCs) and local clinical teams aimed at reducing the risk that the amber threshold is reached.

3. Plan Structure

3.1 The plan is structured to provide a framework of actions for SNBTS and NHSS hospitals in four phases:

Green	Normal circumstances where supply meets demand
Pre Amber	Reduced availability of blood without an impact on clinical care
Amber	Significantly reduced availability of blood and/or platelets with impact on clinical activity
Red	Severe, prolonged shortage of blood and/or platelets with impact on clinical activity

3.2 Each hospital should have an Emergency Blood Management Arrangement (EBMA) for red cells and platelets in all four phases, with particular focus on mitigating actions to be taken in amber and red phases. **This applies to all hospitals, regardless of size or volume of blood use and includes independent hospitals.**

3.3 By ensuring that all hospitals have EBMAs for shortage it is expected that, on declaration of a shortage by SNBTS, all hospitals will invoke these plans at the same time, ensuring a swift response to the shortage.

3.4 SNBTS plans for each phase will include providing any communication to NHSS Hospitals and, where relevant, press statements regarding the shortage. Any appeals for blood donors will be co-ordinated to ensure a consistent message is delivered to the general public.

3.5 SNBTS provides a blood bank dashboard[ii] and daily SNBTS issuable stock reports for red cells[iii] to provide information to HTTs to aid monitoring of hospital transfusion laboratory stock management practice and clinical transfusion practice. To subscribe to daily stock report emails please email nss.snbtsdashboards@nhs.scot

4. Operation of the plan

A flow chart is provided in Appendix 1

4.1 Green Phase

4.1.1 Actions listed in Green phase are focused on preparing the arrangements required to be implemented in shortage.

4.1.2 As the Green phase of the plan applies to normal circumstances, the plan is, in effect, operating at all times.

4.1.3 Hospital transfusion laboratories are expected to have minimum and target stockholding levels for all blood components of all groups. These should be reviewed at least annually by the blood bank manager and HTT and aligned to any changes in clinical service delivery profiles. Information on optimal target stock levels for each blood bank is available from the SNBTS blood bank dashboard.

4.1.4 The HTC chair should work with the HTT to ensure that EBMAs are reviewed and updated at least every three years (see also section 3.2). EBMA should then be approved by the HTC and other appropriate governance bodies. The EBMA should be lodged within major incident/ contingency/ business continuity plans. The EBMA will define which members of staff will participate in shortage management and how a reduction in usage will be achieved.

4.1.5 All staff involved in transfusion should be aware of the EBMA and their roles in managing blood shortage.

4.1.6 During the Green phase SNBTS will continually monitor SNBTS stock levels and take appropriate actions to maintain stock of all blood components.

4.2 Pre Amber Phase

4.2.1 SNBTS may identify a potential short-term supply problem for one or more components that may result in delays to order fulfilment (see sections 2.6 and 2.7). In these circumstances, SNBTS may issue an alert asking hospitals to implement short term measures to reduce demand. This aims to reduce pressure on blood stocks while SNBTS implement measures to address the shortage such as increasing donor collection.

4.2.2 Measures requested to reduce demand in pre amber phase should not have an impact on patient care.

4.2.3 **Emergency Blood Management Arrangements should not be activated.**

4.3 Amber Phase

4.3.1 During pre-amber phase, SNBTS will take action to increase collections from donors. If these actions prove to be unsuccessful, SNBTS will declare a shortage and communicate a move to the Amber phase.

4.3.2 However, should SNBTS identify a severe, imminent threat to the blood supply or less than one days' blood supply of red cells SNBTS may communicate a move directly to the Red phase of the plan.

4.3.3 The pre-determined Amber level for red cells of a single critical blood group (or all blood groups) is set at approximately two days' stock (section 2.6).

4.3.4 The pre-determined Amber level for platelets of a single blood group is approximately 0.8 days' stock (section 2.7).

4.3.5 This information will be communicated by email to all hospitals, in two stages: firstly, a communication warning of an imminent Amber alert asking hospitals to prepare, followed by a second communication to state that an Amber alert has been declared. The information from SNBTS will include the nature of the shortage and any actions which need to be taken by hospitals as part of their EBMAs.

4.3.6 **In the Amber phase the EBMA should be activated.**

4.3.7 If the shortage is caused by a short-term reduction in the availability of donors (such as severe bad weather or an influenza or COVID 19 outbreak), the implementation of actions by hospitals to minimise any avoidable blood component wastage, review and reduce stockholding may prove sufficient to manage the shortage.

4.3.8 To help prioritise the patients who should be treated, as shortages become more severe, three broad patient categories are identified (see Appendix 2 for red cells and Appendix 3 for platelets). If the shortage is more prolonged, it will be necessary to reduce demand for non-essential transfusions (Category 3) and thereby reduce orders to SNBTS, aiming for an overall reduction in demand of 20%.

4.3.9 If stocks of blood components return to a sustainable level, SNBTS will communicate to hospitals that the Amber level shortage no longer applies and

that orders can return to Pre Amber in the first instance to allow national stocks to stabilise, before return to normal.

4.3.10 If stocks continue to fall, SNBTS may declare a Red level shortage.

4.4 Red Phase

4.4.1 SNBTS will declare a Red level shortage if there is a severe, prolonged shortage of blood; e.g. a 50% loss of donors, or, if an imminent severe threat to the blood supply is identified (See also 2.6 and 2.7).

4.4.2 This information will be communicated by email to all hospitals, in two stages: firstly, a communication warning of an imminent Red alert asking hospitals to prepare, followed by a second communication to state that a Red alert has been declared. The information from SNBTS will include the nature of the shortage and any actions which need to be taken by hospitals as part of their EBMAs.

4.4.3 In the first instance these actions will be to reduce red cell stockholding in hospitals to approximately 40% of their target level. This may be accompanied by a further reduction in usage. In this case it is likely that only patients in Category 1 of the EBMA listed in Appendices 2 and 3 will be treated.

4.4.4 If stocks of blood return to a sustainable level, SNBTS will communicate to hospitals that the red level shortage no longer applies and that hospital can return to either Amber, Pre Amber or Green phases.

5. Guidance for hospitals on Emergency Blood Management Arrangements (EBMA)

5.1 Green phase

5.1.1 The Hospital Transfusion Team (HTT) has a specific remit to review blood and blood component usage and wastage using the SNBTS blood bank dashboard and other local sources of information. This applies to all hospitals where blood is transfused, including independent hospitals, regardless of size or volume of blood use.

5.1.2 The HTT, with the support of members of the HTC, should implement and monitor measures to reduce inappropriate and unnecessary transfusion using patient blood management principles as outlined below:-

- Implement agreed protocols and thresholds for all transfusions.
- Develop stock management and clinical policies to minimise discard of all blood components
- Set local key performance indicators (KPIs) based on national KPIs for time expiry and clinical wastage of all blood components.
- Ensure preoperative assessment – haemoglobin optimisation including iron therapy and bleeding assessment, including peri-operative adjustment of anti-thrombotic treatment.
- Use tranexamic acid for high blood loss surgery and cell salvage where appropriate.
- Intra-operative coagulation factor replacement based on near-patient testing.
- Annual revision of the maximum/agreed surgical blood ordering schedule.
- Implementation of single-unit issue of red cells where appropriate.
- Review of and reduction of the de-reservation period of allocated red cells and platelets to better manage stocks.

5.1.3 In the event of a shortage, hospitals must have a workable hospital-wide shortage plan known as the Emergency Blood Management Arrangements (EBMA) and this is managed by the Emergency Blood Management Group (EBMG) of major stakeholders in blood usage who must have executive powers on behalf of the Medical Director and HTC chair. The minimum recommended composition of the group is given below:

Recommended Emergency Blood Management Group Composition	
Chief Executive or Medical Director	Chair of the HTC
Clinical Director of Acute Medicine	Haematologist Responsible for Transfusion
Director of Nursing	Transfusion Laboratory Manager
Clinical Director of Surgery	Transfusion Practitioner

Critical Care/Lead Clinical Anaesthetist	Clinical Risk Manager
Director of Operations	

5.1.4 Each hospital's EBMAs should be agreed and verified by key staff within the hospital and approved by the HTC. Final approval should be via the Chief Executive or Medical Director. The Resilience Lead should also be involved in review of the EBMA.

5.1.5 It is essential the EBMA have wide recognition to ensure their effectiveness when called into action. Staff should be aware of their existence and be willing to accept that a decision-making process, however difficult, is necessary when the supply of blood is limited.

5.1.6 The hospital should ensure that communication lines are clear for the activation of the plan. It must ensure that SNBTS are informed of any changes in contact email addresses by email to nss.snbtstransfusionteam@nhs.scot

5.1.7 In shortage it may be necessary to restrict transfusions to those groups of patients in most need. In order to simplify the management of this, it is suggested that patients be divided into three broad categories;

- Category 1: Critical/Emergency
- Category 2: Essential/Urgent
- Category 3: Planned/Elective

Examples are given in Appendix 2 (red cells) and Appendices 3-5 (platelets).

5.2 Preparation for shortage – Pre Amber Phase

5.2.1 Should a pre amber shortage occur SNBTS will send an e-mail informing the Transfusion Laboratory Manager (TLM) and hospital transfusion laboratory that the national blood stocks have reduced. Hospital blood banks should have a mechanism in place for noting these communications and ensuring appropriate action(s) are taken within 24 hours of receipt.

5.2.2 Hospitals should ensure EBMA are in place and up to date.

5.2.3 Communications from SNBTS will outline actions required by hospital blood banks. These may include:

- Postponing orders for stock replenishment purposes where it is safe to do so
- Accepting substitutions of components of a different group where required and clinically safe to do so
- Minimising discard of red cells and/ or platelets
- Ensuring transfusions are administered in line with evidence-based patient blood management guidelines

5.2.4 Any delays to transfusion or any avoidable transfusion incidents should be reported to SHOT.

5.3 Activation of the EBMA – Amber Phase

5.3.1 Should an amber level shortage occur, SNBTS will communicate this in two stages: firstly, a communication warning of an imminent Amber alert asking hospitals to prepare, followed by a second communication to state that an Amber alert has been declared. These will be sent by e-mail to the Transfusion Laboratory Manager (TLM) and hospital transfusion laboratory. Hospitals must ensure a mechanism is in place to note the initial communication and act upon it within 6-12 hours to implement the Amber status contingency plan.

5.3.2 The TLM or deputy will immediately copy the SNBTS correspondence to the Medical Director, Consultant Haematologist for Transfusion and Chief Executive to ensure the EBMA is activated.

5.3.3 The Consultant Haematologist will alert the EBMG and recommend the introduction of the hospital's Amber EBMA. Lead consultants and directorate managers will be informed immediately that the Amber plan has been implemented and the information will be cascaded to all medical staff.

5.3.4 The EBMG will prepare to actively manage the shortage. As with any major incident or emergency plan, cover arrangements should be clear. Usually, the Consultant Haematologist for Transfusion will assume a lead role.

5.3.5 The EBMG will meet to review the actions to be taken as outlined below. This may include a review of theatre lists to ensure that patients in Category 3 who will require blood transfusion support are deferred to ensure the hospital will reach the required **reduction in overall usage of approximately 20%**. Where

reductions do not reach the required reduction in stockholding, action may need to be taken which may impact on patients in Category 2. Other measures should include:

- Review stockholding with the aim of reducing usage and avoidable wastage to increase the central 'pool' of SNBTS held blood components.
- Consideration should be given to reducing the transfusion trigger/threshold for all transfusions and using single-unit issue in non-bleeding patients.
- In cases of actual or potential massive blood loss a consultant haematologist must be contacted by the referring clinical team to allow discussion and planning of patient management and blood component provision.
- All cases which are deemed to require transfusion by their clinical teams should be referred to a Consultant Haematologist or deputy.
- Reduction of the reservation period for blood components to 12 hours or less wherever possible.

5.3.6 Any shortage and its impact on patient care should to be reviewed daily by a group of key staff and a situation report (SITREP) produced (Appendix 7).

5.3.7 Any delays to transfusion or any avoidable transfusion incidents should be reported to SHOT.

5.4 Activation of the EBMA– Red Phase

5.4.1 Should a Red national shortage occur, this will either be an escalation of Amber or a direct notification of Red shortage.

5.4.2 SNBTS will communicate this in two stages: firstly, a communication warning of an imminent Red alert asking hospitals to prepare, followed by a second communication to state that a Red alert has been declared. These will be sent by e-mail or telephone call to the Transfusion Laboratory Manager (TLM) and hospital transfusion laboratory. Hospitals must ensure a mechanism is in place to note the initial communication and act upon it within 6-12 hours to implement the Red status contingency plan.

5.4.3 The communication will indicate that red cell stockholding should be reduced to 40% of stated stock target stock level for all groups.

5.4.4 The TLM or deputy will immediately copy the SNBTS correspondence to the Medical Director, Consultant Haematologist for Transfusion and Chief Executive to ensure the EBMA is activated and EBMG is convened to activate the hospital's Red EBMA and actively manage the shortage.

5.4.5 Lead Consultants and Directorate Managers will be informed immediately that the Red plan has been implemented, and the information will be cascaded to all medical staff.

5.4.6 The EBMG will meet and implement the Red status contingency plan and to review the actions to be taken as outlined below.

- Reduce red cell stockholding to 40% of target levels.
- Daily review of the blood shortage and its impact on patient care by the EBMG.
- Medical assessment of all transfusion requests by a Consultant Haematologist or deputy.
- Transfusions assessed and an order of priority determined, based on clinical need.
- The enactment of a predetermined policy on dealing with major bleeding that should include guidance on when to stop blood component support. A framework to aid team decision making in the context of severe national blood shortage is provided in Appendix 6.

5.4.7 Any shortage and its impact on patient care should to be reviewed daily by a group of key staff and a situation report (SITREP) produced (Appendix 7)

5.4.8 Any delays to transfusion or any avoidable transfusion incidents should be reviewed by the EBMG and recorded on internal incident management system. Consideration should be given to external an external report to the UK Haemovigilance Scheme, SHOT particularly where there is documented patient harm

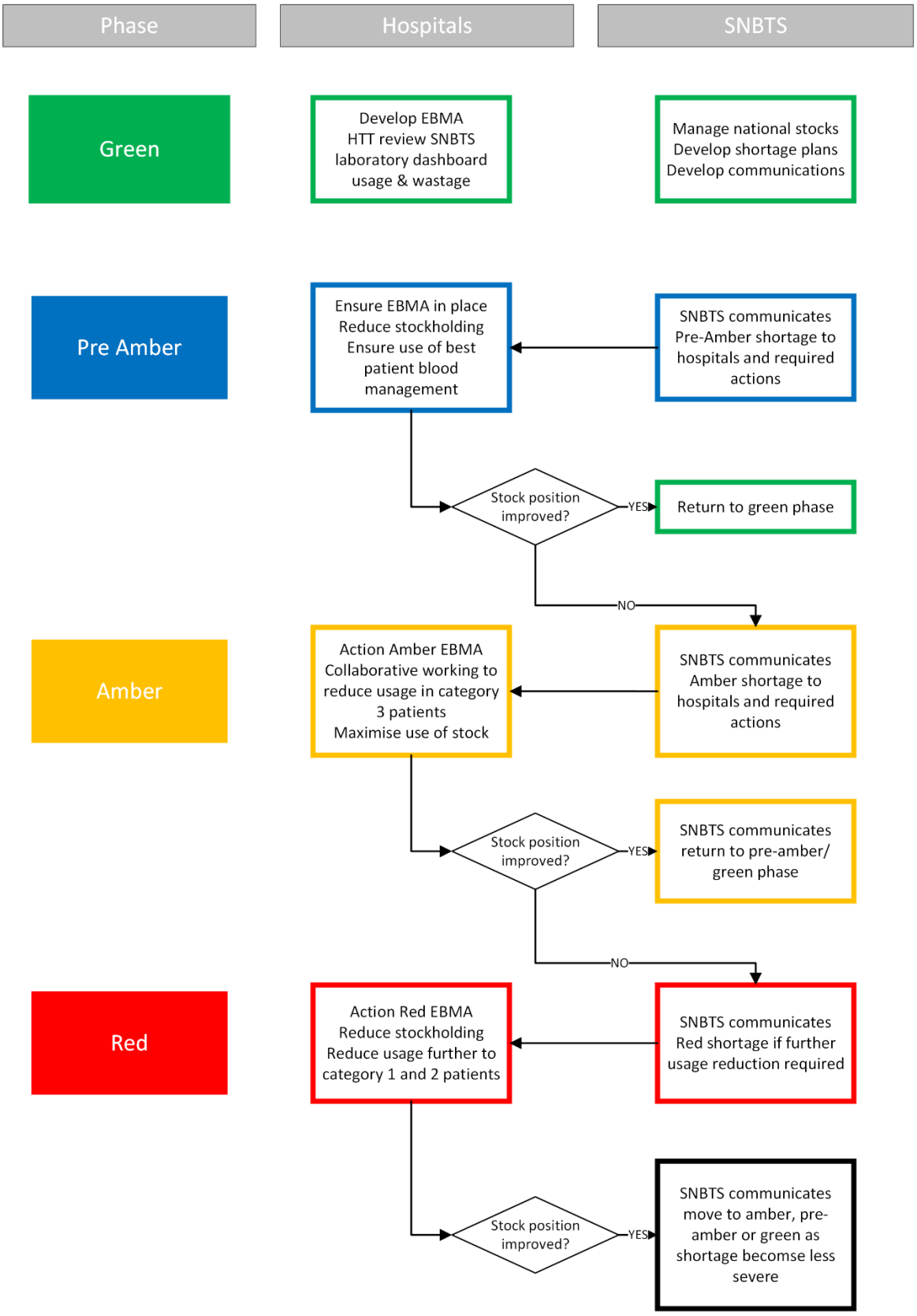
5.5 Recovery from shortage

5.5.1 SNBTS will send an email or make a telephone call informing the TLM or hospital transfusion laboratory that stocks have risen to a level where hospitals can move to Amber, Pre Amber or Green status.

5.5.2 Hospitals should ensure that immediate demand does not return the national stocks to below critical levels by using a phased return to normal stock levels. The return to normal activity levels should similarly be phased, for example elective surgery backlogs should not be compressed into the immediate post recovery period.

5.5.3 The TLM or deputy will disseminate the information as above. The EBMG should convene at the earliest opportunity to review the effect of the blood shortage and amend the blood shortage arrangements as necessary. Any recommendations should be fed back to the HTC.

Appendix 1 Flowchart for shortage plan



Appendix 2 Patient categories for red cell EBMA

The following patient categories aim to aid hospitals in prioritisation of patients to ensure the required reduction in red cell usage is achieved, while maintaining transfusion availability for those who need it most.

<table>
<tr><th colspan="4">OPTIMISE ALL PATIENT BLOOD MANAGEMENT STRATEGIES</th></tr>
<tr><td colspan="2">Category 1</td><td>Category 2</td><td>Category 3</td></tr>
<tr><td><<0.5days of stock (RED A)</td><td>0.5-1day of stock (RED B)</td><td></td><td></td></tr>
<tr><td colspan="2">These patients will remain highest priority of transfusion

Resuscitation
Resuscitation of life-threatening /on-going blood loss including trauma. If ongoing major haemorrhage with expected poor prognosis, review appropriateness of continuing transfusion support (see appendix 6).

Transfusion-dependent anaemias including thalassaemia
Review the need for transfusion and delay if not symptomatic with anaemia.

Haemoglobinopathy patients on regular transfusion programmes - follow amber guidance but also increase interval between red cell exchanges or consider using top up transfusion as interim measure.</td><td>These patients will not be transfused in the RED phase

Surgery*/Obstetrics
Cancer surgery (palliative).
Symptomatic but not life- threatening post-operative or post-partum anaemia.
Urgent*** surgery.

Priority 2 and 3 surgeries
Consider postponing which is likely to require donor blood support on a case-by-case basis e.g., taking into consideration blood group and correction of anaemia.

Non-surgical anaemias
Symptomatic but not life-threatening anaemia.</td><td>These patients will not be transfused in the AMBER phase

Surgery*
Consider postponing priority 4 surgeries which is likely to require donor blood support on a case-by-case basis e.g., taking into consideration blood group and correction of anaemia.</td></tr>
<tr><td>Surgical*support (RED A)
Priority 1a
*procedures can be supported with donor blood with exceptions **

Priority 1b emergency procedures CANNOT be supported with donor blood.

These should be reviewed on a case-by-case basis e.g., taking into consideration blood group and correction of anaemia.</td><td>Surgical*support (RED B)
Priority 1a and 1b
Procedures can be supported which are likely to require donor blood support. These should be reviewed on a case-by-case basis e.g., taking into consideration blood group and correction of anaemia.</td><td></td><td>Chronically transfused patients

1) Haemoglobinopathy
Patients on Red Cell Exchange (RCE) programme
a) Reassess use of red cells during previous red cell exchanges to ensure optimising red cell component usage.
b) If available, use the depletion mode in the Apheresis machine if safe to do so and if it results in less blood use.
c) Consider increasing interval for RCE.
d) Consider top up red cell transfusion post</td></tr>
</table>

			partial exchange to reduce number of red cells needed. 2) All Patients (including haemato-oncological patients receiving chemotherapy) Reduce transfusion threshold to 70g/L if no contraindication. 3) Maximise use of all PBM measures i.e., Tranexamic acid, use of cell salvage, optimisation of pre-op anaemia, minimise iatrogenic anaemia by limiting blood sampling.
Non-surgical anaemias Continue to transfuse a) in life-threatening anaemia including patients requiring in-utero support and high dependency care/SCBU. b) Stem cell transplantation, or chemotherapy already commenced**** Review cadaveric organ transplants and delay, if possible, particularly if large volume of blood may be required i.e., cardiac / liver transplant	Delay starting a. Stem cell transplantation, or chemotherapy b. Living related organ transplantation Delay prophylactic transfusion a. in severe bone marrow failure syndrome if patient not symptomatic with anaemia.		

*Clinical Guide to Surgical Prioritisation from Federation of surgical Speciality Association [17]

* Emergency – patient likely to die within 24 hours without surgery.

** With the exception of poor risk aortic aneurysm patients who rarely survive but who may require large volumes of blood.

*** Urgent – patient likely to have major morbidity if surgery not carried out.

**** Planned haemopoietic stem cell transplant or chemotherapy may be deferred if possible.

Appendix 3 Patient categories for platelet EBMA

The following table provides general guidance for the use of platelet transfusions in the context of reduced availability of all platelet groups.

OPTIMISE ALL PATIENT BLOOD MANAGEMENT STRATEGIES			
Category 1 ***(Red Phase)***	**Category 2**	**Category 3** ***(Amber Phase)***	
Patients to be transfused (follow appendix 4 for thresholds)	***Patients NOT to be transfused in Red Phase*** *(Follow appendix 5)*	***Patient to be transfused*** *(Follow appendix 4)*	***Patient not to be transfused*** *(Follow appendix 5)*
1. Resuscitation /Bleeding a. Resuscitation of life-threatening /on-going blood loss including trauma. If ongoing major haemorrhage with expected poor prognosis *, review appropriateness of continuing transfusion support ***b.*** Bleeding in the presence of sepsis/acute DIC, BMF, Immune thrombocytopenia **2. Surgery** * a. Priority 1a procedures can be supported with platelets with exceptions ** b. Priority 1b emergency procedures **CANNOT** be supported with platelets if they go ahead. These should be reviewed on a case-by case basis e.g., taking into consideration blood group and correction of thrombocytopenia. 3. **Non-surgical conditions**	**1. Surgery** a. Cancer palliative surgery. b. Priority 2 and 3 surgeries. Consider postponing surgery likely to require donor platelet support on a case-by-case basis e.g., taking into consideration blood group and correction of thrombocytopenia. **2. Critical care patients** resuscitated following massive transfusion with no on-going active bleeding **3. Non-surgical thrombocytopenia** **4. Bone marrow failure syndrome** on intensive treatment but with no active bleeding **5. Invasive procedures**	***1. Invasive emergency procedure with high-risk bleeding*** Use guidance from appendix 6 for thresholds. ***2. Bone marrow failure*** Patients receiving intensive chemotherapy including following allogeneic stem cell transplant. Transfuse according to Amber thresholds.	**1. Surgery*** Consider postponing priority 4 surgery which is likely to require donor platelet support on a case-by-case basis e.g., taking into consideration blood group and correction of thrombocytopenia **2. Procedures with low-risk bleeding** **Do not give prophylactic platelet transfusions in:** **3. Bone marrow failure syndromes** Not receiving intensive treatment **4. Auto BMT** **5. Thrombocytopenia congenital/ acquired platelet defects**

a. Thrombocytopenia with bleeding including patients requiring in-utero support and neonates in high dependency care/SCBU. b. Patients already started stem cell transplantation, or chemotherapy with bleeding or additional risk factors for bleeding			
Consider delay in starting a. Stem cell transplantation or chemotherapy b. Living related organ transplantation c. Cadaveric organ transplants, if possible, particularly if large volume of blood may be required i.e., cardiac / liver transplant			

*Clinical Guide to Surgical Prioritisation from Federation of Surgical Speciality Associations

* Emergency; patient likely to die within 24 hours without surgery.

** Except for poor risk aortic aneurysm patients who rarely survive but who may require large volumes of blood.

Appendix 4 Guidance for platelet use in Amber Phase

British Society for Haematology Guideline (2016) **Adults**
British Society for Haematology Guideline (2016 & 2020 addendum) **Children, Neonates**
Platelet transfusion: principles, risks, alternatives, and best practice
Platelet transfusions are an essential component in the management of selected patients with thrombocytopenia. However, they need to be used judiciously as they are a limited resource and are not risk free

Prior to prescribing a platelet transfusion consider:

What is the indication for transfusion in this patient?	Are there any alternatives which could be used instead?	Is the patient aware of the benefits, harms, and alternatives to a platelet

Possible alternatives to platelet transfusion:

- Apply surface pressure after superficial procedures and correct surgical causes for bleeding
- Surgical patients expected to have at least a 500 ml blood loss (or >10% blood volume in children), use tranexamic acid (TXA) unless contraindicated
- Trauma patients who are bleeding or at risk of bleeding, early use of TXA
- Severe bleeding replace fibrinogen if plasma concentration less than 1.5 g/L
- Anti-platelet agents - discontinue or if urgent procedure/bleeding use TXA if risk/benefit would support
- Uraemia with bleeding or pre-procedure – dialyse, correct anaemia, consider desmopressin
- Inherited platelet function disorders - specialist haematology advice required. Consider desmopressin
- Chronic Bone Marrow Failure (BMF) with bleeding – consider TXA

Indication for use of platelet transfusion in adults and children (AMBER ALERT)	Transfusion threshold/not indicated
Prophylactic use (No bleeding or WHO grade 1) - one adult dose required (or weight-based paediatric equivalent)	
• Reversible Bone Marrow Failure, including allogeneic stem cell transplant	10×10^9/L
• Critical illness	10×10^9/L
• Reversible and Chronic Bone Marrow Failure receiving intensive therapy	10×10^9/L
• Chronic Bone Marrow Failure to prevent persistent bleeding of grade > 2	Count variable
• Chronic stable Bone Marrow Failure, abnormal platelet function, platelet consumption/ destruction (e.g., DIC, TTP) or immune thrombocytopenia (ITP, HIT, PTP) • Reversible BMF with autologous stem cell transplant (patient stable)	NOT INDICATED
Prophylactic use in presence of risk factors for bleeding (e.g., sepsis, abnormalities of haemostasis)	
• Reversible/chronic bone marrow failure, or critical care	10 to 20×10^9/L
• Abnormal platelet function, platelet consumption/destruction (e.g., TTP), immune thrombocytopenia	NOT INDICATED
Pre-procedure	
• Central venous catheter (CVC) tunnelled or untunnelled (excluding PICC line)	20×10^9/L
• Lumbar puncture*	40×10^9/L
• Percutaneous liver biopsy	50×10^9/L
• Major surgery	50×10^9/L
• Epidural anaesthesia, insertion & removal	80×10^9/L
• Neurosurgery or ophthalmic surgery involving the posterior segment of the eye	100×10^9/L
• Bone marrow aspirate or trephine biopsies, PICC line insertion, traction removal of central venous catheters (CVCs), cataract surgery, other procedures with low risk of bleeding	NOT INDICATED
Therapeutic use (Bleeding WHO grade 2 or above)	
• Severe bleeding	50×10^9/L
• Multiple trauma, brain or eye injury, spontaneous intracerebral haemorrhage	100×10^9/L

• Bleeding (WHO grade >2) but not severe • Bleeding in specific clinical conditions – see table next page for indications	30 x 10^9/L

Indication for use of platelet transfusion in neonates (AMBER ALERT)	Transfusion indicated (threshold) / not indicated
Prophylactic use (No bleeding or WHO grade 1)	
• Neonate (including very pre-term) • Neonate with NAIT (no family history of ICH)	25 x 10^9/L 25 x 10^9/L
e in presence of risk factors for bleeding (e.g., sepsis)	
• Preterm neonate with sepsis • Neonate with NAIT (Family history of ICH)	25 x 10^9/L 50 x 10^9/L
Pre-procedure	
• Lumbar puncture* • Major surgery • Neurosurgery	40 x 10^9/L 100 x 10^9/L 100 x 10^9/L
• Procedures with low risk of bleeding	NOT INDICATED
Therapeutic use (Bleeding WHO grade 2 or above)	
• Severe bleeding	100 x 10^9/L
Specific clinical conditions	
Platelet function defect	
• Congenital – Pre-procedure or therapeutic use. When alternative therapy contraindicated or ineffective. Directed by specialist in haemostasis. • Acquired (anti-platelet agents, uraemia)- only indicated for severe bleeding	Count Variable
Disseminated intravascular bleeding	
• Pre-procedure or therapeutic use. Consider threshold counts above but may not be achievable and individual case review required	Use pre-procedure or therapeutic threshold as guide
Thrombotic thrombocytopenic purpura	
• Platelet transfusion contraindicated	unless life-threatening bleeding
Immune thrombocytopenia (excluding NAIT)	
• (ITP, HIT, PTP) Pre-procedure when other therapy ineffective or procedure urgent or to treat severe bleeding. Consider threshold counts above but may be unachievable or unnecessary and individual case review required	Use pre-procedure or therapeutic threshold as guide
Footnotes	
*It is accepted that prior to lumbar puncture some clinicians will transfuse platelets at higher counts (e.g., 50 x 10^9 /L) in clinically unstable children, non-ALL patients, or for the first LP in newly-diagnosed ALL patients to avoid haemorrhage and cerebrospinal fluid contamination with blasts, or at lower counts (≤ 20 x 10^9 /L) in stable patients with ALL, depending on the clinical situation. These practices emphasise the importance of considering the clinical setting and patient factors.	
Abbreviations ALL acute lymphocytic leukaemia; BMF bone marrow failure; DIC Disseminated intravascular coagulation; HIT heparin-induced thrombocytopenia; ICH intracranial haemorrhage; ITP primary immune thrombocytopenia; LP lumbar puncture; NAIT neonatal alloimmune thrombocytopenia; PICC peripherally inserted central catheter; PTP post-transfusion purpura; TTP thrombotic thrombocytopenic purpura:	

Appendix 5 Guidance for platelet use in Red Phase

British Society for Haematology Guideline (2016) Adults
British Society for Haematology Guideline (2016 & 2020 addendum) Children, Neonates
Platelet transfusion: principles, risks, alternatives, and best practice

Platelet transfusions are an essential component in the management of selected patients with thrombocytopenia. However, they need to be used judiciously as they are a limited resource and are not risk free.

Prior to prescribing a platelet transfusion consider:

What is the indication for transfusion in this patient?	Can the procedure or intervention be delayed?	Are there any alternatives to platelet transfusion?	Is the patient aware of the benefits, harms, and alternatives to a

Possible alternatives to platelet transfusion:

- Postpone any procedures or surgery that may require a platelet transfusion that are not urgent
- Can the procedure be changed to one with a low risk of bleeding e.g., from percutaneous to trans-jugular liver biopsy?
- Apply surface pressure after superficial procedures and correct surgical causes for bleeding
- Surgical patients expected to have at least a 500 ml blood loss (or >10% blood volume in children), use tranexamic acid (TXA) unless contraindicated
- Trauma patients who are bleeding or at risk of bleeding, early use of TXA
- Severe bleeding replace fibrinogen if plasma concentration less than 1.5 g/L
- Anti-platelet agents - discontinue or if urgent procedure/bleeding use TXA if risk/benefit would support
- Uraemia with bleeding or pre-procedure – dialyse, correct anaemia, consider desmopressin
- Inherited platelet function disorders - specialist haematology advice required. Consider desmopressin
- Chronic Bone Marrow Failure with bleeding – consider TXA

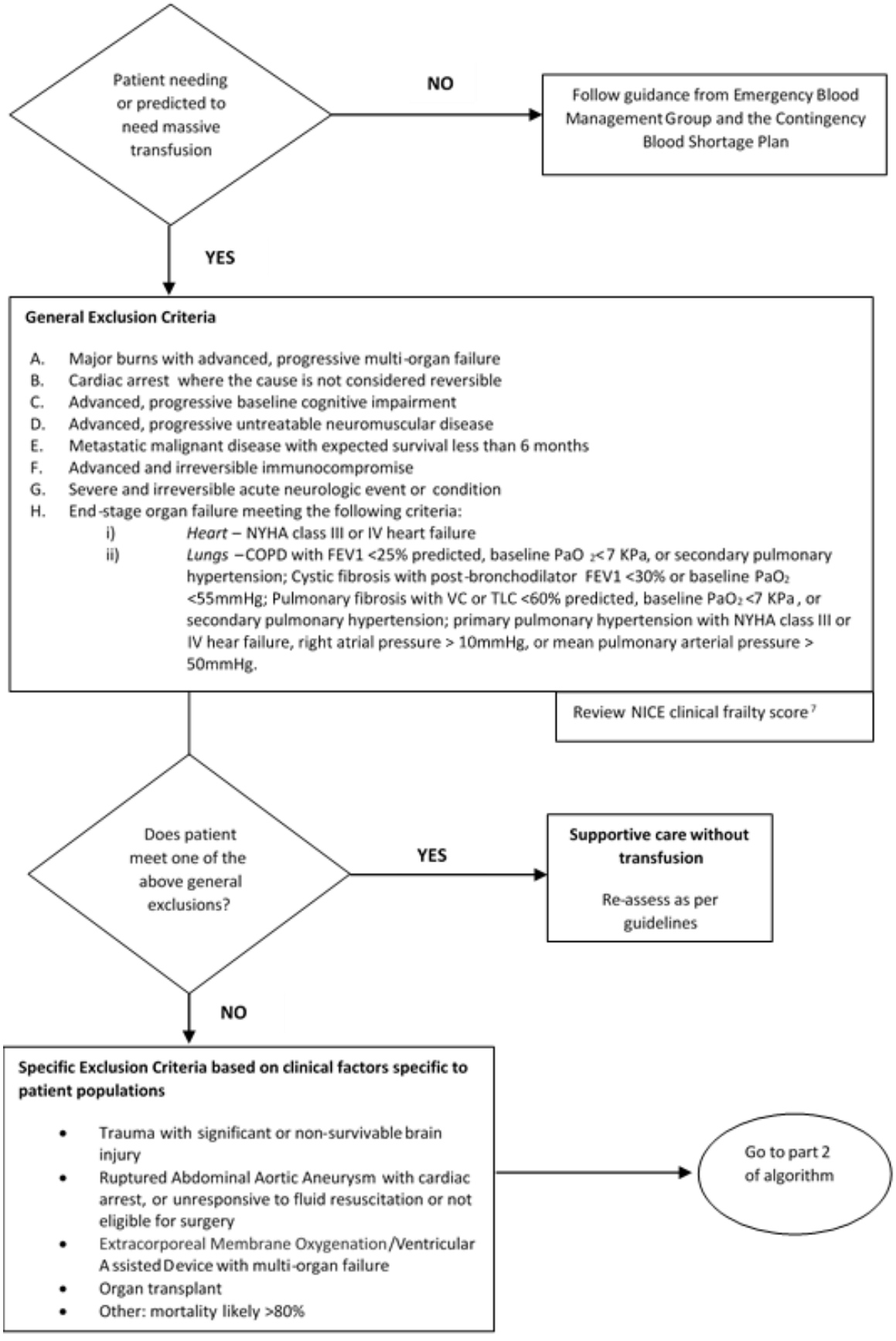
Indication for use of platelet transfusions in adults and children (RED ALERT)	Transfusion indicated (threshold)/ not indicated
Prophylactic use (No bleeding or WHO grade 1)	
• Any cause without additional risk factors for bleeding	**NOT INDICATED**
Prophylactic use in presence of risk factors for bleeding (e.g., sepsis, abnormalities of haemostasis)	
• Reversible or chronic bone marrow failure or critical care – consultant review required	10 to 20 x 10^9/L
• Abnormal platelet function, platelet consumption/destruction (e.g., TTP), immune thrombocytopenia	**NOT INDICATED**
Pre-procedure (Emergency or urgent procedures only)	
• Central venous catheter (CVC) tunnelled or untunnelled (excluding PICC line) • Lumbar puncture* • Percutaneous liver biopsy • Major surgery • Epidural anaesthesia, insertion & removal • Neurosurgery or ophthalmic surgery involving the posterior segment of the eye	20 x 10^9/L 40 x 10^9/L 50 x 10^9/L 50 x 10^9/L 80 x 10^9/L 100 x 10^9/L
• Bone marrow aspirate or trephine biopsies, PICC line insertion, traction removal of central venous catheters (CVCs), cataract surgery, other procedures with low risk of bleeding	**NOT INDICATED**
Therapeutic use (Bleeding WHO grade 2 or above)	

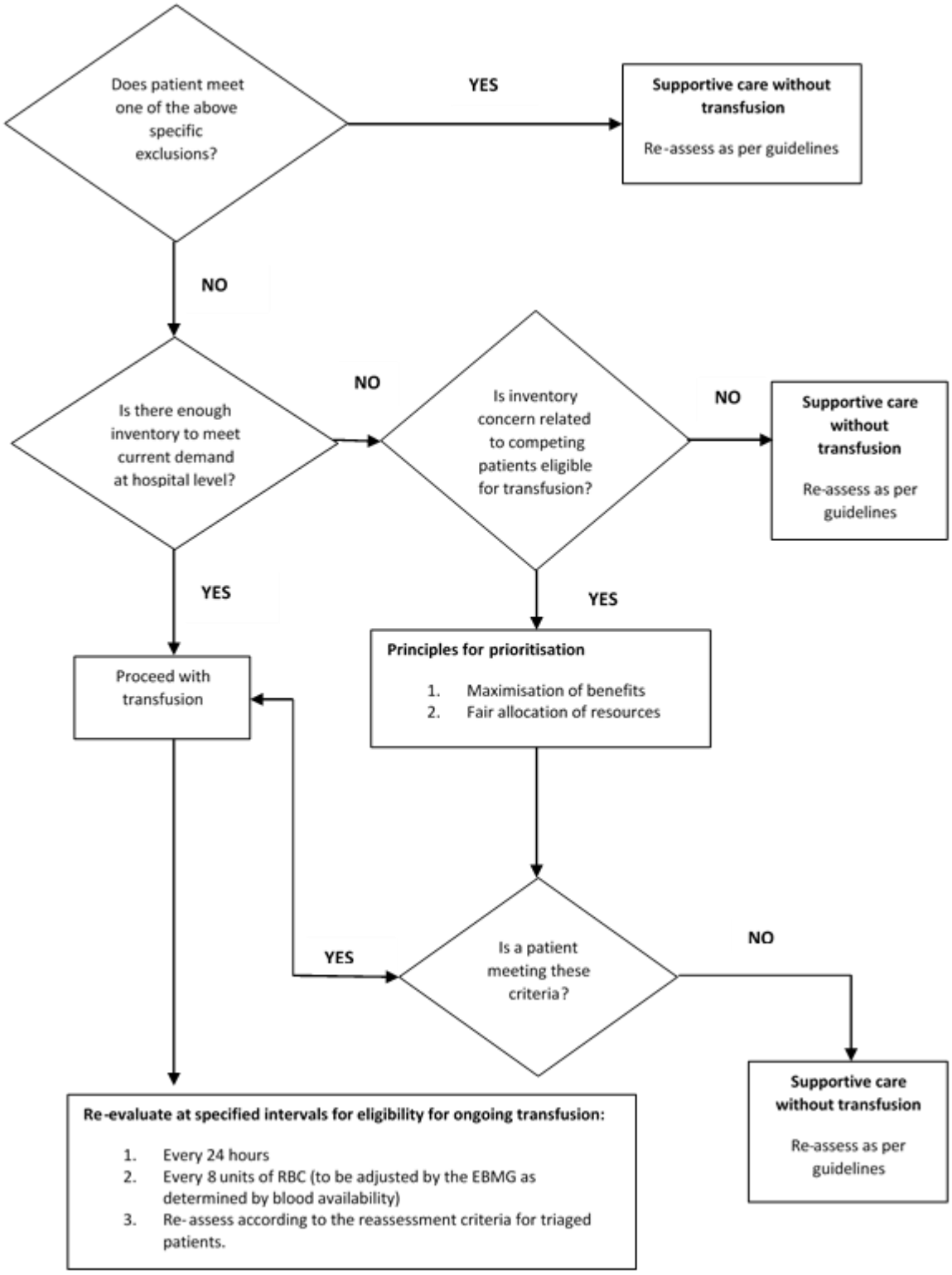
• Severe bleeding • Multiple trauma, brain or eye injury, spontaneous intracerebral haemorrhage • Bleeding (WHO grade >2) but not severe • Bleeding in specific clinical conditions – see table next page for indications	50×10^9/L 100×10^9/L 30×10^9/L
Indication for use of platelet transfusions in neonates (RED ALERT)	**Transfusion threshold) / not indicated**
Prophylactic use (No bleeding or WHO grade 1)	
• Neonate (including very pre-term) • Neonate with NAIT (no family history of ICH)	25×10^9/L 25×10^9/L
Prophylactic use in presence of risk factors for bleeding (e.g., sepsis)	
• Preterm neonate with sepsis • Neonate with NAIT (Family history of ICH)	25×10^9/L 50×10^9/L
Pre-procedure (Emergency or urgent procedures only)	
• Lumbar puncture* • Major surgery • Neurosurgery	40×10^9/l 100×10^9/l 100×10^9/l
• Procedures with low risk of bleeding	**NOT INDICATED**
Therapeutic use (Bleeding WHO grade 2 or above)	
• Severe bleeding	100×10^9/L
Specific clinical conditions	
Platelet function defect	
• *Congenital* – Pre-procedure or therapeutic use. When alternative therapy is contraindicated or ineffective. Directed by specialist in haemostasis. • *Acquired* (anti-platelet agents, uraemia)- only indicated for severe bleeding	Count Variable
Disseminated intravascular bleeding	
• Pre-procedure or therapeutic use.Consider threshold counts above but may not be achievable and individual case review required	Use pre-procedure or therapeutic threshold as guide
Thrombotic thrombocytopenic purpura	
• Platelet transfusion contraindicated	unless life-*threatening bleeding*
Immune thrombocytopenia (excluding NAIT)	
• (ITP, HIT, PTP). Pre-procedure when other therapy ineffective or procedure urgent or to treat severe bleeding. Consider threshold counts above but may be unachievable or unnecessary and individual case review required	Use pre-procedure or therapeutic threshold as guide
Footnotes	
*It is accepted that prior to lumbar puncture some clinicians will transfuse platelets at higher counts (e.g., 50 $\times 10^9$ /L) in clinically unstable children, non-ALL patients, or for the first LP in newly-diagnosed ALL patients to avoid haemorrhage and cerebrospinal fluid contamination with blasts, or at lower counts (≤ 20 $\times 10^9$ /L) in stable patients with ALL, depending on the clinical situation. These practices emphasise the importance of considering the clinical setting and patient factors.	

Abbreviations

ALL acute lymphocytic leukaemia; BMF bone marrow failure; DIC Disseminated intravascular coagulation; HIT heparin-induced thrombocytopenia; ICH intracranial haemorrhage; ITP primary immune thrombocytopenia; LP lumbar puncture; NAIT neonatal alloimmune thrombocytopenia; PICC peripherally inserted central catheter; PTP post-transfusion purpura; TTP thrombotic thrombocytopenic purpura:

Appendix 6 A framework to aid team decision making in massive haemorrhage during severe blood shortage





Algorithm part 2

Appendix 6: Flow chart adapted from National Advisory Committee on Blood and Blood products, Canada. Working group on emergency disposition of blood during a red phase blood shortage. Emergency framework for rationing of blood for massively bleeding patients during a red phase of a blood shortage. 2012

https://nacblood.ca/resources/shortages-plan/emergency-framework-final.pdf

Appendix 7 Situation Report (SITREP)

Emergency Blood Management Arrangement: Situation Report			
Completion and submission of the SITREP is the responsibility of the Hospital Transfusion Team (HTT).			
Blood Bank			
SITREP completed by:			
Contact details of reporter:	Phone:	Email:	
Period covered by SITREP	From: DD/MM/YYYY	To: DD/MM/YYYY	
EBMA status	o EBMA NOT ACTIVATED	o AMBER	o RED

1.0 SITUATION	
Hospital activity (reduced, increased, no change) – *detail if relevant*	
Specific information re: red cells stock levels/demand/usage/wastage	
Specific information re: platelets demand/usage/wastage	
2.0 ACTIONS TAKEN AND ACTIONS PLANNED	
Actions implemented/agreed re stockholding – *give completion/target dates*	
Actions implemented/agreed re restrictive transfusion practice - *give completion/target dates*	
3.0 ISSUES	
Any reportable incidents or complaints directly as a result of blood shortages – *do not use patient identifiable info*	
Any other information to report	
Please complete all fields. If there is nothing to report, or the information request is not applicable, please insert 'no change since last SITREP'	
Email this SITREP nss.snbtsbloodshortage@nhs.scot and save a copy for your EBMG and HTT records Use the filename YYYY-MM-DD EBMA SITREP <YOUR HOSPITAL or HEALTHBOARD> <YOUR INITIALS>	

Instructions for use

This situation report (SITREP) provides a mechanism for recording and reporting information about the activities and issues during blood shortage. It can also be used when blood shortage is anticipated to gather information about predicted changes in clinical service delivery. The SITREP template is to provide a quick, clear and concise understanding of the current situation focusing on *context*, in addition to the facts. Below is guidance to complete the form.

1. Situation to date (what has happened?)

- Brief summary of "hospital activity" – has transfusion activity, increased, decreased? Or is there no change? Add specific detail if relevant. Use this section to record changes to clinical service delivery which might impact on demand for blood components even if the EBMA has not been activated*.
- Summary of information relating to red cells, has stockholding/demand/ usage/ wastage increased or decreased. Is there a specific reason for this change?
- Summary of information relating to platelets has demand/ usage/ wastage increased or decreased? Is there a specific reason for this change?

2. Actions taken and actions planned (what has been done/what will be done?)

- Brief reporting of actions completed to date - typically for the period covered by the SITREP
- Brief reporting of scheduled/planned actions.

3. Issues (what has gone wrong/might go wrong?)

- Brief description of issue(s)/ complaints that are known/reasonably expected to arise directly as a result of the blood shortages, before the next SITREP is issued. Patient identifiable information **MUST NEVER** be used but DATIX, Q-Pulse or other incident reference would be helpful where available.
- If there is any other information to report, please use this section. This could include changes to clinical service delivery which might impact on the demand for blood components* (see section 1.0)

Note:

- Information should be factual and largely without interpretation and conjecture.

- Information should cover the period between the last SITREP and the next SITREP
- SITREPs should be brief and not a narrative.

- Do not leave fields blank - If there is no change since the last SITREP please state – Nil or N/A
- Ensure old information is deleted, and do not just add new/additional info.

References

i HDL (2005) 25 Appendix C EMERGENCY PLANNING – AN INTEGRATED PLAN FOR THE MANAGEMENT OF BLOOD SHORTAGES
https://www.scot.nhs.uk/sehd/mels/HDL2005_25.pdf

ii SNBTS blood bank dashboard (logon and password required)
https://viz.nhsnss.scot.nhs.uk/#/site/NSS/views/Bloodbankdashboard/DashboardOverview?:iid=1

iii Daily issuable stock report (logon and password required)
https://viz.nhsnss.scot.nhs.uk/#/site/NSS/views/SNBTSStocklevels/IssuableStock?:iid=1

NBTC Red Cell and Platelet Shortage Plans April 2023
https://nationalbloodtransfusion.co.uk/recommendation

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[i] HDL (2005) 25 Appendix C **EMERGENCY PLANNING – AN INTEGRATED PLAN FOR THE MANAGEMENT OF BLOOD SHORTAGES** https://www.scot.nhs.uk/sehd/mels/HDL2005_25.pdf

[ii] SNBTS blood bank dashboard (logon and password required)
https://viz.nhsnss.scot.nhs.uk/#/site/NSS/views/Bloodbankdashboard/DashboardOverview?:iid=1

[iii] Daily issuable stock report (logon and password required)
https://viz.nhsnss.scot.nhs.uk/#/site/NSS/views/SNBTSStocklevels/IssuableStock?:iid=1

NBTC Red Cell and Platelet Shortage Plans April 2023 https://nationalbloodtransfusion.co.uk/recommendations