

National Blood Transfusion Committee

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

Updated Version July 2022

1.0 Executive summary

1.1 A working group of the National Blood Transfusion Committee was tasked with updating the plan for red cell shortages in 2016. The general concepts of the original plan were found to be sound. This represents an evolution of that original plan.

1.2 Hospitals 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 2020 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.

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

- Red cells 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://www.transfusionguidelines.org/uk-transfusion-committees/national-blood-transfusion-committee/responses-and-recommendations>) for guidelines to address platelet shortage.

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 This plan is updated in response to the threat to the blood supply from COVID-19 infection.

2.0 Background

2.1 NHS emergency planning requires the development of contingency plans to ensure the effective use of available blood and blood components 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 Red cell shortages are rare in the UK. However, there have been seasonal shortages of red cells units of specific blood groups including Group O D negative.

2.3 The original integrated plan for the management of red cell shortages 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
- Prolonged shortages which could result from a number of 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 has also prompted concerns around red cell shortages that may be prolonged
- Unexpected increases in demand

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 operate at all times 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* and *PBM* initiatives.

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 short or prolonged period
- **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 During the Pre-Amber phase NHSBT may issue a precautionary notification to hospitals informing them of potential supply chain issues and asking hospitals to take appropriate action to protect the supply chain. This action is intended to prevent the requirement to move to Amber phase.

4.3 NHSBT will actively strive to minimise the risk of blood shortages. However, if red cell stocks fall to a pre-determined level then NHSBT may activate shortage plans and communicate a move to Pre-Amber or Amber phase. This 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.

4.4 Hospitals are required to have Emergency Blood Management Arrangements in order to respond to notifications from NHSBT. 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 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 ensuring stock is distributed according to age and group mix, to ensure wastage is kept to a minimum
- Importing red cell units from other blood services

If these actions prove to be unsuccessful, NHSBT will declare a shortage and communicate a move to the next appropriate phase.

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 (EBM) Group with representation from the Medical Director, operational and risk management, key clinical users and the Hospital Transfusion Team. The responsibility of the group is to provide strategic guidance and formulate arrangements to manage the appropriate use of red cells in each operational phase, as part of their 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 Transfusion Laboratory Managers to implement the EBMA. In a shortage, actions within hospitals may need to be reviewed daily by either the EBM Group or a nominated group of key staff.

6.5 It is essential that the EBMA 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.

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: an Audit Tool* (<https://www.transfusionguidelines.org/uk-transfusion-committees/national-blood-transfusion-committee/responses-and-recommendations>). 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 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 Hb concentration is normal before surgery. Assuming normovolaemia has been maintained, the Hb 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).

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 O D negative red cells. It is accepted that certain groups of patients benefit more than others from the use of this universal product. It is important that patients are prioritised with respects

to their transfusion needs in order to identify those where the use of O D negative cells is essential. Group O D positive red cells may be used for males and women of non-childbearing age where no anti-D is detectable. Hospitals are directed to the NBTC guidelines for the appropriate use of group O D negative red cells (<https://www.transfusionguidelines.org/uk-transfusion-committees/national-blood-transfusion-committee/responses-and-recommendations>).

7.5 The provision of O D negative units for use in the pre-hospital setting may also need review. Consideration may need to be given to suspending the service, reducing the number of units provided or substitution with O D positive units. In addition, all efforts should be made to ensure that unused blood is 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.

8.2 Pre-Amber Phase

8.2.1 Clinical teams in Hospitals should take the following actions;

- Ensure EBMP arrangements are in place and that the EBMP 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 a Blood Component App

summarising national clinical indications for transfusions and the Patient Blood Management toolkit

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 O D negative red cells for O D negative patients in line with guidelines
- Transfuse group specific wherever possible
- Enter daily red cell stock levels via the VANESA site as soon as possible. This will help NHSBT determine the quantities of red cells across the whole of the blood system
- Accept shorter dated red cells where you are confident that they can be used
- Start communications to 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
- 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) 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, email, telephone or mass messaging technology where appropriate. The information from NHSBT will include the nature of the shortage and any actions, which need 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.

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

8.3.4 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.

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).

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 cessation of procedures in category 3 (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 cessation 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 also with NHSBT as needed.

9.4 During shortages NHSBT will monitor blood usage in hospitals. It is recognised that hospital case-load and case-mix varies 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.

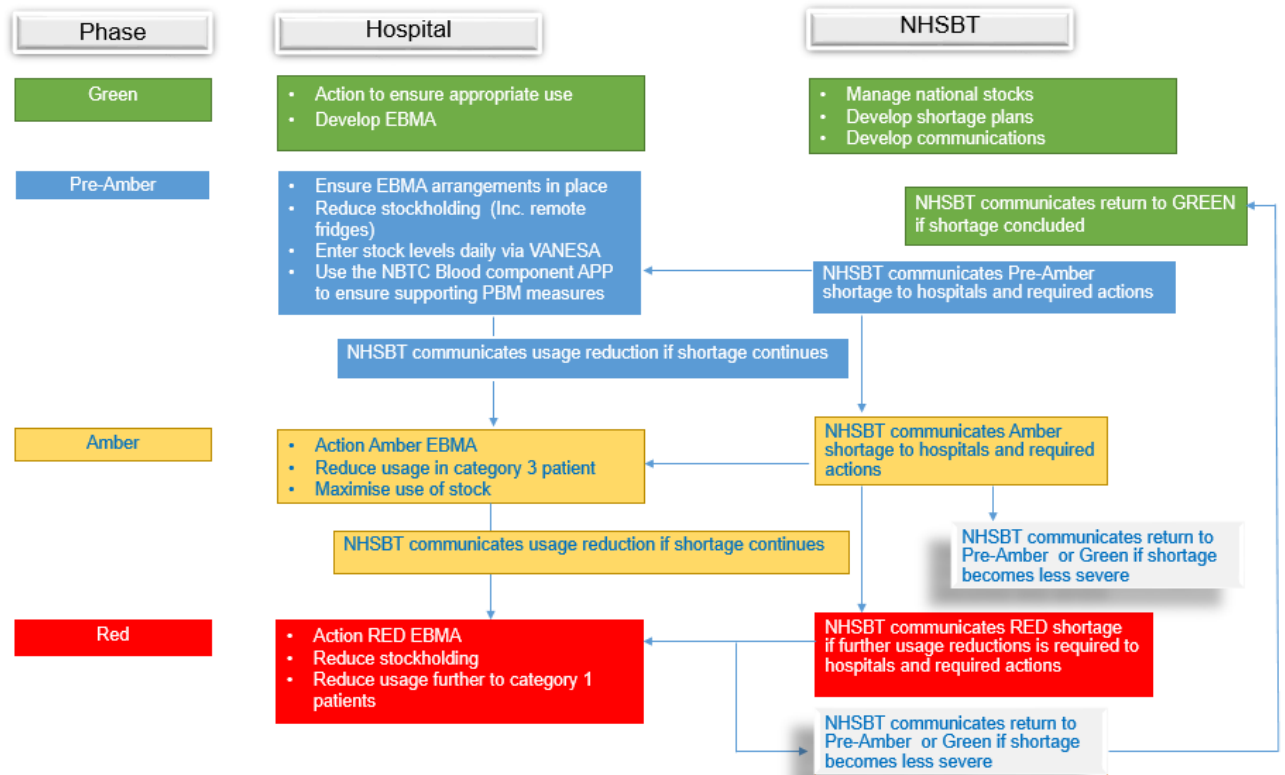
10.0 Recovery from shortages

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 Laboratory Manager or deputy 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



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.

Category 1 These patients will remain highest priority of transfusion	Category 2 These patients will be transfused in the amber but not the red phase	Category 3 These patients will not be transfused in the amber phase
Resuscitation Resuscitation of life-threatening /on-going blood loss including trauma		
Surgical support Emergency surgery* including cardiac and vascular surgery**, and organ transplantation Cancer surgery with the intention of cure	Surgery/obstetrics Cancer surgery (palliative) Symptomatic but not life- threatening post-operative or post-partum anaemia Urgent*** surgery	Surgery Elective surgery which is likely to require donor blood support
Non-surgical anaemias Life-threatening anaemia including patients requiring in-utero support and high dependency care/SCBU Stem cell transplantation, or chemotherapy **** Severe bone marrow failure Transfusion-dependent anaemias including thalassaemia and myelodysplasia Sickle cell disease (SCD) patients on regular transfusion programmes for prevention of complications of SCD Organ transplant	Non-surgical anaemias Symptomatic but not life-threatening anaemia	

* 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 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
- 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

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
- 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 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
- Transfusion laboratory teams in Hospitals should take the following actions;
 - Reduce stockholding of red cells where possible
 - Conserve O D negative red cells for O D negative patients in line with guidelines
 - Transfuse group specific wherever possible
 - Enter daily red cell stock levels via the VANESA site as soon as possible
 - 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

Additional actions in the Amber Phase

- Continuation of elective surgery will depend on red cell stock levels
- Consideration should be given to reviewing the transfusion trigger for transfusions
- In cases of actual or potential significant blood component requirement, the clinical team should liaise with the hospital transfusion laboratory and consider the availability of blood components
- 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

Additional actions in the Red Phase

- 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

Appendix 4: Emergency Blood Management Arrangement Checklist

Checklist: Emergency Blood Management Arrangements



Blood and Transplant

This guidance has been developed in conjunction with the National Blood Transfusion Committee (NBTC) red cell and platelet 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

<p>Checklist for green <i>This is the business as usual phase of the EBMA</i></p> <p>Clinical teams to ensure:</p> <ol style="list-style-type: none"> your EBMA plan is up to date <input type="checkbox"/> the members of the Emergency Blood Management (EBM) Group are aware of the plan <input type="checkbox"/> PBM strategies such as anaemia treatment, cell salvage and adherence to national indication codes are followed <input type="checkbox"/> familiarity with trust Emergency Preparedness Resilience and Response (EPRR) plans and command structures <input type="checkbox"/> communications are drafted for use if a move to amber/red is required <input type="checkbox"/> confirm stocks of Anti D, Tranexamic acid, Fibrinogen, Albumin and Desmopressin - ensure process to order additional stocks is established <input type="checkbox"/> process agreed for the review of appropriateness of blood requests with haematology clinicians as needed <input type="checkbox"/> 	<p>Checklist for amber <i>NHSBT will inform transfusion team that amber phase needs to be actioned if stock falls below two days for red cells or one day for platelets.</i></p> <p>General:</p> <ol style="list-style-type: none"> Activate EBMA and convene EBM Group <input type="checkbox"/> Prepare to report stock levels and decisions made by EBM Group for escalation trust-wide <input type="checkbox"/> Arrange trust-wide communications (e.g. screensavers, emails, newsletters) <input type="checkbox"/> Review satellite fridges; is stock still required? <input type="checkbox"/> <p>Red cells: Consider:</p> <ol style="list-style-type: none"> contacting areas where transfusions may stop <input type="checkbox"/> if all PBM initiatives are being utilised? Can they be scaled up? <input type="checkbox"/> <p>Platelets: Consider:</p> <ol style="list-style-type: none"> reprioritising prophylactic transfusions <input type="checkbox"/> D positive platelets for D negative patients (with anti-D) <input type="checkbox"/> pharmaceutical alternatives for appropriate patients <input type="checkbox"/> contacting areas where transfusions may stop <input type="checkbox"/> 	<p>Checklist for red <i>The move to red phase will be communicated to trusts if there are severe shortages of either red cells or platelets.</i></p> <p>Complete all amber actions.</p> <p>General:</p> <ol style="list-style-type: none"> Launch rota for senior haematology clinicians, used to support the transfusion laboratory and triage requests <input type="checkbox"/> Update communications to reflect change to red phase <input type="checkbox"/> Remove all stock from satellite fridges except emergency group O from acute areas e.g. ED and maternity <input type="checkbox"/> <p>Red cells:</p> <ol style="list-style-type: none"> Contact clinical areas where transfusions will not take place <input type="checkbox"/> Requests should be vetted by blood transfusion lab staff supported by blood transfusion consultants <input type="checkbox"/> <p>Platelets:</p> <ol style="list-style-type: none"> Contact clinical areas where transfusions will not take place <input type="checkbox"/> Ensure all requests are vetted/ triaged by a senior haematology clinician <input type="checkbox"/>
<p>Checklist for pre-amber:</p> <ol style="list-style-type: none"> Ensure EBMA arrangements in place <input type="checkbox"/> Reduce stockholding (inc. remote fridges) <input type="checkbox"/> Enter stock levels daily via VANESA <input type="checkbox"/> Use the NBTC Blood Component App to support PBM measures <input type="checkbox"/> Contact senior management team and high blood users <input type="checkbox"/> 	<p>Recovery phase: <i>NHSBT will inform the transfusion team of return to 'green' phase.</i></p> <ol style="list-style-type: none"> Convene the EBM Group <input type="checkbox"/> Ensure that change in clinical activity reflects blood stock levels <input type="checkbox"/> Use trust-wide communications to update staff <input type="checkbox"/> 	<p>CLICK HERE for more information</p>

July 2022: Updated on behalf of NBTC by Fateha Chowdhury, Julie Staves, Mike Murphy, Tracey Scholes, Lise Estcourt, Chris Philips, Andrew Charlton, Kairen Coffey, Matthew Bend