

National Blood Transfusion Committee
A Plan for NHS Blood & Transplant and Hospitals to
Address Plasma (Fresh Frozen Plasma /
Cryoprecipitate) Shortages

August 2022

1.0 Executive summary

- 1.1 A working group of the National Blood Transfusion Committee (NBTC) was tasked with writing the Plan for Plasma; Fresh Frozen Plasma (FFP) and Cryoprecipitate shortages in 2022. The general concepts of the plan were found to be sound.
- 1.2 Hospitals and NHS Blood and Transplant (NHSBT) should work together to reduce the risk of plasma shortages through the management of both supply and demand.
- 1.3 This paper is the integrated plan for plasma shortages, which includes lists of actions to be taken by both NHSBT and hospitals in the event of a potential or actual plasma shortage.
- 1.4 The objective is to ensure that patients who need plasma can receive a transfusion. The arrangements are designed to ensure that:
 - Plasma is available for all essential transfusions
 - Overall plasma usage is reduced to ensure supply remains available for the patients who need it most
- 1.5 A shortage of plasma may be associated with a red cell and or platelet shortage. Readers are referred to the [NBTC webpage](#) for guidelines to address red cell and platelet shortages.
- 1.6 The plasma shortage plan operates 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 has been written in response to the threat to the blood supply.

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 component 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 Plasma shortages are rare in the UK.
- 2.3 This integrated plan for the management of plasma shortages includes 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 effects of the COVID-19 pandemic have prompted concerns around plasma 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 plasma 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 / PBM programmes should help avoid the activation of formal plasma 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 PBM initiatives.

4.0 Plan Structure

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

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

4.3 NHSBT will actively strive to minimise the risk of plasma shortages. However, if FFP or Cryoprecipitate stocks fall to a pre-determined level, then NHSBT may activate shortage plans and communicate a move to the Pre-Amber or Amber phase. This may apply to either a single blood group or all blood groups. 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 FFP / Cryoprecipitate stocks and usage. It is recommended that plasma 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 a pre-set target level. 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 keep wastage to a minimum
- Importing plasma 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 plasma in each operational phase, as part of their existing emergency plans.
- 6.2 Proposed generic actions for hospitals at the **Green**, **Pre-Amber**, **Amber** and **Red** phases 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 the 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 plasma 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 plasma 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](#). Although it is accepted that clinical judgement plays an essential part in the decision whether or not to transfuse, 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 routinely require transfusion support if their clotting screen (Prothrombin Time (PT), Activated Partial Thromboplastin Time (APTT) and Claus Fibrinogen) is normal before surgery. Assuming coagulopathy has been prevented, the clotting screen or TEG can be used to guide the transfusion of plasma if there is bleeding, or an invasive procedure is needed.
- 7.3 Measures to avoid the use of plasma transfusions include stopping or reversing the effects of anticoagulant therapy and antiplatelet agents. The use of tranexamic acid for surgical patients likely to have at least moderate blood loss (>500ml) is recommended.
- 7.4 Group AB donors make up only 4% of the population. Overdependence on group AB plasma may have a negative impact on the management of this scarce resource. Blood services worldwide encounter recurrent shortfalls of AB plasma. 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 AB plasma is essential.
- 7.5 The provision of AB plasma units for use in the pre-hospital setting may also need review, as it may not be sustainable. Consideration may need to be given to suspending the service, reducing the number of units provided or substitution with HT negative Group A plasma components. In addition, all efforts should be made to ensure that unused plasma is returned to stock.
- 7.6 Use high titre negative Group A plasma components in patients with major haemorrhage with an unknown blood group.

- 7.7 Use high titre negative Group A plasma, if the same blood group is not available, for known Group B and AB patients.

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 plan 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 plasma 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 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 its implications
 - Consider indications for plasma transfusion as per evidence-based national guidance
 - Use tools available to support decisions, including the Blood Component App summarising national clinical indications for transfusions, and the Patient Blood Management toolkit
 - Ensure guidelines are in place, stating dosages of alternative clotting factor products such as Lyoplas (freeze-dried plasma), Fibrinogen Concentrate and Prothrombin Complex Concentrates
 - Ensure guidelines are in place for use of alternatives (i.e. Octaplas, Albumin) for plasma exchange procedures
- 8.2.2 Transfusion laboratory teams in Hospitals should take the following actions:
- Reduce stockholding of plasma where possible. Even a small reduction in stockholding in every hospital will make a significant difference overall

- Conserve AB plasma for AB patients in line with guidelines
- Transfuse group specific wherever possible
- Accept substitution of alternative groups of plasma where you are confident that they can be used
- Ensure alternative clotting products are available in stock, i.e. Lyoplas, Fibrinogen concentrate, Prothrombin Complex Concentrate
- Ensure alternatives for plasma exchange procedures are in stock (Octaplas, Albumin)
- Start communications to senior clinicians/high users about the 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:

- Utilise active stock management of issued units to maximise potential for transfusion, i.e. if you have already thawed units and issued but not used, reutilise for another request or consider thawing 1 unit at a time where appropriate
- Reduce levels of pre-thawed plasma stock in remote fridges
- Ordering plasma as needed
- Using alternative clotting products, i.e. Fibrinogen concentrate, Prothrombin Complex Concentrate

8.3 Amber Phase

8.3.1 If national stocks fall to less than 5 days or an imminent threat to the supply of plasma 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 System messaging screen, email, telephone or mass messaging technology, where appropriate. The information from NHSBT will include the nature of the shortage and any actions that 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 plasma return to a sustainable level, NHSBT will communicate to hospitals the return to Pre-Amber or 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 plasma, or if an imminent severe threat to the supply of plasma 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 plasma usage by hospitals.
- 9.2 Where the required reduction in usage is small it is anticipated that hospitals will be able to achieve this through the implementation of appropriate use measures and stock reduction. 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. For example, where 50% or more of the plasma 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.
- 9.4 During shortages, NHSBT will monitor 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 NBTC and Hospital Trusts, to support and share good practice.

10.0 Recovery from shortages

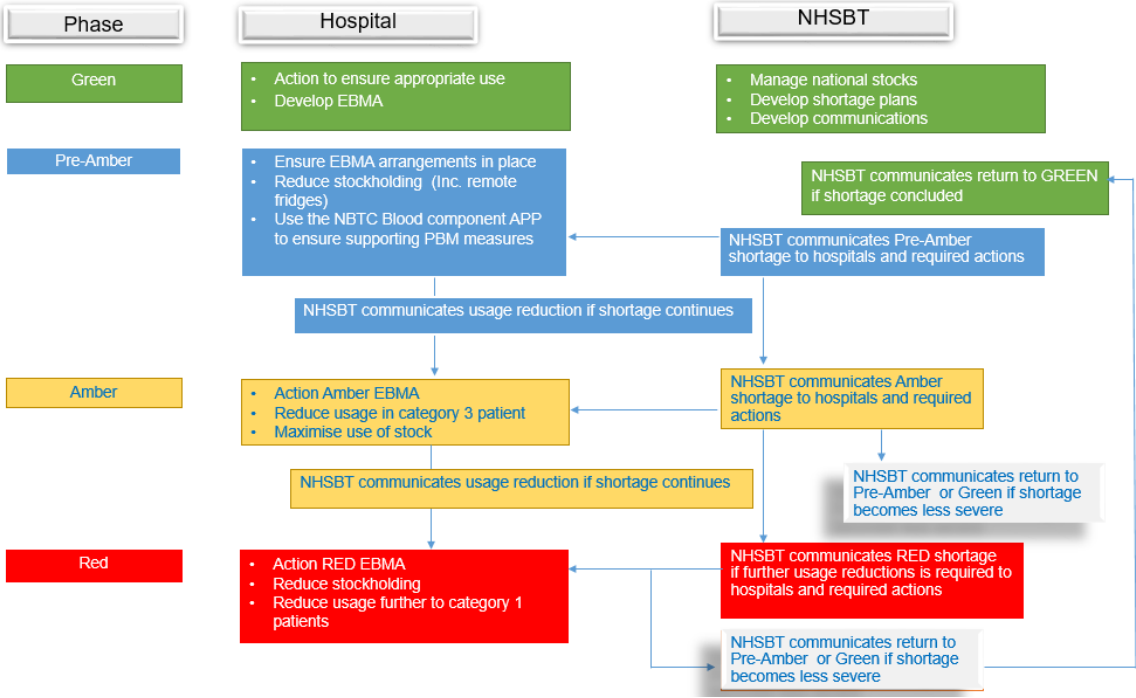
- 10.1 NHSBT will contact the Transfusion Laboratory to tell them that stocks have risen to a level where hospitals can move to Pre-Amber, Amber or Green phase.
- 10.2 The EBM Group may be needed to convene should the hospital be considering a return to normal operations, as it will be essential that 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 plasma shortage and amend the local arrangements as necessary. The recovery plan should be communicated to all staff.

References

BSH Guidelines:

[Spectrum of fresh frozen plasma and cryoprecipitate products 2018](#)

Appendix 1: Schematic of plasma shortage plan



Appendix 2: Indication for transfusion

To simplify the management of patients in a general plasma 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 plasma 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
<p>Massive haemorrhage and critical care Massive transfusion for any condition including obstetrics, emergency surgery and trauma, with on-going bleeding Bleeding in the presence of sepsis/acute DIC</p>	<p>Surgery/obstetrics Cancer surgery (palliative) Urgent*** surgery</p>	<p>Invasive procedure Elective procedures which are likely to require plasma support Transfusion triggers for invasive procedures According to BSH guidelines</p>
<p>Surgical support Emergency surgery* including cardiac and vascular surgery**, and organ transplantation Cancer surgery with the intention of cure</p>	<p>Plasma exchange Conditions requiring urgent treatment</p>	<p>Surgery Elective surgery which is likely to require plasma support</p>
<p>Plasma exchange Life-threatening conditions requiring urgent treatment (e.g. TTP)</p>		
<p>Neonates For preterm neonates with very severe coagulopathy and bleeding</p>		
<p>Bone marrow failure Active bleeding associated with severe coagulopathy</p>		

* 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.

Appendix 3: Proposed actions for hospitals at each phase

Green Phase

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

- 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
- Ensure that effective blood transfusion policies for the appropriate use of plasma are in place, implemented and monitored
- Ensure that education and training are provided to all staff involved in the process of blood transfusion and are 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 plasma and the use of effective alternatives in every clinical practice where blood is transfused.

- Implement existing national guidance on the appropriate use of plasma and alternatives
- Ensure that guidance is in place for the medical and surgical use of plasma, and other blood components such as red cells and platelets
- Ensure regular monitoring and audit of usage of plasma, red cells and platelets in all clinical specialities
- Establish local protocols to empower blood transfusion laboratory staff to ensure that appropriate clinical information is provided with requests for plasma for 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 to the potential move to Amber and its implications

- Consider indications for plasma transfusions, as per evidence-based national guidance
- Use the tools available to support decisions, including the [Blood Component App](#) summarising national clinical indications for transfusions and the Patient Blood Management toolkit
- Ensure guidelines are in place with dosage stated for alternative clotting factors, i.e. Lyoplas (freeze-dried plasma), Fibrinogen Concentrate and Prothrombin Complex Concentrate
- Ensure guidelines are in place for use of alternative agents for plasma exchange, i.e. Octaplas, Albumin

Transfusion laboratory teams in Hospitals should take the following actions:

- Reduce stockholding of plasma where possible
- Conserve AB plasma for group AB patients in line with guidelines
- Transfuse group specific wherever possible
- Accept substitution of alternative groups of plasma where you are confident that they can be used
- Ensure stock alternatives for plasma exchange procedures (Octaplas, Albumin) and clotting factors Lyoplas (freeze-dried plasma), Fibrinogen Concentrates, Prothrombin Complex Concentrates
- Start communications with senior clinicians/high users about potential to move to Amber phase and the consequences of this

If it is safe to do so, consider:

- Utilising active stock management of issued units to maximise potential for transfusion, i.e. if you have already thawed units and issued but not used, reutilise these for another request or consider thawing 1 unit at a time where appropriate
- Ordering more often as needed
- Considering the reduction or removal of pre-thawed plasma stock in Remote Issue fridges, especially those in locations used for elective surgery

Additional actions in the Amber Phase:

- Continuation of elective surgery will depend on stock levels
- Consideration should be given to reviewing the transfusion triggers
- 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
- Utilise active stock management of issued units to maximise potential for transfusion
- Consider the further reduction or removal of pre-thawed plasma stock in Remote Issue fridges, especially those in locations used for elective surgery

- Consider the use of temperature loggers in blood boxes, to reduce wastage because of uncertainty in cold chain management
- All requests to be vetted and approved by Haematology SpR / Consultant

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 stock levels and the impact of the 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 plasma 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, 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

<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"> 1. your EBMA plan is up to date <input type="checkbox"/> 2. the members of the Emergency Blood Management (EBM) Group are aware of the plan <input type="checkbox"/> 3. PBM strategies such as anaemia treatment, cell salvage and adherence to national indication codes are followed <input type="checkbox"/> 4. familiarity with trust Emergency Preparedness Resilience and Response (EPRR) plans and command structures <input type="checkbox"/> 5. communications are drafted for use if a move to amber/red is required <input type="checkbox"/> 6. confirm stocks of Anti D, Tranexamic acid, Fibrinogen, Albumin, Lyoplas, Octaplas and Desmopressin - ensure process to order additional stocks is established <input type="checkbox"/> 7. 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 stage needs to be actioned if stock falls below 2 days for red cells, 5 days for plasma or 1 day for platelets.</i></p> <p>General:</p> <ol style="list-style-type: none"> 1. Activate EBMA and convene EBM group <input type="checkbox"/> 2. Prepare to report stock levels and decisions made by EBM group for escalation trust-wide <input type="checkbox"/> 3. Arrange trust-wide communications (e.g. screensavers, emails, newsletters) <input type="checkbox"/> 4. Review satellite fridges; is stock still required? <input type="checkbox"/> 5. Consider pharmaceutical alternatives in appropriate patients with EBM group and disseminate decision <input type="checkbox"/> 6. Contact areas where transfusions may stop <input type="checkbox"/> 7. Clinical staff to reprioritise prophylactic transfusions <input type="checkbox"/> <p>Red cells: Consider:</p> <ol style="list-style-type: none"> 1. are all PBM methods being used, review scale up? <input type="checkbox"/> <p>Platelets: Consider:</p> <ol style="list-style-type: none"> 1. D positive platelets for D negative patients (with anti-D) <input type="checkbox"/> <p>Plasma: Consider:</p> <ol style="list-style-type: none"> 1. conserving AB plasma for group AB patients <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, plasma or platelets.</i></p> <p>Complete all amber actions.</p> <p>General:</p> <ol style="list-style-type: none"> 1. Launch rota for senior haematology clinicians, used to support the transfusion laboratory and triage requests <input type="checkbox"/> 2. Update communications to reflect change to red phase <input type="checkbox"/> 3. Remove all stock from satellite fridges except emergency group O from acute areas e.g. ED and maternity <input type="checkbox"/> 4. Contact clinical areas where transfusions will not take place. <input type="checkbox"/> 5. Requests should be vetted by Blood Transfusion Laboratory staff with support from Blood Transfusion Consultant. <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"> 1. Convene the EBM group <input type="checkbox"/> 2. Ensure that change in clinical activity reflects blood stock levels <input type="checkbox"/> 3. Use trust-wide communications to update staff <input type="checkbox"/> 		

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for more
information



August 2022: Written on behalf of NBTC by Fateha Chowdhury, Julie Staves