

## Chief Medical Officer's National Blood Transfusion Committee

# A Plan for NHS Blood and Transplant and Hospitals to address Red Cell Shortages

### 1.0 Executive summary

- 1.1 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.
- 1.2 This paper updates the integrated plan for blood shortages (Gateway Ref 3344<sup>1</sup>) released in 2004 and NHSBT external document ESD/PCS/HL/001/01<sup>2</sup> released in January 2005. The original plan was prepared by the Chief Medical Officer's National Blood Transfusion Committee's (NBTC) subgroup on contingency planning, and lists actions to be taken by both NHSBT, then the National Blood Service, and hospitals in the event of a potential or actual red cell shortage.
- 1.3 The objective is to ensure that patients who need blood can receive a transfusion regardless of their geographical location. The arrangements are designed to ensure that: -
  - Blood is available for all essential transfusions to patients equally across the country
  - Overall blood usage is reduced to ensure the most urgent cases receive the supply which is available.
- 1.4 A shortage of red cells may be associated with a platelet shortage. Readers are referred to the integrated shortage plan to address platelet shortages (original Gateway Reference 6514<sup>3</sup>).
- 1.5 The red cell and platelet shortage plans operate in similar ways describing three phases dependent on NHSBT stock levels - Green, Amber and Red. The green phase is focused on implementing the recommendations of the HSC 2007/001 *Better Blood Transfusion – Safe and Appropriate Use of Blood*.<sup>4</sup>  
[http://www.transfusionguidelines.org.uk/docs/pdfs/nbtc\\_bbt\\_hsc\\_07.pdf](http://www.transfusionguidelines.org.uk/docs/pdfs/nbtc_bbt_hsc_07.pdf)
- 1.6 The original plan was developed to be integrated with NHS emergency planning arrangements. The main changes in this revision are the removal of the following:
  - Benchmarking arrangements. Applying differential reductions in usage to different hospitals based on categories of good transfusion practice would overcomplicate the plan.

- Detailed guidance for the development of Hospital based Emergency Blood Management Arrangements. Comments received since the original plan was published have indicated that the original plan was too proscriptive and hospitals should be allowed to develop arrangements most suited to their needs.

## 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, and will be critical to ensuring transfusion support remains available for the patients who most need it.
- 2.2 Blood shortages are rare in the UK. However, there have been seasonal shortages of specific blood groups such as Group O RhD negative.
- 2.3 The original integrated plan for the management of blood shortages included a framework to manage shortages in a variety of situations, including: –
- Short term shortages, caused by, for example, bad weather or an influenza outbreak.
  - Very acute shortages caused by, for example, security issues which stop donors coming forward to donate blood.
  - Prolonged blood shortages which could result from a number of circumstances e.g. the introduction of further measures to reduce the risk of disease transmission by transfusion or changes in processing.
  - Unexpected increases in demand.

## 3.0 Rationale

- 3.1 The framework described below is designed to ensure that NHSBT and hospitals in England and north Wales work in a consistent, integrated manner to manage blood 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 programmes may avoid the activation of formal blood shortages arrangements. The NBTC has collated guidance on these programmes and has developed a toolkit to support hospitals in this work:  
<http://www.transfusionguidelines.org.uk/Index.aspx?Publication=NTC&Section=27&pageid=1368>
- 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 Initiative*. These actions are defined within the HSC 2007/001 *Better Blood Transfusion – Safe and Appropriate Use of Blood*.<sup>4</sup>  
[http://www.transfusionguidelines.org.uk/docs/pdfs/nbtc\\_bbt\\_hsc\\_07.pdf](http://www.transfusionguidelines.org.uk/docs/pdfs/nbtc_bbt_hsc_07.pdf)

## 4.0 Plan Structure

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

- Green: Normal circumstances where supply meets demand.
- Amber: Reduced availability of blood for a short or prolonged period.
- Red: Severe, prolonged shortages.

4.2 NHSBT will actively strive to minimise the risk of blood shortages. However, if red cell stocks fall to a pre-determined level then NHSBT will activate shortage plans and communicate a move to 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.

4.3 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 blood stocks and blood 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 a number of wide ranging actions may be taken. These include:

- Calling more donors (of all groups, or of a specific group, depending on the nature of the shortage).
- Extending shifts in the processing 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 Amber 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 blood in each operational phase, as part of their existing emergency plans.

- 6.2 Proposed generic actions for hospitals at Green, 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 blood 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 blood 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.<sup>5,6,7,8</sup> 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 located on the toolkit website are used to document the indication for transfusion.<sup>9</sup> It should be noted these are current guidelines and may change depending on new evidence.  
[http://www.transfusionguidelines.org.uk/docs/pdfs/nbtc\\_bbt\\_indication\\_codes\\_2009\\_v2.pdf](http://www.transfusionguidelines.org.uk/docs/pdfs/nbtc_bbt_indication_codes_2009_v2.pdf)
- 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 including the use of alternatives to blood should be considered as part of *Better Blood Transfusion* even when blood stocks are normal. Non-surgical management of bleeding e.g. arterial embolisation, stenting or coiling of aneurysms might be more readily considered as treatment options during blood shortages.

- 7.4 Overdependence on group O RhD negative red cells may have a negative impact on the management of this scarce resource. Blood services worldwide encounter recurrent shortfalls of O RhD 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 RhD negative cells is essential. Group O RhD positive red cells may be used for males and women of non-child bearing age in whom no anti-D is detectable. Hospitals are directed to the NBTC guidelines for the appropriate use of group O RhD negative red cells:<sup>10</sup>  
[http://www.transfusionguidelines.org.uk/docs/pdfs/nbtc\\_bbt\\_o\\_neg\\_red\\_cells\\_r ecs\\_09\\_04.pdf](http://www.transfusionguidelines.org.uk/docs/pdfs/nbtc_bbt_o_neg_red_cells_r ecs_09_04.pdf)

## **8.0 Operation of the Plan**

### **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.

### **8.2 Amber Phase**

- 8.2.1 If national stocks fall to a pre-determined level, or an imminent threat to the blood supply is identified, NHSBT will communicate a move to Amber phase, in most circumstances. This may apply to either a single blood group or to all blood groups.
- 8.2.2 Information from NHSBT about blood shortages will be communicated to hospitals by fax, 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 any actions to be taken.
- 8.2.3 In the first instance hospitals will be required to implement revised stockholding. The impact of this will be to reduce orders from these hospitals as these hospitals use their own stocks to meet patients requirements for blood. This will ensure the national stock of red cells is available to all hospitals.
- 8.2.4 If the shortage is sufficiently severe that a reduction in usage is required NHSBT will inform hospitals that red cell use should be reduced by a certain percentage (based on their normal use).

8.2.5 If stocks of red cells return to a sustainable level, NHSBT will communicate to hospitals that orders can return to normal. 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.

### **8.3 Red Phase**

8.3.1 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.

8.3.2 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 In some shortage scenarios a reduction in hospital stockholding may be sufficient to allow recovery from shortage. However, in most scenarios this will need to be accompanied by a reduction in blood 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. In a more severe shortage 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 NHSBT complaints system.

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, or member of the Hospital Liaison Team. NHSBT will work closely with the Regional Transfusion Committees, the National Blood Transfusion Committee and the Strategic Health Authorities to support and share good practice.

## **10.0 Recovery from shortages**

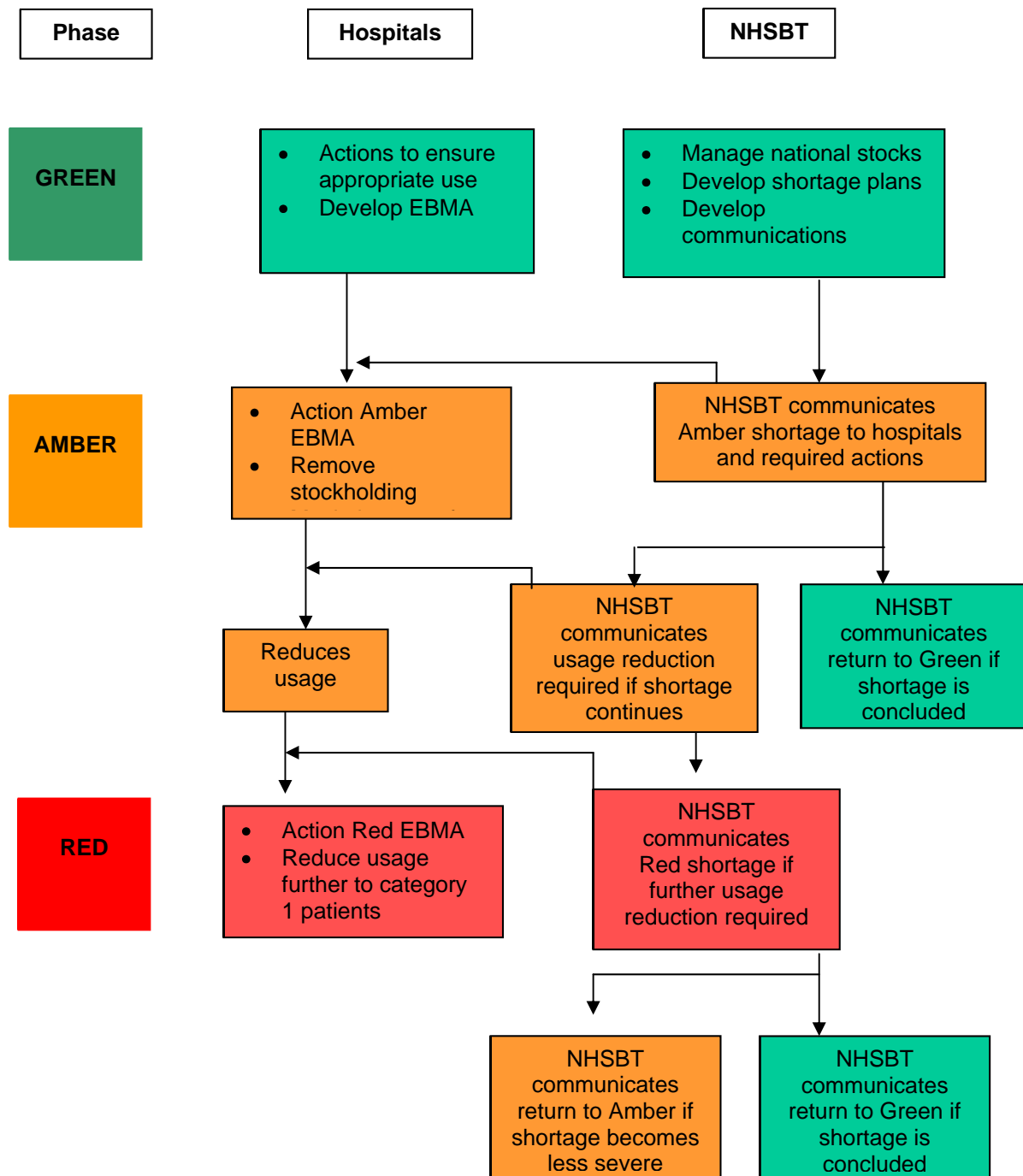
10.1 NHSBT will send a fax informing the Transfusion Laboratory that stocks have risen to a level where hospitals can move to Amber or Green phase.

- 10.2 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 blood shortage and amend the local arrangements as necessary. The recovery plan should be communicated to staff. Any recommendations should be fed back to the Hospital Transfusion Committee.

## 11.0 References

- 1) Gateway 3344. Emergency Planning - Development of an integrated plan for the Management of blood shortages.
- 2) ESD/PCS/HL/001/01. Development of an integrated blood shortage plan for the National Blood Service and hospitals.
- 3) Gateway 6514. An integrated plan for the National Blood Service and Hospitals to address platelet shortages.
- 4) Gateway reference: 9058. HSC 2007/001: Better Blood Transfusion - Safe and Appropriate use of Blood. Department of Health 2007.  
[http://www.transfusionguidelines.org.uk/docs/pdfs/nbtc\\_bbt\\_hsc\\_07.pdf](http://www.transfusionguidelines.org.uk/docs/pdfs/nbtc_bbt_hsc_07.pdf)
- 5) British Committee for Standards in Haematology (2001). Guidelines for the clinical use of red cell transfusion. *British Journal of Haematology*, **113**, 24-31.
- 6) British Committee for Standards in Haematology (2006). Guidelines on the management of massive blood loss. *British Journal of Haematology*, **135**, 634-641.
- 7) British Committee for Standards in Haematology (2004) Transfusion guidelines for neonates and older children. *British Journal of Haematology* **124**:433-453.
- 8) Association of Anaesthetists of Great Britain and Ireland (2008). Blood transfusion and the anaesthetist: red cell transfusion  
[http://www.aagbi.org/publications/guidelines/docs/red\\_cell\\_08.pdf](http://www.aagbi.org/publications/guidelines/docs/red_cell_08.pdf)
- 9) National Blood Transfusion Committee indication codes for blood transfusion. Available on the transfusionguidelines website and the DH NBTC website:  
<http://www.transfusionguidelines.org.uk/Index.aspx?Publication=NTC&Section=27&pageid=7556>  
<http://www.dh.gov.uk/ab/NBTC/index.htm>
- 10) Guidelines for the use of O RhD negative red cells. Available on the transfusionguidelines website and the DH NBTC website:  
[http://www.transfusionguidelines.org.uk/docs/pdfs/nbtc\\_bbt\\_indication\\_codes\\_2009\\_v2.pdf](http://www.transfusionguidelines.org.uk/docs/pdfs/nbtc_bbt_indication_codes_2009_v2.pdf)  
[http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@ab/documents/digitalasset/dh\\_103411.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@ab/documents/digitalasset/dh_103411.pdf)

## 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 is an essential part of decision-making for individual patients.

Category 1	Category 2	Category 3
<b>These patients will remain highest priority of transfusion</b>	<b>These patients will be transfused in the Amber but not the Red phase</b>	<b>These patients will not be transfused in the Amber phase</b>
<b>Resuscitation</b> Resuscitation of life-threatening /on-going blood loss including trauma.		
<b>Surgical support</b> Emergency surgery* including cardiac and vascular surgery**, and organ transplantation. Cancer surgery with the intention of cure.	<b>Surgery/Obstetrics</b> Cancer surgery (palliative). Symptomatic but not life-threatening post-operative or post-partum anaemia. Urgent*** (but not emergency) surgery.	<b>Surgery</b> Elective surgery which is likely to require donor blood support (Patients with > 20% chance of needing 2 or more units of blood during or after surgery).
<b>Non-surgical anaemias</b> Life-threatening anaemia including patients requiring in-utero support and high dependency care/SCBU. Stem cell transplantation or chemotherapy **** Severe bone marrow failure. Thalassaemias (but consider lower threshold). Sickle cell disease crises affecting organs. Sickle cell patients aged ≤ 16 with past history of CVA.	<b>Non-surgical anaemias</b> 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 should be deferred if possible.

## Appendix 3: Proposed generic actions for hospitals at each phase

### Green Phase

#### **Secure appropriate arrangements for *Better Blood Transfusion* 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 appropriate blood transfusion policies for the effective use of donor blood 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 alternatives.
- 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**

- Ensure that mechanisms are in place for the pre-operative assessment of patients for planned surgical procedures to allow the identification, investigation and treatment of anaemia and the optimisation of haemostasis.
- Ensure that an agreed list of indications for transfusion are established in collaboration with key clinical specialities, and are implemented and monitored.

- Develop a blood conservation strategy including the use of point-of-care testing for haemoglobin concentration and haemostasis and alternatives to donor blood such as peri-operative cell salvage and pharmacological agents such as anti-fibrinolytics and intravenous iron.
- Ensure that the blood conservation strategy is implemented.
- Ensure the establishment of procedures for the identification and management of maternal anaemia in particular with correction of iron deficiency in the antenatal and postnatal period.

### **Amber Phase**

- Continuation of elective surgery will depend on blood stock levels.
- Consideration should be given to reducing the transfusion trigger for transfusions.
- In cases of actual or potential massive blood loss a Consultant Haematologist must be contacted by the referring clinical team to allow discussion and planning of patient management and blood product provision.
- All cases which are deemed to require transfusion outside of the indication codes for transfusion should be referred to a Consultant Haematologist.
- Reduction of the reservation period for blood to 12 hours wherever possible.

### **Red Phase**

- Reduce stockholding to the level notified by the NHSBT.
- Reduce usage to the level indicated by NHSBT.
- Daily review of the blood shortage and its impact on patient care by the EBMG.
- Medical assessment of all requests by a Consultant Haematologist.
- An order of priority based on clinical need.
- The establishment of links between hospitals to utilise regional stocks more effectively.
- The enactment of a predetermined policy on dealing with major bleeding that should include guidance on when to stop blood component support.

**Reference.** Action plan adapted from the HSC 2007/001: *Better Blood Transfusion - Safe and Appropriate Use of Blood*. Department of Health 2007. Gateway reference: 9058.