

National Blood Transfusion Committee
**A Plan for NHS Blood and Transplant and Hospitals to Address
Red Cell Shortages**

Updated Version April 2023

Addendum added to Red Phase October 2024

1.0 Executive summary

1.1 A working group of the National Blood Transfusion Committee (NBTC) was tasked with updating the plan written for red cell shortages in 2016. The current document builds on the principals of the original and subsequent plans.

1.2 All hospitals (including those in the private sector) and NHS Blood and Transplant (NHSBT) should work together to reduce the risk of red cell shortages through the management of both the supply and demand for blood.

1.3 This paper updates the integrated plan for blood shortages published in 2022¹ to include a pre-amber stage and lists actions to be taken by both NHSBT and hospitals in the event of a potential or actual red cell shortage. This latest update incorporates the feedback received from hospitals from the Amber alert in October 2022 and July 2024.

1.4 The objective is to ensure that patients who need blood can receive timely transfusion support. The arrangements are designed to ensure that: -

- Red cells units are available for all essential transfusions.
- Overall red cell usage is reduced to ensure supply remains available for the patients who need it most.

1.5 A shortage of red cells may be associated with a platelet shortage. Readers are referred to the NBTC webpage; <https://nationalbloodtransfusion.co.uk/recommendations> for guidelines to address platelet shortage ².

1.6 The red cell and platelet shortage plans operate in similar ways describing four phases dependent on NHSBT stock levels - Green, Pre-Amber, Amber, and Red. The Green phase is focused on implementing the principles of patient blood management (PBM) to ensure appropriate use.

1.7 Addendum added to Red Phase in relation to severe shortage of O D negative red cells, in the event of unavailability of O D negative red cells, to prevent delay in transfusion, use of O D positive red cells for all patients (including those of childbearing potential and children <18years), is acceptable if this would be lifesaving.

1.8 If one or more blood groups are below one day's supply and a compatible alternative group is not available, consultant led prioritisation may need to be undertaken as suggested in section 8.4.3. Increased use of substituted groups can lead to a shortage of other blood groups. There may be insufficient supplies of alternative groups to avoid the need for prioritisation.

2.0 Background

2.1 NHS emergency planning requires the development of contingency plans to ensure the effective use of available blood when blood stocks fall to very low levels. Pre-determined plans will be critical to ensuring transfusion support remains available for the patients who need it most.

2.2 Although severe red cell shortages are rare in the UK, recent experiences have shown the fragility of the blood supply chain when multiple factors are combined with other external issues such as industrial action. Levels of red cell units have been at Pre-Amber for specific blood groups including O D negative at various times for prolonged periods.

2.3 The original integrated plan for the management of red cell shortage included a framework to manage shortages in a variety of situations, including:

- Short term shortages, for example, during bad weather or an influenza outbreak.

- Very acute shortages, for example, security issues which prevent donors coming forward to donate blood, industrial action, and adverse weather.
- Prolonged shortages which could result from several circumstances, for example the introduction of further measures to reduce the risk of disease transmission by transfusion or changes in processing. The COVID-19 pandemic in 2020 also prompted concerns around red cell shortages.
- Unexpected increases in demand for example following a major incident or mass casualty event.

3.0 Rationale

3.1 The framework described below is designed to ensure that NHSBT and hospitals in England work in a consistent, integrated manner to manage red cell shortages.

3.2 The plan is designed to be always accessible even when there is no shortage. Where there are modest reductions in the blood supply, for example <10% reduction, appropriate use / Patient Blood Management (PBM) programmes should help avoid the activation of formal red cell shortage arrangements.

3.3 The appropriate use of donor blood and the use of effective alternatives to blood are important public health and clinical governance issues. This plan is designed to build on actions taken by hospitals to improve transfusion safety and effectiveness in line with the *Better Blood Transfusion*^{3,4,5} and *PBM* initiatives⁶.

4.0 Plan Structure

4.1 The plan is structured to provide a framework of actions for NHSBT and hospitals at four phases. A schematic of the plan is shown in Appendix 1.

- **Green:** Normal circumstances where supply meets demand.
- **Pre-Amber:** Reduced availability of blood for a short or prolonged period

without impact on clinical care.

- **Amber:** Reduced availability of blood for a short or prolonged period with impact on clinical activity.
- **Red:** Severe, prolonged shortages with impact on clinical activity.

4.2 NHSBT will actively strive to minimise the risk of blood shortages. However, if red cell stocks fall to a pre-determined critical level, then NHSBT may activate shortage plans and communicate a move to Pre-Amber or Amber phase after discussions have been undertaken with relevant approval bodies i.e., NHS England, Department of Health, and Social Care (DHSC).

4.3 During the Pre-Amber phase NHSBT will issue a precautionary notification informing all hospitals of potential supply chain issues and asking hospitals to take appropriate actions to protect the blood supply chain. This action is intended to prevent the requirement to move to Amber phase.

4.4 Activation of red cell shortage may apply to either a single blood group or all blood groups. However, should NHSBT identify a severe, imminent threat to the blood supply then, NHSBT may communicate a move directly to the Red phase.

4.5 Hospitals are required to have Emergency Blood Management Arrangements (EBMA) to respond to notifications from NHSBT in a timely manner. The response may require a reduction in both red cell stocks and red cell use. It is recommended that blood use should be prioritised according to the recommendations suggested in Appendix 2.

5.0 NHSBT actions

5.1 National stock levels are monitored daily, and production levels amended to ensure stock levels are kept at the pre-set target level. However, if this does not have the desired impact several wide-ranging actions may be taken. These may include:

- Calling more donors (of all groups, or of a specific group, depending on the nature of the shortage).

- Extending shifts in the manufacturing department to increase production.
- Extending the opening times of static clinics and mobile donor sessions.
- Increased monitoring and movement of the national stock to ensure;
 - stock is distributed according to age and group mix.
 - wastage is kept to a minimum.
- Importing red cell units from other UK Blood Services and other approved providers.

5.2 If these actions are insufficient to mitigate blood supply issues in the short term, NHSBT will declare a shortage and communicate a move to the next appropriate phase.

5.3 NHSBT will send communications to Chief Executives, Medical Directors, Transfusion Laboratory Managers, Transfusion Practitioners, Chair of Regional Transfusion Committees, Consultant Haematologist with responsibility for Blood Transfusion and England EPRR.

5.4 It is responsibility of the Hospitals (and other organisations), to inform NHSBT of any changes in contact details of the above listed positions.

5.5 As necessary, NHSBT will communicate with the Press and Politicians.

6.0 Hospital Emergency Blood Management Arrangements (EBMA)

6.1 It is recommended that each hospital should establish as part of their overall emergency planning, an Emergency Blood Management Group (EBMG) (or equivalent body) with representation from the Medical Director, operational and risk management, key clinical users i.e., leads from Surgery, Anaesthetics, Maternity, Trauma, Emergency Department, Haematology, Medicine, and Hospital Transfusion Teams. Each hospital should have procedures on how a blood shortage is managed utilising existing emergency planning / business continuity arrangements (e.g., Bronze / Silver / Gold command and control structure). It is likely that required members of EBMG will already be represented in existing structures, if not they should be incorporated. The responsibility of the EBMG is to provide strategic guidance and formulate arrangements to manage the appropriate use of red cells in each operational phase, as part of existing emergency plans.

6.2 Proposed generic actions for hospitals at Green, Pre-Amber, Amber, and Red are outlined in Appendix 3. The choice of actions is dependent on the local case mix and configuration of services. Hospitals plans should clarify the roles and responsibilities of staff and give clear guidance for internal communication. Consideration should be given to centralising hospital stock and modification of surgical lists.

6.3 Once the arrangements have been formulated, they should be managed by the Hospital Transfusion Team and re-enforced when required by senior clinical staff representing the main users of blood.

6.4 Should a national red cell shortage occur, NHSBT will activate their emergency plan and will notify Hospital Transfusion Teams to implement the EBMA. In a shortage, actions within hospitals may need to be reviewed daily by either the EBMG or a nominated group of key staff.

6.5 It is essential that the EBMG have senior hospital management support i.e., from the Chief Executive and Medical Director to ensure their effectiveness when they are called into action. Clinical 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 red cells is limited.

6.6 If an Amber shortage is declared, all requests to the transfusion laboratory should be vetted by laboratory staff and referred to hospital Haematology Specialist Registrar or Consultant if request falls outside BSH guidance.

6.7 If a Red Phase shortage is declared, all requests to the transfusion laboratory should be vetted by hospital Haematologists (Registrar or Consultant) or other authorised persons for appropriateness and before the order(s) are placed to the local Hospital Services at NHSBT.

6.8 In all delivery types if Hospital Services is unable to meet a request, and no suitable alternative can be found, this will be referred to the on call NHSBT Consultant.

7.0 Indications for transfusion

7.1 The indications for transfusion provided below are taken from UK national guidelines for the use of blood components and are provided in the [Indication Codes for Transfusion](#) ⁷. Although it is accepted that clinical judgement plays an essential part in the decision to transfuse or not, the purpose of drawing available transfusion guidelines together into a single table is to help clinicians prioritise the use of blood transfusion. It is recommended that the national indication codes for blood transfusion are used to document the indication for transfusion. It should be noted these are based on current guidelines and may change depending on new evidence.

7.2 It is assumed that many patients undergoing elective surgical operations should not require transfusion support if their haemoglobin concentration is normal before surgery. Assuming normovolaemia has been maintained, the haemoglobin can be used to guide the use of red cell transfusion.

7.3 Measures to avoid the use of blood transfusion include pre-operative iron replacement for iron deficiency anaemia, and the use of tranexamic acid for surgical

patients likely to have at least moderate blood loss (>500ml) or >10% blood volume loss in children and patients weighing less than 50kg.

7.4 Overdependence on group O D negative red cells may have a negative impact on the management of this scarce resource. Blood services worldwide encounter recurrent shortfalls of group O D negative red cells. It is accepted that certain groups of patients benefit more than others from the use of this valuable blood component. It is important that patients are prioritised with respect to their transfusion needs to identify those where the use of group O D negative cells is essential. Group O D positive red cells may be used for males and patients of non-childbearing potential where no anti-D alloantibody is detectable. Hospitals are directed to the [NBTC guidelines for the appropriate use of group O D negative red cells](#) ⁸.

7.5 The provision of group O red cell units for use in the pre-hospital setting may also need review. The care in this setting is Consultant-led and the decision to suspend the supply needs multidisciplinary agreement as to whether the service is suspended, or the provision of the number of red cell units provided is reduced. In addition, all efforts should be made to ensure that unused red cell units are returned to stock.

8.0 Operation of the Plan (see Appendix 3 for specific actions at each phase)

8.1 Green Phase

8.1.1 Hospitals will develop their EBMA and integrate these within their emergency incident plans. The EBMA will define which members of staff will participate in the shortage management and how a reduction in usage will be achieved.

8.1.2 During the Green phase NHSBT will continue to develop communications and logistics plans to support hospitals as effectively as possible during shortages.

8.1.3 Use of red cells should be monitored to ensure appropriate use.

8.1.4 Use of red cells for procedures using large volumes of red cells should be reviewed regularly for target aims and wastage e.g., review blood usage and HbS% targets for patients undergoing regular automated red cell exchange.

8.1.5 Hospital transfusion laboratory teams should enter component stock levels and wastage data daily into [VANESA](#)⁹. Inventory management resources from Blood Stock Management Scheme can be found [here](#)¹⁰.

8.2 Pre-Amber Phase

8.2.1 Clinical teams in Hospitals should take the following actions

- Ensure EBMA are in place and that the EBMG can be convened quickly if needed. This is in anticipation of a potential Amber alert should the situation not improve. It is recommended that the Medical Director is alerted at the potential move to Amber and the implications of this move.
- Review haemoglobin triggers for red cell transfusions with use of restrictive transfusions as per evidence-based Patient Blood Management guidance.
- Use tools available to support decisions to administer transfusions and to consider alternatives to blood including the [Blood Components App](#)¹¹ summarising national clinical indications for transfusions and the Patient Blood Management toolkit.
- If contacted by NHSBT for recruitment of specific blood groups of donors, ensure communications are relayed by advertisement on the local intranet requesting staff who are regular blood donors to arrange appointment with local donation centre.

8.2.2 Transfusion laboratory teams in hospitals should take the following actions

- Reduce stockholding of red cells where possible. Even a small reduction in stockholding in every hospital will make a significant difference overall.
- Conserve group O D negative red cells for group O D negative patients in line with guidelines.
- Transfuse group specific blood wherever possible.

- Enter daily red cell stock levels into [VANESA](#) ⁹. This will help NHSBT determine the precise blood supply status at all times to inform actions.
- Accept shorter dated red cells where you are confident that they can be used.
- Avoid requesting fresh red cells for stock.
- Start communications with senior clinicians/high users about potential move to Amber phase and the consequences of this.

8.2.3 Transfusion laboratory teams in hospitals will be asked to consider if it is safe to:

- Reduce reservation periods.
- Reduce levels of stock in remote fridges.
- Reduce levels of irradiated stock and ordering more often as needed.
- Limit requests for phenotyped units for stock and order on a named patient basis only.

8.3 Amber Phase

8.3.1 If national stocks ([Blood stocks - Hospitals and Science - NHSBT](#) ¹²) fall to less than 2 days or an imminent threat to the blood supply is identified, NHSBT will communicate a move to Amber phase. This may apply to either a single blood group or to all blood groups.

8.3.2 Information from NHSBT about blood shortages will be communicated to hospitals by several channels e.g., Online Blood Ordering Messaging screen (OBOS), email, or mass messaging technology where appropriate. Hospital Business Continuity plans should ensure reliable and tested methods are available for communication with NHSBT at all times.

8.3.3 The information from NHSBT will include the nature of the shortage and any actions needed to be taken by hospitals as part of their EBMA. At this stage, hospitals should activate their EBMA to confirm any actions to be taken.

8.3.4 Hospitals may be expected to revise their usage and/ or stockholding further during the Amber phase.

8.3.5 If patient care is adversely affected by the red cell shortage, the responsibility for communicating this to the patient i.e., duty of candour lies with the Hospital Consultant in charge of the patient. Advice can be sought from NHSBT Consultant as required.

8.3.6 If stocks of red cells return to a sustainable level, NHSBT will communicate to hospitals the return to Green phase. If, however, stocks continue to fall, NHSBT may communicate that a greater reduction in usage is required. This may be within the Amber phase or be accompanied by the declaration of a move to Red phase.

8.4 **Red Phase**

8.4.1 NHSBT will declare a Red phase shortage if there is a severe shortage of red cells or, if an imminent severe threat to the supply of red cells is identified. The Red phase will be divided according to number of days of supply, Red B is between 0.5-1.0 days' supply of stock, Red A is less than 0.5 days' supply of stock.

8.4.2 NHSBT will communicate with hospitals as in the Amber phase. The information will include the nature of the shortage and any actions that need to be taken by hospitals as part of their EBMA. Actions will include a further reduction in stockholding and a reduction in usage by a percentage (based on normal use).

8.4.3 Hospitals are directed to the [NBTC guidance and triage tool for the rationing of blood for massively bleeding patients during a severe national blood shortage](#)¹³, adapted from the Canadian guidance¹⁴ for UK practice, Appendix 5a and 5b outlines the algorithm for triaging patients in the context of severe national shortage. The Recommended Summary Plan for Emergency Care and Treatment ([ReSPECT](#))¹⁵ (Appendix 5c) can be used to document decisions made by multidisciplinary teams in an emergency.

8.4.4 If patient care is adversely affected by the red cell shortage, the responsibility for communicating this to the patient i.e., duty of candour lies with the Hospital Consultant in charge of the patient. Advice can be sought from NHSBT Consultant as required.

9.0 Impact and monitoring of shortages

9.1 Most declared shortage scenarios will need to be accompanied by a reduction in red cell usage by hospitals.

9.2 Where the required reduction in usage is quite small it is anticipated that hospitals will be able to achieve this through the implementation of appropriate use measures. However, hospitals may have to consider postponement of procedures in category 2 (Appendix 2) to achieve the required reductions in usage. In a prolonged shortage this will inevitably have an impact on elective surgery and waiting lists. In a more severe shortage, reductions in usage will need to be achieved by postponement of some or all procedures in category 2. Where, for example, 50% or more of the red cell supply becomes unavailable it is likely that only patients in category 1 would be treated.

9.3 Hospitals should report adverse incidents in patients or with the operation of this plan through local governance systems, SHOT, SABRE and with NHSBT as needed. SHOT reporting criteria can be found via this [link](#)¹⁶.

9.4 During shortages NHSBT will monitor blood usage in hospitals. It is recognised that hospital caseloads and case-mix vary, but where hospitals are unable to meet the recommended reductions in stockholding and use, the Haematologist with responsibility for blood transfusion or the Transfusion Laboratory Manager will be expected to discuss the hospital needs with an NHSBT Consultant, Hospital Customer Service Manager, or member of the PBM Team. NHSBT will work closely with the Regional Transfusion Committees, the National Blood Transfusion Committee and Hospital Trusts to support and share good practice.

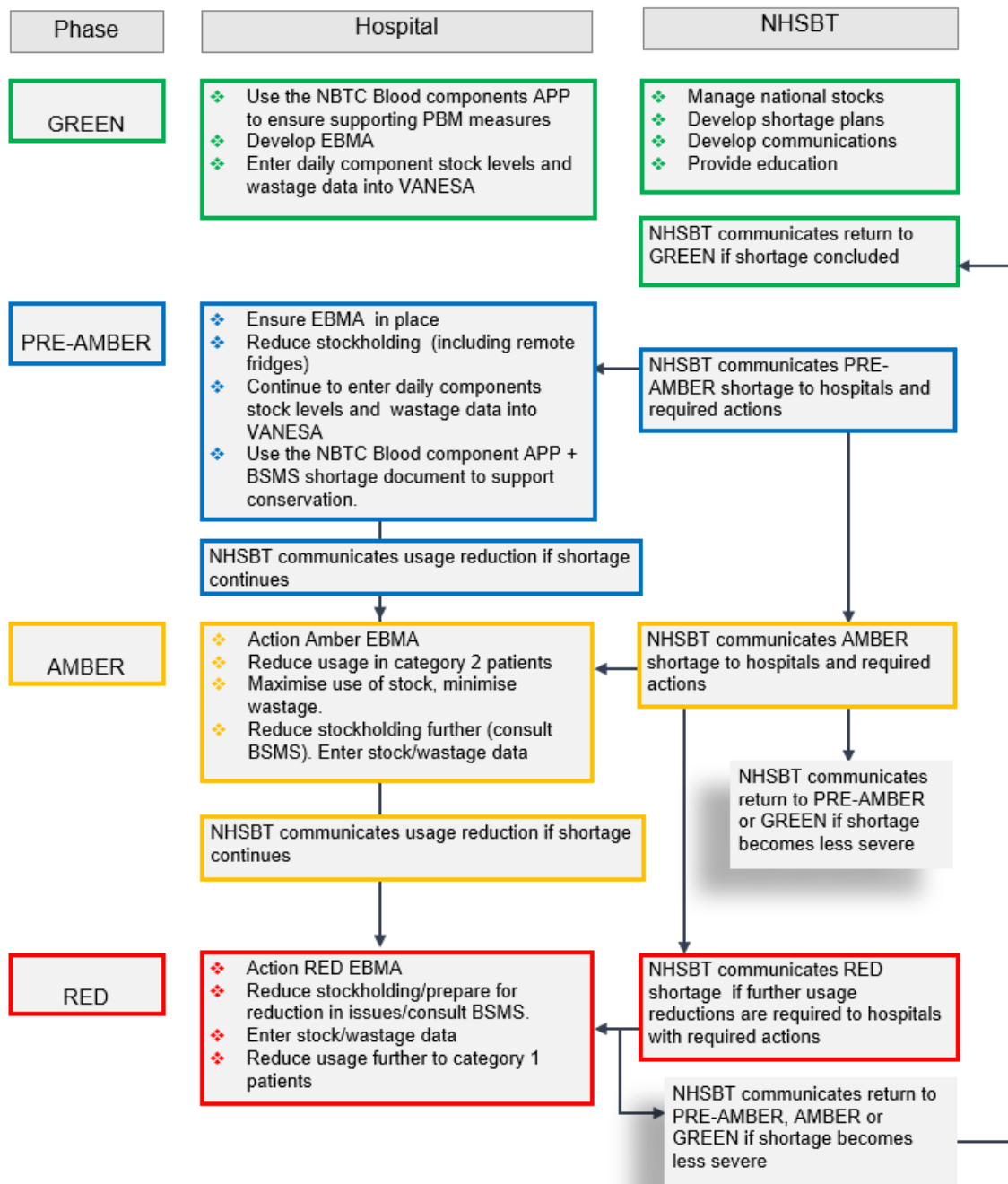
10.0 Recovery from shortages

10.1 NHSBT will contact the Transfusion Laboratory to tell them that stocks have risen to a level where hospitals can move to Pre-Amber, Amber, or Green phase.

10.2 The EBM Group may be needed to convene should the hospital be considering a return to normal operations, as it will be essential that blood component supplies are considered first.

10.3 The Transfusion Team will disseminate the information as above. The EBM Group should convene at the earliest opportunity to review the effect of the red cell shortage and amend the local arrangements as necessary. The recovery plan should be communicated to staff and the blood provider.

Appendix 1: Schematic of red cell shortage plan



Vanessa- Data entry recommendations

Green	Daily component stock levels advised. Wastage data at least monthly advised.
Pre-Amber	Daily component stock levels strongly recommended. Wastage data at least monthly advised.
Amber	Daily component stock levels strongly recommended. Wastage data at least weekly advised.
Red	Daily component stock levels mandatory. Supply wastage data immediately upon wastage of unit (this may be daily) or if local traceability procedures do not allow at least weekly.

Appendix 2: Indication for transfusion

To simplify the management of patients in a general red cell shortage a traffic light system has been created using three broad patient categories. This is to assist hospitals with prioritising patients to achieve the required reduction in red cell usage. It is recognised that clinical judgement and context of the shortage are essential parts of decision-making.

OPTIMISE ALL PATIENT BLOOD MANAGEMENT STRATEGIES			
Category 1 (RED Phase)		Category 1 (Red Phase) continued	Category 2
<0.5days of stock (RED A)	0.5-1day of stock (RED B)		
These patients will remain highest priority of transfusion		These patients will not be transfused in the RED phase	These patients will not be transfused in the AMBER phase
<p>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 3).</p> <p>Transfusion-dependent anaemias including thalassaemia Review the need for transfusion and delay if not symptomatic with anaemia.</p> <p>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.</p>		<p>Surgery*/Obstetrics Cancer surgery (palliative). Symptomatic but not life- threatening post-operative or post-partum anaemia. Urgent*** surgery.</p> <p>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.</p>	<p>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.</p>
<p>Surgical*support</p> <p>Priority 1a *procedures can be supported with donor blood with exceptions**</p> <p>Priority 1b emergency procedures CANNOT be supported with donor blood.</p> <p>These should be reviewed on a case-by-case basis e.g., taking into consideration blood group and correction of anaemia.</p>	<p>Surgical*support</p> <p>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.</p>	<p>Non-surgical anaemias Symptomatic but not life-threatening anaemia.</p>	<p>Chronically transfused patients</p> <p>1) Haemoglobinopathy Patients on Red Cell Exchange (RCE) programme</p> <p>a) Reassess use of red cells during previous red cell exchanges to ensure optimising red cell component usage.</p> <p>b) If available, use the depletion mode in the Apheresis machine if safe to do so and if it results in less blood use.</p> <p>c) Consider increasing interval for RCE.</p>

			<p>d) Consider top up red cell transfusion post partial exchange to reduce number of red cells needed.</p> <p>2) All Patients (including haemato-oncological patients receiving chemotherapy) Reduce transfusion threshold to 70g/L if no contraindication.</p> <p>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.</p>
<p>Non-surgical anaemias</p> <p>Continue to transfuse</p> <p>a) in life-threatening anaemia including patients requiring in-utero support and high dependency care/SCBU.</p> <p>b) Stem cell transplantation, or chemotherapy already commenced****</p> <p>Review cadaveric organ transplants and delay, if possible, particularly if large volume of blood may be required i.e., cardiac / liver transplant</p>	<p>Delay starting</p> <p>a. Stem cell transplantation, or chemotherapy</p> <p>b. Living related organ transplantation</p> <p>Delay prophylactic transfusion</p> <p>a. in severe bone marrow failure syndrome if patient not symptomatic with anaemia.</p>		

*[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: Proposed actions for hospitals at each phase

Green Phase

Secure appropriate arrangements for Patient Blood Management and the appropriate use of blood

- Obtain senior management and NHS Trust Board commitment.
- Secure appropriate membership and functioning of the Hospital Transfusion Committee (HTC) and Hospital Transfusion Team (HTT) including staffing and resources (see Annex A).
- Ensure that effective blood transfusion policies for the appropriate use of red cells are in place, implemented and monitored ¹⁸.
- Ensure that education and training are provided to all staff involved in the process of blood transfusion and is included in the induction programmes for relevant new staff.
- Consider the establishment of links between hospital blood transfusion laboratories to utilise regional stocks more effectively.
- Enter daily stocks levels and wastage figures into VANESA.

Ensure the appropriate use of blood and the use of effective alternatives in every clinical practice where blood is transfused

- Implement existing national guidance on the appropriate use of blood and alternative.
- Ensure that guidance is in place for the medical and surgical use of red cells, and other blood components such as platelets and fresh frozen plasma.
- Ensure regular monitoring and audit of usage of red cells, platelets, and fresh frozen plasma in all clinical specialities.
- Use of red cells for procedures using large volumes of red cells should be reviewed regularly for target aims and wastage e.g., review blood usage and HbS% targets for patients undergoing regular automated red cell exchange.

- Establish local protocols to empower blood transfusion laboratory staff to ensure that appropriate clinical information is provided with requests for blood transfusion.
- Establish local protocols to empower blood transfusion laboratory staff to query clinicians about the appropriateness of requests for transfusion against local guidelines for blood use.

Secure appropriate and cost-effective provision of blood transfusion and alternatives in surgical and obstetric care

Pre-Amber Phase

Clinical teams in Hospitals should take the following actions:

- Ensure EBM arrangements are in place and that the EBM group can be convened quickly if needed. This is in anticipation of a potential Amber alert should the situation not improve. It is recommended that the Medical Director is alerted at the potential move to Amber and the implications of this.
- Review haemoglobin triggers for red cell transfusions with use of restrictive transfusions as per evidence-based Patient Blood Management guidance.
 - Use tools available to support decisions to administer transfusions and to consider alternatives to blood including the 'Blood Component App' summarising national clinical indications for transfusions and the Patient Blood Management toolkit.
 - If contacted by NHSBT for targeted donation i.e., specific group(s) that maybe low, to ensure communication is relayed by advertisement on the local intranet to request for staff who are regular donors to arrange appointment with local donation centre.

All patients

- Minimise iatrogenic anaemia (reduce frequency or volume), take samples from patients only if this will change clinical management.

- Use a restrictive red cell transfusion threshold, haemoglobin of 70 g/L unless patient is bleeding, has acute coronary syndrome, or is on a chronic transfusion programme.
- Transfuse one unit of red cells at a time (or equivalent volumes calculated based on body weight for children from 1 year of age, or adults with low body weight), in patients who are not bleeding or on a chronic transfusion programme. Reassess the patient clinically and with a further blood count to determine if further transfusion is needed.

Surgical patients

- Ensure patients with anaemia who are due to have elective surgery are properly diagnosed and treated prior to the planned surgery.
- Ensure early pre-assessment of patients in priority categories P2-3, check haematinic status, and treat deficiencies with appropriate supplement. Early screening for anaemia and other significant comorbidities is recommended by other NHSE guidance and can be supported by using Hemocue or similar point of care devices.
- Optimise care of patients in P1 category with iv iron infusions pre-operatively or at induction.
- Review preoperative haemoglobin concentration and expected blood loss. If preoperative haemoglobin low or intraoperative blood loss could be greater than 500ml (in adults) use tranexamic acid and cell salvage unless contraindicated. Contraindications to either tranexamic acid or cell salvage should be documented.
- Ensure that operating theatres have adequate access to cell salvage equipment and appropriately trained staff to deliver cell salvage when it is indicated.
- Use point-of-care coagulation testing to guide intraoperative blood component management.
- Consider use of post-operative iv and/or oral iron in anaemic patients to avoid need for transfusion.

Patients requiring or who may require a chronic transfusion programme

- Use alternatives to transfusion, where appropriate (MDS guidance, oncology guidance).
- Review local protocols for red blood cell transfusions if they are used to maintain haemoglobin concentration above a target level during curative radiotherapy (e.g., in cervical or head and neck cancers). The evidence that transfusion improves cancer outcomes in this situation is of poor quality.
- Red cell exchange for haemoglobinopathy patients:
 - Reassess use of red cells during previous red cell exchanges to ensure optimising red cell component use.
 - If available, use the depletion mode in the Apheresis machine if safe to do so and if it results in less blood use.

Transfusion laboratory teams

- Use the Emergency Blood Management Arrangements (EBMA) [checklist](#) (Appendix 4).
- Use the recommended guidance provided by the Blood Stocks Management Scheme (BSMS) to reduce stock orders.
- Reduce stockholding of red cells where possible.
- Conserve group O D negative red cells for O D negative patients in line with guidelines.
- Transfuse group specific red cells wherever possible.
- Remove age requirement for red cells used for red cell exchanges in haemoglobinopathy patients. Age requirements are not in place in other countries that use red cell exchange in sickle cell disease.
- Enter daily red cell stock levels and wastage data into VANESA.
- Accept shorter dated red cells where you are confident that they can be used.
- Start communications with senior clinicians/high users about potential to move to Amber phase and the consequences of this.
- Consider if it is safe to do so:
 - reducing reservation periods.
 - reducing levels of stock in remote fridges.
 - reducing levels of irradiated stock and ordering more often.
 - limiting requests for phenotyped units for stock and order on a named patient basis only.

- Any delays to transfusion or avoidable transfusion should be reported to [Serious Hazards of Transfusion \(SHOT\)](#) ¹⁶.

These guidance from NHSBT and other organisations can be found in this [link](#) ¹².

Additional actions in the Amber Phase

All patients

- Decision to transfuse should be consultant led in **all cases** unless it is an emergency.
- Where component use is prolonged in major haemorrhage, trauma scenario or pre-hospital setting, review transfusion support in clinical cases where component use is prolonged or of significant quantity to consider the appropriateness of continued treatment.
- The clinical team should liaise with the hospital transfusion laboratory and consider the availability of blood components.
- Consideration should be given to reviewing the transfusion trigger for all transfusions particularly in haemato-oncological or critical care unless contraindicated.

Surgical

- Continuation of elective surgery will depend on red cell stock levels.

Patients requiring or who may require a chronic transfusion programme

- Use alternatives to transfusion, where appropriate, e.g., iv iron or Erythropoietin (MDS guidance, oncology guidance).
- Review local protocols for red blood cell transfusions if they are used to maintain haemoglobin levels above a target level during curative radiotherapy (e.g., in cervical or head and neck cancers). The evidence that transfusion improves cancer outcomes in this situation is of poor quality.

Red cell exchange for haemoglobinopathy patients

- Consider where possible, exchanging to a higher post HbS% and then giving a simple top transfusion.

- Reconsider bringing HbS% post exchange to below 15%. To achieve this often requires many additional units because at lower HbS% levels you are removing mostly transfused blood. Other mechanisms of maintaining a sufficiently low HbS% could include aiming at a higher haemoglobin following the exchange.
- Reassess use of red cells during previous red cell exchanges to ensure optimising red cell component use.
- If available, use the depletion mode in the Apheresis machine if safe to do so and if it results in less blood use.

Transfusion laboratory teams

- Decrease stock holding when safe to do so using the recommended guidance provided by the Blood Stocks Management Scheme.
- Consider a reduction in the reservation period for blood wherever possible.
- Consider the use of temperature loggers in blood boxes to reduce wastage because of uncertainty in cold chain management.
- Consider the further reduction or removal of stock in Remote Issue fridges especially those in locations used for elective surgery.
- Any delays to transfusion or any avoidable transfusion incidents should be reported to [Serious Hazards of Transfusion \(SHOT\)](#) ¹⁶.
- Consider sharing stock between sites/Trusts.

These guidance from NHSBT and other organisations can be found in this [link](#) ¹².

In all delivery types except in an emergency, if Hospital Services is unable to meet a request and no suitable alternative can be found, this will be referred to the on-call NHSBT Consultant.

Additional actions in the Red Phase

- Entry of daily red cell stock levels and wastage data into VANESA is **mandatory**.
- NHSBT may request a reduction in stock levels down to a given level on an individual hospital basis.

- EBM Group to review red cell stock levels and the impact of the blood shortage on patient care as frequently as needed.
- All requests for blood components to be reviewed by the blood transfusion laboratory supported by the Consultant in charge of transfusion to minimise inappropriate requests for this Red Phase.
- Consider where possible the removal of all red cell stock from remote issue fridges, except for emergency units, and issue blood components directly from the laboratory.
- Sites with no on-site laboratory will need to ensure transportation is maintained to ensure adequate blood component availability.
- Clinical teams are advised to consider following the [NBTC guidance and triage tool for the rationing of blood for massively bleeding patients during a severe national blood shortage](#) ¹³ which outlines the algorithm for triaging patients ^{13,14} in the context of severe national shortage.
- In severe shortage of O D negative red cells, in the event of unavailability of O D negative red cells, to prevent delay in transfusion, use of O D positive red cells for all patients (including those of childbearing potential / children <18years), is acceptable if this would be lifesaving. The benefits of transfusing O D positive red cells significantly outweigh the risk of antibody development ¹⁹⁻²¹. Where possible this decision should be led by senior clinicians.
- Where O D positive red cells have been transfused due to unavailability of O negative red cell, ensure that this is reported through local clinical governance structures and to SHOT.
- If O D positive red cells are transfused to a patient who is of childbearing potential, ensure local haematologists are aware of transfusion, to review appropriateness of administration of prophylactic anti-D.
- If one or more blood groups are below one day's supply and a compatible alternative group is not available, consultant led prioritisation may need to be undertaken as suggested in section 8.4.3. Increased use of substituted groups can lead to a shortage of other blood groups. There may be insufficient supplies of alternative groups to avoid the need for prioritisation.
- In the event of insufficient supplies prioritisation may not be possible.
- Any delays to transfusion or any avoidable transfusion incidents should be reported to [Serious Hazards of Transfusion \(SHOT\)](#) ¹⁶. Ensure duty of

candour is completed (see section 8.4.4) if O positive red cells have been unavoidably transfused in place of O negative red cells.

In all delivery types except in an emergency, if Hospital Services is unable to meet a request and no suitable alternative can be found, this will be referred to the on-call NHSBT Consultant.

Appendix 4: Emergency Blood Management Arrangement Checklist

Checklist: Emergency Blood Management Arrangements

This guidance has been developed in conjunction with the National Blood Transfusion Committee (NBTC) red cell, platelet and plasma shortage plans and aims to create a short and concise series of steps to follow in the case of shortage.



Click on the white boxes to tick each step

Checklist for green
This is the business as usual phase of the EBMA

Clinical teams to ensure:

1. your EBMA plan is up to date
2. members of Emergency Blood Management (EBM) Group are aware of the plan
3. PBM strategies (anaemia treatment, cell salvage, adherence to national indication codes) are followed
4. familiarity with trust Emergency Preparedness Resilience and Response (EPRR) plans and command structures
5. communications are drafted for use if a move to amber/red is required
6. stock confirmation of Anti D, Tranexamic acid, Fibrinogen, Albumin, Lyoplas, Octaplas and Desmopressin - ensure process to order additional stocks is established
7. process agreed for the review of appropriateness of blood requests with haematology clinicians as needed
8. daily stock levels and wastage are entered into VANESA

Checklist for pre-amber:

1. Ensure EBMA arrangements in place
2. Reduce stockholding (inc. remote fridges)
3. Enter daily stock levels and wastage into VANESA
4. Use the NBTC Blood component APP to ensure supporting PBM measures

Checklist for amber
NHSBT will inform transfusion team that amber alert declared.

General:

1. Activate EBMA and convene EBM group
2. Prepare to report stock levels and decisions made by EBM group for escalation trust-wide
3. Arrange trust-wide communications (screensavers, emails, newsletters)
4. Review satellite fridge stock
5. Consider pharmaceutical alternatives in appropriate patients with EBM group and disseminate decision
6. Contact areas where transfusions may stop
7. Reprioritise prophylactic transfusions
8. Enter daily stock levels and wastage into VANESA

Red cells:

1. Consider, are all PBM methods being used, review scale up?

Platelets:

1. Use reduced dose platelets (if available) for non bleeding patients
2. Consider D positive platelets for D negative patients (cover with anti-D)

Plasma:

1. Consider conserving AB plasma for group AB patients

Checklist for red
The move to red phase will be communicated to trusts if there are severe shortages of either red cells, plasma or platelets.

Complete all amber actions.

General:

1. Launch rota for senior haematology clinicians to support laboratory in vetting requests
2. Update communications to reflect change to red phase
3. Remove all stock from satellite fridges except emergency group O from acute areas e.g. ED and maternity
4. Contact clinical areas where transfusions will not take place.

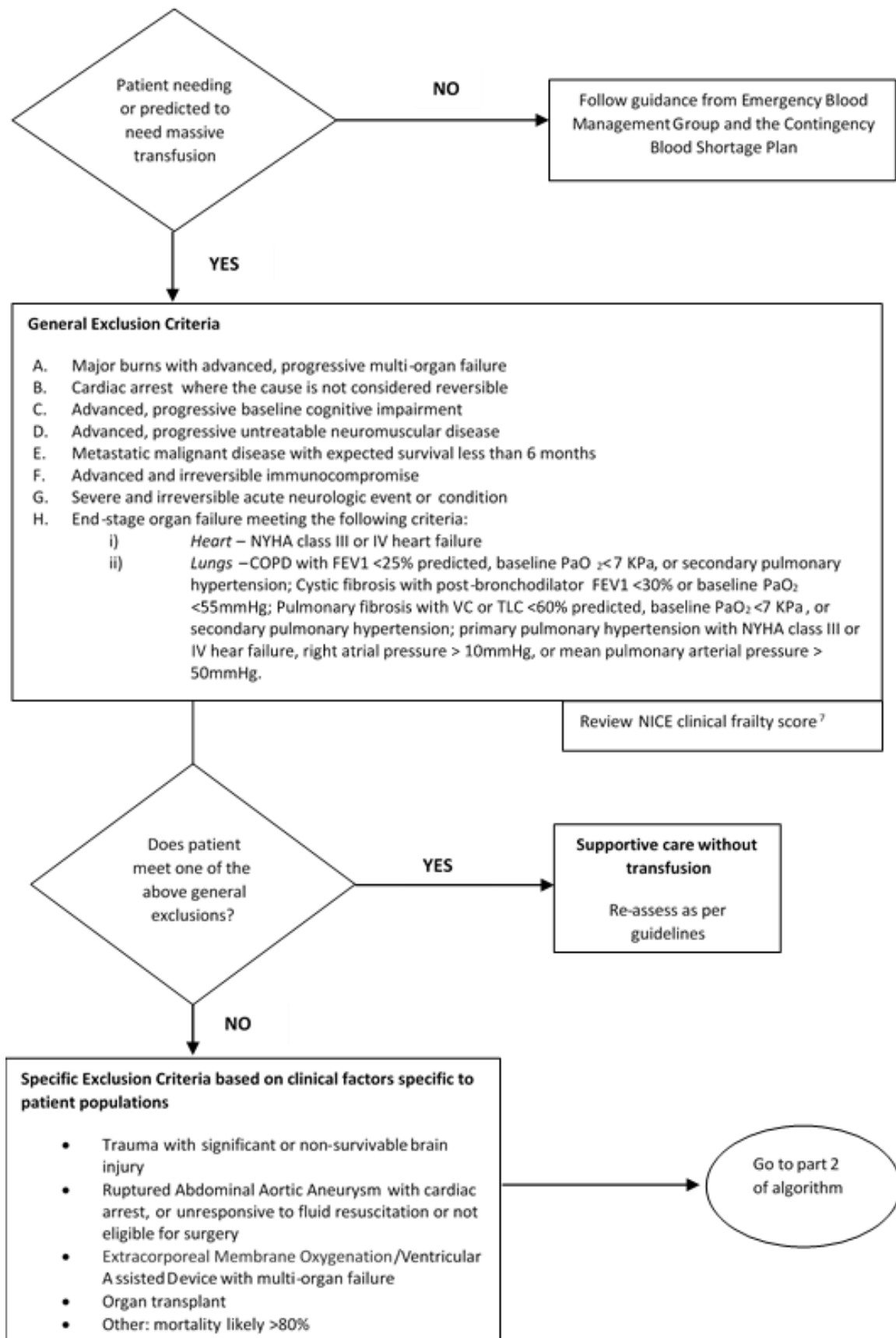
Recovery phase:
NHSBT will inform the transfusion team of return to 'green' phase.

1. Convene the EBM group
2. Ensure that change in clinical activity reflects blood stock levels
3. Use trust-wide communications to update staff

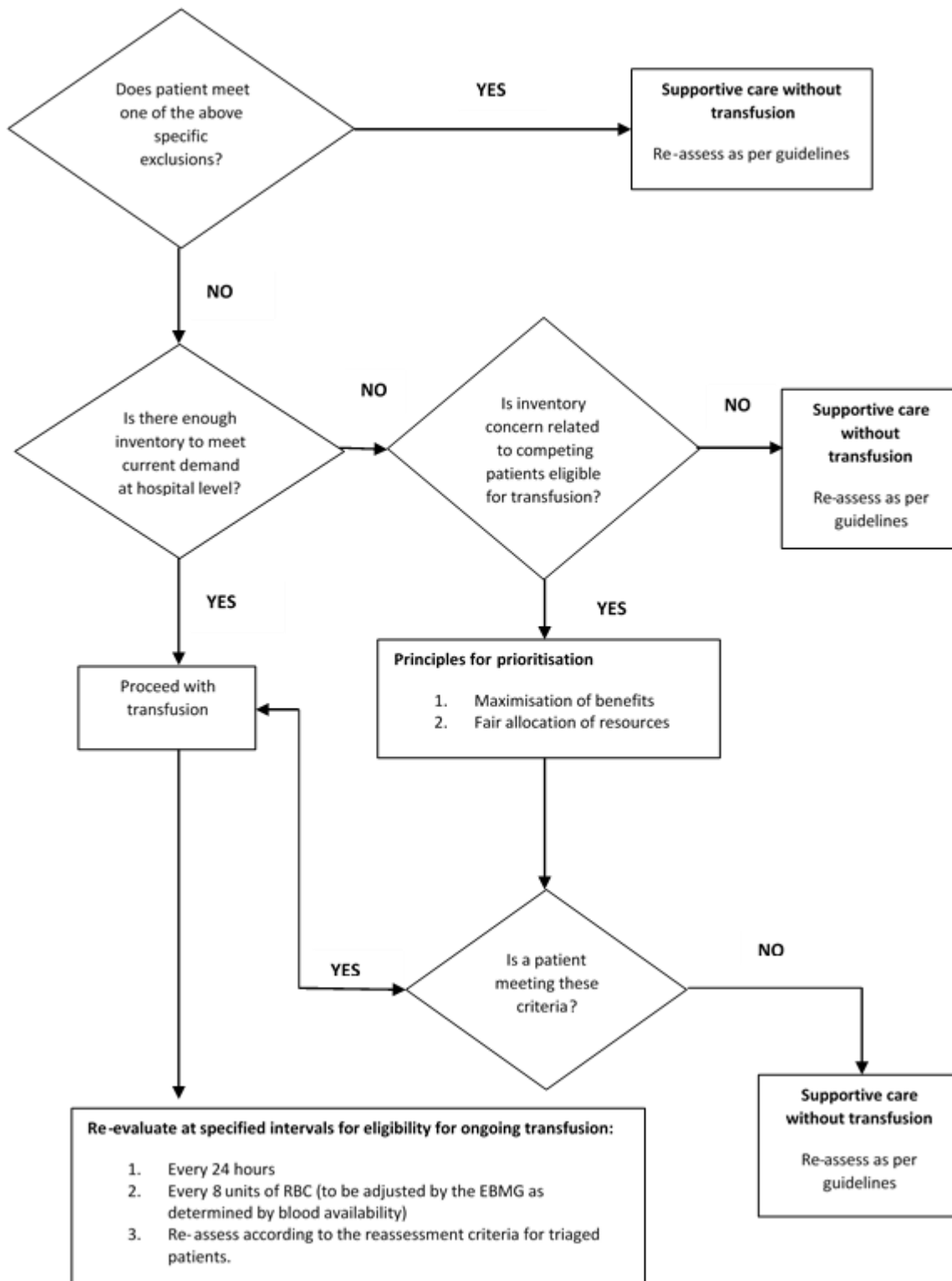
[CLICK HERE](#)
for more
information



Appendix 5a: Emergency Framework for Blood Rationing in the context of severe national shortage - Algorithm for Triage Team (Part 1)



Appendix 5b: Emergency Framework for Blood Rationing in the context of severe national shortage- Algorithm for Triage Team (Part 2)



This flow chart has been 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. 2012¹⁴.

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

Appendix 5c: ReSPECT Recommended Summary Plan for Emergency Care and Treatment

**Recommended Summary Plan for
Emergency Care and Treatment for:**

Preferred name

1. Personal details

Full name

Date of birth

Date completed

NHS/CHI/Health and care number

Address

ReSPECT

2. Summary of relevant information for this plan (see also section 6)
Including diagnosis, communication needs (e.g. interpreter, communication aids) and reasons for the preferences and recommendations recorded.

Details of other relevant planning documents and where to find them (e.g. Advance Decision to Refuse Treatment, Advance Care Plan). Also include known wishes about organ donation.

ReSPECT

3. Personal preferences to guide this plan (when the person has capacity)

How would you balance the priorities for your care (you may mark along the scale, if you wish):

Prioritise sustaining life, even at the expense of some comfort

Prioritise comfort, even at the expense of sustaining life

Considering the above priorities, what is most important to you is (optional):

ReSPECT

4. Clinical recommendations for emergency care and treatment

Focus on life-sustaining treatment as per guidance below

Focus on symptom control as per guidance below

Now provide clinical guidance on specific interventions that may or may not be wanted or clinically appropriate, including being taken or admitted to hospital +/- receiving life support.

CPR attempts recommended Adult or child

For modified CPR Child only, as detailed above

CPR attempts NOT recommended Adult or child

ReSPECT

5. Capacity and representation at time of completion

Does the person have sufficient capacity to participate in making the recommendations on this plan? Yes / No

Do they have a legal proxy (e.g. welfare attorney, person with parental responsibility) who can participate on their behalf in making the recommendations? Yes / No / Unknown
If so, document details in emergency contact section below

ReSPECT

6. Involvement in making this plan

The clinician(s) signing this plan is/are confirming that (select A,B or C, OR complete section D below):

A This person has the mental capacity to participate in making these recommendations. They have been fully involved in making this plan.

B This person does not have the mental capacity to participate in making these recommendations. This plan has been made in accordance with capacity law, including, where applicable, in consultation with their legal proxy, or where no proxy, with relevant family members/friends.

C This person is less than 18 (UK except Scotland) / 16 (Scotland) years old and (please select 1 or 2, and also 3 as applicable or explain in section D below):

- 1 They have sufficient maturity and understanding to participate in making this plan
- 2 They do not have sufficient maturity and understanding to participate in this plan. Their views, when known, have been taken into account.
- 3 Those holding parental responsibility have been fully involved in discussing and making this plan.

D If no other option has been selected, valid reasons must be stated here. Document full explanation in the clinical record.

Record date, names and roles of those involved in decision making, and where records of discussions can be found:

ReSPECT

7. Clinicians' signatures

Designation (grade/speciality)	Clinician name	GMC/NMC/HCPC Number	Signature	Date & time

Senior responsible clinician

ReSPECT

8. Emergency contacts

Role	Name	Telephone	Other details
Legal proxy/parent			
Family/friend/other			
GP			
Lead Consultant			

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9. Confirmation of validity (e.g. for change of condition)

Review date	Designation (grade/speciality)	Clinician name	GMC/NMC/HCPC number	Signature

ReSPECT

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Taken from ReSPECT. COVID-19 Resources. <https://www.resus.org.uk/respect> ¹⁵

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Oct 2024: Addendum updated by Fatts Chowdhury & Julie Staves

Reviewed by the following groups UK Red Alert Planning, NBTC EPWG, PBM Team, BSMS and the SHOT team.

April 2023: updated by Fatts Chowdhury & Julie Staves.

Reviewed by the following groups UK Red Alert Planning, NBTC EPWG, PBM Team, BSMS and the SHOT team.