1. Executive Summary

1.1 The platelet shortage plan operates similarly to the red cell shortage plan with four phases dependent on NHSBT stock levels - Green, Pre-Amber, Amber and Red (Appendices 1 & 2). As with the red cell plan, actions listed in the Green phase are focused on preparation of arrangements for shortages and implementing appropriate use recommendations.

1.2 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 platelet shortage.

1.3 To help prioritise the patients who should be treated, as shortages become more severe four broad patient categories are identified (Appendix 3).

1.4 A key set of actions for NHSBT is to continually monitor its stock levels and take appropriate actions to maintain these. Should stocks begin to fall, NHSBT will act to increase production and, if necessary, increase collections from donors.

1.5 Within Trusts it is expected that the Emergency Blood Management Group (EBMG) established to produce arrangements for, and manage, red cell shortages will also be responsible for producing arrangements for, and managing, platelet shortages.

1.6 Trusts are encouraged to work within their Pathology Networks to provide additional mutual support, optimise regional stock management and minimise waste.
2.0 Background

2.1 In 2020, the NBTC updated the integrated blood shortage plan for NHSBT and hospitals.

2.2 An integrated, national plan should also be available for the management of platelet shortages to ensure the most effective use of this component.

2.3 This document provides details of the plan and hospitals are requested to amend their emergency plans accordingly.

2.4 All references to providing, counting or tracking of platelets refer to adult doses of platelets.

3.0 Planning Principles

3.1 As with the blood shortage plan, the platelet shortage plan is designed to ensure that hospitals and NHSBT can work within a consistent, integrated framework across England to provide equal access for patients to available units of platelets based on need. This will be achieved by making sure that those patients most in need receive the available supply and ensuring that any reduction in usage is made from those patients who will be least affected. The plan has the following two key aims:

- That the national “pool” of platelets is available for all essential transfusions to all patients equally across the country.
- That overall usage is reduced to ensure the most urgent cases receive the supply that is available.

3.2 The number of platelets used in England is significantly less than the demand for red cells and although more hospitals routinely hold stocks of units of platelets, most requests made of the NHSBT are for specific patients. Consequently, this plan will focus on restricting platelet supplies according to the urgency of treatment required by patient type, rather than a generic reduction in supply and stockholding, as used for red cell shortages in the blood shortage plan.

3.3 Hospitals are encouraged to ensure that platelets are used only when necessary and usage follows national, published guidelines.
3.4 In the development of the red cell shortage plan, hospitals are required to establish their Emergency Blood Management Group (EBMG) to define Emergency Blood Management Arrangements (EBMA). Hospitals are encouraged to use the same structures when implementing this platelet plan.

3.5 Platelet shortages may or may not occur at the same time as red cell shortages. Platelet shortages that occur when there are sufficient blood stocks are only likely to be short-term in nature.

3.6 Availability of platelet stock will be considered. Substitution across ABO groups, D type and CMV status may be required in line with British Society for Haematology (BSH) guidelines.

4.0 Plan Structure

4.1 The plan is structured to provide a framework of actions for NHSBT and hospitals at four phase levels:

- **Green**: “Normal” circumstances where supply meets demand
- **Pre-Amber**: Reduced availability of units of platelets
- **Amber**: Reduced availability of units of platelets with impact on clinical activity
- **Red**: Severe shortage

During the Pre-Amber phase NHSBT may issue a precautionary notification to hospitals informing them of potential supply chain issues, such as a shortage in a particular ABO Rh group 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.

4.2 It is envisaged that each hospital will produce an EBMA for each of the above stages. Guidance to assist hospitals in actions to be taken in EBMA can be found in Appendix 1. This plan should be included in hospital emergency incident plans. NHSBT will also develop plans for each phase.

4.3 By ensuring that all hospitals have EBMA for shortage it is expected that, on declaration of a shortage by NHSBT, all hospitals will invoke these plans at the same time, ensuring a swift response to the shortage.
4.4 As the Green phase of the plan applies to “normal” circumstances, the plan is, in effect, operating at all times. Actions in this phase will focus on ensuring arrangements for shortage are developed and that platelets are used safely and appropriately.

4.5 Hospital actions at Pre-Amber, Amber and Red phase include actions to stop any stockholding of units of platelets and, where required, to reduce usage.

4.6 A table categorising patient types to support decision-making in hospitals is provided in Appendix 3.

4.7 A schematic summary of the plan is listed in Appendix 2.

4.8 In situations where NHSBT restricts supply of platelets for stock holding, consideration will be given to offering free ad hoc deliveries to sustain the supply chain.

5.0 Operation of the Plan

5.1 Green Phase

5.1.1 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.

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

5.1.3 NHSBT will take a number of actions to avoid a shortage of platelets. On a daily basis, national platelet stock levels are monitored, and production levels amended to ensure stock levels are kept at the pre-set target stock level. However, if this does not have the desired impact, a number of wide-ranging actions may be taken. These could include:

- Calling more donors (of all groups, or of a specific group, depending on the nature of the shortage)
- Increasing the number of whole blood donations collected into packs suitable for platelet production
- Extending shifts in the manufacturing department to increase production of platelets
- Extending the opening times of static clinics (for the collection of platelet donations)
- Extending opening times of mobile sessions (for the collection of whole blood donations)
• Increased monitoring and movement of the national platelet stock ensuring units of platelets are distributed according to age and group mix, to ensure wastage is kept to a minimum.

Depending on the actions applied in an individual situation the process may be managed using the NHSBT emergency planning system.

5.1.4 If stocks fall at one or more centres or in a particular ABO Rh group, but the national stock remains above the pre-determined level, then NHSBT may ask hospitals to delay platelet transfusions or accept units of platelets of different groups where possible (in line with BSH adult and paediatric guidelines). This will allow NHSBT to initiate stock transfers to balance the platelet stocks rather than declaring an amber shortage.

5.1.5 Should NHSBT identify a severe, imminent threat to the platelet supply, it may communicate a move directly to the Red phase of the plan and request that only patients in category 1 are treated.

5.2 Pre Amber Phase

5.2.1 NHSBT will send communications to hospitals to;
• Reduce stockholding of platelets where possible, small reductions will make a big difference
• Avoid requesting long dated platelets
• If time permits for urgent requests, match ABO group, rather than rely on group A platelets.
• For routine requests group specific platelets should be provided if possible
• Accept and use both apheresis and pooled platelets (except where there is a requirement for HLA/HPA matched platelets)
• Refer to appendix 4 for additional advice on appropriate substitutions
• Review the EBMA checklist (appendix 5)

5.2.2 Appropriate Use of Blood Components:
There are a number of tools available to support decisions to administer transfusions and to consider alternatives to blood including the blood components app and website summarising national clinical indications for transfusions and the Patient Blood Management toolkit; please follow this link.

5.2.3 Transfusion team should send communications to senior clinicians/high users about potential to move to Amber phase and the consequences of this.
5.3 Amber Phase

5.3.1 If NHSBT stocks fall to a pre-determined level where stocks are insufficient to ensure supply for the day, it will communicate a move to Amber phase.

5.3.2 This information will be communicated by several channels including messaging boards on the Online Blood Ordering System, email and/or telephone, 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 the local actions to be taken.

5.3.3 In the first instance, the actions will be to immediately restrict stockholding in hospitals. This will be achieved by hospitals ordering only where there is a specific identified requirement for a platelet transfusion or for a unit of platelets to be on standby to cover a procedure. The impact of this will be to reduce orders from these hospitals. During Amber phase any platelets issued will have a maximum expiry of 24 hours. This will ensure the national stock of platelets held by NHSBT is available to all hospitals.

In addition, to ensure the available national stock is used to its maximum effect, NHSBT may request hospitals to:

- Restrict issues for use in accordance with identified categories of patient as defined in Appendix 3. If a reduction in usage is required at this stage, restrictions to supply will be limited to categories 1 and 2 (including HLA/HPA matched platelets). At this point all requests for units of platelets from the hospital must be authorised by a named clinician
- Prohibit use of platelets for prophylaxis
- Not request long dated platelet units
- Accept platelets of a different ABO group (in line with BSH adult and paediatric guidelines).
- Accept leucodepleted platelets instead of CMV negative platelets
- Accept D positive platelet units where D negative platelet units are not available, administering anti-D where applicable (250 IU anti-D will cover 5 adult units of platelets).
- Optimise pre-op preparation of patients e.g. stop anti-platelet agents 7 days prior to surgery whenever possible
- Consider alternatives or additions to platelet transfusion e.g.
  - Tranexamic acid - trauma, surgical bleeding and short-term for patients with chronic thrombocytopenia and bleeding
  - Desmopressin for patients with uraemia or inherited platelet disorders at risk of bleeding or bleeding
- Fibrinogen or Cryoprecipitate to maintain fibrinogen concentration at 1.5-2g/l if trauma or surgical bleeding

5.3.4 NHSBT will take further actions to optimise platelet supply to complement those already taken in the green phase. Options may include:

- Importation of platelets from other UK blood services
- Modification of the platelet dose
- Suspension of some testing where appropriate.

5.3.5 NHSBT will monitor the demand of platelets from hospitals.

5.3.6 If stocks of platelets return to a sustainable level, NHSBT will communicate to hospitals that the Amber phase no longer applies and that orders can return to normal. If, however, stocks continue to fall, NHSBT may communicate that a greater reduction in usage is required which necessitates the declaration of a Red phase.

5.4 Red Phase

5.4.1 NHSBT will declare a Red phase shortage if there is a severe shortage of platelets or, if an imminent severe threat to the supply of platelets is identified.

5.4.2 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 all actions taken under the Amber phase accompanied by a further reduction in usage such that usage will be restricted to patients in category 1 of Appendix 3.

At this point all requests for units of platelets in the hospital must be made via a named senior Clinician, such as a Consultant Haematologist. Requests to NHSBT will be referred to a NHSBT Consultant who may discuss the requirement with the requesting clinician. Requests for units of platelets from hospitals must be accompanied by the following dataset over and above the usual details provided to NHSBT when ordering platelets:

- Patient identifier (hospital number or name)
- Indication for transfusion
- Requesting Consultants name
- Patient category (see Appendix 3)
- Patient blood group
5.4.3 As the availability of units of platelets will be very low in the Red phase, NHSBT will implement a monitoring process which will allow for the tracking of every unit of platelets. Hospitals will be requested to track closely the fate of each unit of platelets delivered to them. NHSBT will request information on each unit of platelets at regular intervals so that, if the unit is not used, it can be retrieved and delivered to an alternative location for use. This will ensure that wastage of platelet units is kept to a minimum and the most urgent cases are supported.

5.5 Recovery from shortage

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

5.5.2 The Transfusion Laboratory Manager or deputy will disseminate the information as above. The EBMG should convene at the earliest opportunity to review the effect of the platelet shortage and amend the platelet shortage arrangements as necessary. Any recommendations should be fed back to the Hospital Transfusion Committee.
Appendix 1: Proposed generic actions for hospitals at each phase

**Green Phase**

- The hospital will work towards ensuring the safe and appropriate use of all platelets
- Ensuring wherever possible that aspirin or other drugs affecting platelet function are stopped prior to surgery in time to allow platelet function to recover
- Formulation of Emergency Blood Management Arrangements (EBMA) for Green, Pre-Amber, Amber and Red phase of a platelet shortage to ensure consistent action in hospitals to ensure the patients who require them most receive the available units of platelets
- Ensuring clinical audit is undertaken against agreed guidelines so that the fate of all units of platelets is understood. This should include feedback to reduce any inappropriate use, implementation of best practice to ensure the appropriate use of platelets and to minimise wastage and re-audit to ensure effectiveness of actions taken
- Implementing the National Codes for Transfusion as recommended by the National Blood Transfusion Committee to ensure that every request for transfusion clearly states the indication for transfusion. Implementation of agreed transfusion protocols/transfusion thresholds for all transfusions
- Education/training sessions for staff of all levels, including induction and regular updates.
- Transfusion guidelines formulated and included in the Junior Medical Staff induction.
- Hospital wide education of existence of EBMA
- Participation in the Blood Stocks Management Scheme (BSMS)
- Implementing the Blood Stocks Management Scheme stockholding algorithm [https://hospital.blood.co.uk/patient-services/patient-blood-management/platelet-resources/](https://hospital.blood.co.uk/patient-services/patient-blood-management/platelet-resources/)
- Transfusion Laboratory Manager to develop links with local hospitals with a view to movement of stock between sites

**Pre Amber Phase**

- Reduce stockholding of platelets where possible, small reductions will make a big difference
- Avoid requesting long dated platelets
- If time permits for urgent requests, match ABO group, rather than rely on group A platelets
- For routine requests group specific platelets should be provided if possible
- Accept and use both apheresis and pooled platelets (except where there is a requirement for HLA/HPA matched platelets)
- Refer to appendix 5 for additional advice on appropriate substitutions
- Review the EBMA checklist (appendix 6)
- Start communications with senior clinicians/high users about potential the potential to move to Amber phase and the consequences of this
Amber Phase

- Restrict stockholding of units of platelets
- Maximise the use of available platelet units through:
  - Interchangeable use of apheresis and pooled platelets (except for HLA/HPA matched platelets)
  - Not requesting long-dated platelets
  - Accepting platelets of a different ABO group (in line with BSH guidelines)
  - Accepting leucodepleted platelets instead of CMV negative platelets
  - Accepting D positive platelets where D negative are not available and administering anti-D where applicable (250 IU anti-D will cover 5 adult units of platelets)
  - Contacting NHSBT Hospital services when platelets have been issued but not used, to establish whether they should be returned to the national pool for re-distribution
- Reduce usage to categories identified in communications from NHSBT. Ensure all requests are made by a senior clinician
- Identify possible alternatives to transfusion of platelets
- Monitor outcomes of platelet transfusions to inform further transfusion support required

Red Phase

- As in Amber phase but usage will be restricted to category 1 patients only
- Provide an additional dataset for every request from NHSBT
- Provide information to NHSBT to assist with tracking of units of platelets
Appendix 2: Schematic of platelet shortage plan

- Phase
  - Green
    - Ensure EDMA arrangements in place
    - Reduce stockholding (inc. remote refrigeration)
    - Enter stock levels daily via VANERA
    - Use the NBTC Blood component APP to ensure supporting PBM measures
  - Pre-Amber
    - Action Amber EDMA
    - Reduce usage in category 3 patient
    - Maximize use of stock
    - NHSBT communicates usage reduction if shortage continues
  - Amber
    - NHSBT communicates Amber shortage to hospitals and required actions
    - NHSBT communicates usage reduction if shortage continues
  - Red
    - NHSBT communicates RED shortage if further usage reductions is required to hospitals and required actions
    - NHSBT communicates return to Pre-Amber or Green if shortage becomes less severe

- Hospital
  - NHSBT communicates Pre-Amber shortage to hospitals and required actions

- NHSBT
  - Manage national stocks
  - Develop shortage plans
  - Develop communications
  - NHSBT communicates return to GREEN if shortage concluded

NBTC Platelet Shortage Plan
Updated July 2022
Page 11 of 14
Appendix 3: Categorisation of patient types

<table>
<thead>
<tr>
<th>Category 1</th>
<th>Patients to be treated in red phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massive haemorrhage and critical care</td>
<td>Massive transfusion for any condition including obstetrics, emergency surgery and trauma, with ongoing bleeding, maintain &gt; 50 x 10^9/l. Aim for &gt;100 x 10^9/l if multiple trauma or CNS trauma. Bleeding in the presence of sepsis/acute DIC, maintain &gt;50 x 10^9/l.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category 2</th>
<th>Patients to be treated in red and amber phases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical care</td>
<td>Patients resuscitated following massive transfusion with no on-going active bleeding, maintain &gt; 50 x 10^9/l. Surgery: emergency surgery but not urgent surgery for a patient requiring platelet support. Transfusion triggers for invasive procedures. According to BSH guidelines.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category 3</th>
<th>Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery</td>
<td>Elective, non-urgent surgery likely to require platelet support for thrombocytopenia or congenital/acquired platelet defects.</td>
</tr>
</tbody>
</table>

| Bone marrow failure | Active bleeding associated with severe thrombocytopenia or functional platelet defects. Immune thrombocytopenia if serious life-threatening bleeding. |

| Bone marrow failure | All other indications except those in category 1 or 3. |

| Neonates | For preterm neonates with very severe thrombocytopenia (platelet count below 25 x 10^9/l) platelet transfusions should be administered in addition to treating the underlying cause of the thrombocytopenia. Suggested threshold counts for platelet transfusions in other situations are given in the BSH guidelines. |

*Bone marrow failure* | Prophylactic transfusion of stable patients following autologous stem cell transplant. |

* Prophylactic transfusion category should include WHO grade 1 bleeding (as in TOPPS trial). Exclusions – previous WHO > grade 3 bleed, inherited haemostatic or thrombotic disorders, requirement for therapeutic doses of anticoagulation, acute promyelocytic leukaemia, prior to surgery/invasive procedure.

The table provides general guidance for the use of platelet transfusions in the context of reduced availability of all platelet groups. Maximise use of available platelet units by following recommendations in Appendix 2 (Amber alert section).

Category 1 patients are those with the greatest clinical need for platelet support and therefore should be given priority in Red phase when considering allocation of platelets.

In Amber phase, if reduction in usage is required, restrict to using in category 1 & 2 patients. Category 3 patients should be given lowest priority.

The use of platelets should be considered as one element in the overall management of these patients. Use should be guided by the clinical condition of the patient and laboratory/near patient testing.
Appendix 4 Platelet Substitution

ABO non-identical platelets may be given at times of shortage or in an emergency, where no ABO identical platelets are available.

They may also be used when specific requirements are necessary, the blood group is unknown or to prevent wastage due to expiry.

High Titre (HT) negative platelets are available to reduce the risk of haemolysis.

<table>
<thead>
<tr>
<th>Recipient Group</th>
<th>Group O</th>
<th>Group A</th>
<th>Group B</th>
<th>Group AB</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Choice</td>
<td>O</td>
<td>A</td>
<td>B</td>
<td>AB⁺</td>
<td>AB⁻</td>
</tr>
<tr>
<td>2nd Choice</td>
<td>A or B</td>
<td>AB⁺</td>
<td>AB⁺</td>
<td>A⁺ or B⁺</td>
<td>A⁺ or B⁺</td>
</tr>
<tr>
<td>3rd Choice</td>
<td>AB⁺</td>
<td>B⁺ or O⁺⁺</td>
<td>A⁺ or O⁺⁺</td>
<td>O⁺⁺</td>
<td>O⁺⁺</td>
</tr>
</tbody>
</table>

For A or B units transfused into an O patient, or when AB is transfused, high-titre (HT) negative is not required.

*HT negative anti-A and/or anti-B platelets should be selected where available which would lower the risk of haemolysis.

* Group O platelets for non-group O neonates and children should be avoided where possible due to the risk of haemolysis.

*x Due to the population distribution of group AB and its value as a universal plasma donor, stocks may be limited.

Guidance on D selection and anti-D prophylaxis

D negative platelets should be given to D negative patients where possible, particularly to D negative women of childbearing potential, boys under 18 years and those who already have anti-D antibodies.

D positive may be transfused if D negative unavailable. In the case of women of child-bearing potential, anti-D prophylaxis should be given.
## Appendix 5: Emergency Blood 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.

#### Checklist for green

**Clinical teams to ensure:**

1. your EBMA plan is up to date
2. the members of the Emergency Blood Management (EBM) Group are aware of the plan
3. PBM strategies such as anaemia treatment, cell salvage and 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/orange/red is required
6. confirm stocks of Anti D, Transferrin, Albumin, Uroplas, 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

#### Checklist for amber

NBST will inform transfusion team that amber stage needs to be acted on if stock falls below 2 days for red cells, 5 days for plasma or 1 day for platelets.

**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 (e.g. screeners, emails, newsletters)
4. Review satellite fridges, is stock still required?
5. Consider pharmaceutical alternatives in appropriate patients with EBM group and disseminate decision
6. Contact areas where transfusions may stop
7. Clinical staff to re-prioritise prophylactic transfusions

**Red cells:** Consider:

- are all PBM methods being used, review scale up?

**Platelets:** Consider:

- D positive platelets for D negative patients (with anti-D)

**Plasma:** Consider:

- conserving all plasma for group A 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, used to support the transfusion laboratory and triage 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
5. Requests should be vetted by Blood Transfusion Laboratory staff with support from Blood Transfusion Consultant.

**Recovery phase:**

NBST 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

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July 2022: Updated on behalf of NBTC by Fateha Chowdhury, Lise Estcourt, Chris Phillips, Kairen Coffey, Andrew Charlton, Matthew Bend