GUIDANCE AND TRIAGE TOOL FOR THE RATIONING OF BLOOD FOR MASSIVELY BLEEDING PATIENTS DURING A SEVERE NATIONAL BLOOD SHORTAGE

Executive summary

The purpose of this document is to guide healthcare professionals in triaging patients in need of massive transfusion during a severe blood shortage (red phase of blood shortage plan). It will become operational where demand for blood greatly exceeds supply, and where all measures to manage supply and demand have been exhausted.

The document provides an emergency framework and triage tool to guide the allocation of blood components for patients with massive haemorrhage during significant shortage of blood stocks. It is based on the evidence- and ethics-based Canadian framework.1

The guidance complements existing national shortage plans for red cells2,3 and platelets4. In the event of shortages of all blood components this document should be used and supersedes other component specific documents 2,3,4. Its aim is to support clinical decision-making by detailing an approach for rationing resources that protects the community by maximising benefits and sharing resources fairly.

Background

Major haemorrhage is a clinical emergency associated with most specialities, but particularly cardiothoracic and vascular surgery, obstetrics, trauma, and gastroenterology.5 The care of the patients requires haemorrhage control and prevention of the shock induced coagulopathy. Early haemostatic resuscitation with blood transfusion support saves lives but is resource intensive.

In circumstances of potential or impending significant blood shortage, all organisational efforts should be made to reduce the impact. The use of blood components may need to be

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temporarily rationed including for patients with major haemorrhage. During this period, there should be fair, equitable and transparent distribution of blood components to individual patients.

The National Blood Transfusion Committee (NBTC) has supplied organisational guidance to address blood shortages. National plans for red cell and platelet shortages describe three phases: **green** (supply generally meets demand), **amber** (blood inventory is insufficient to continue usual transfusion practice) and **red** (severe, prolonged shortage).\(^2\)\(^,\)\(^4\) In addition, the NBTC have supplied guidance for the specification of emergency red cells.

The national guidance recognises that clinical judgement and the specific context of the blood shortage are both essential to inform blood allocation. This emergency framework for clinical transfusion triage for massively bleeding patients is based on an evidence-based Canadian framework.\(^1\) The focus of the plan is red cell shortage, although it recognises that some patients with massive haemorrhage may also require haemostatic components.

Traditional definitions of massive haemorrhage may be inappropriate in acute clinical situations. Individual hospitals may wish to develop more dynamic definitions. Examples include an expected blood loss of one blood volume in less than 24 hours: \(0.5 \times \) blood volume loss in 3 hours, or transfusion of four or more units of red blood cells in one hour.

**Methods**

This guidance was prepared by a working group on behalf of the NBTC in England whose overall aim is to promote good transfusion practice by providing a framework to channel information and advice to hospitals and Blood Services in England on best practice; the NBTC is accountable to NHS England. Its content is based on existing guidelines for the management of blood shortages\(^2\)\(^,\)\(^4\), and the Canadian emergency framework for clinical transfusion triage for massively bleeding patients.\(^1\) It was reviewed by members of the NBTC, which is accountable to the National Medical Director of NHS England through the Chief Scientific Officer. Its membership includes representatives of the medical Royal Colleges, specialist societies and other professional organisations with an interest in blood transfusion, the Chairs of the Regional Transfusion Committees in England, and patient representatives. The first edition of this document was prepared as part of the emergency response to the coronavirus pandemic. Comments and suggestions were sought and received both verbally

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and in writing from the members of the NBTC at and after its March 30th, 2020 meeting. The 2021 review recognises the lessons found during this period \(^6\) and reflects further feedback.

**Operation of the plan**

Should a national red cell shortage occur, NHS Blood & Transplant (NHSBT) will activate its emergency plan with the support of NHS England if necessary. It will notify Transfusion Laboratory Managers, Transfusion Practitioners & Consultant leads for Transfusion and in extreme national shortages, the CEO and Medical Directors to implement their Emergency Blood Management Arrangements (EBMA). Those arrangements include setting up an Emergency Blood Management Group (EBMG) or equivalent.\(^2,4\)

A ‘Red Phase’ shortage will be declared if there is a severe shortage of red cells, or if there is an imminent severe threat to the supply of red cells. It is essential that senior hospital managers (i.e. Chief Executive and Medical Director) and clinicians support the EBMA and the arrangements for transfusion triage. NHS Trusts should ensure that local policies detailing transfusion triage procedures are easily accessible to all laboratory and clinical staff to aide co-operation and understanding.

Hospitals may already have established an independent multidisciplinary clinical triage team for resource allocation in advance of a shortage. This team should receive comprehensive information on the triage framework before a blood shortage is declared and have adequate background knowledge in terms of triaging critically ill patients, have broad based knowledge of resources and capabilities of the organisation. Transfusion could be included in these local arrangements during a ‘Red phase’ of blood shortage. If not, we recommend that senior managers and experienced physicians in roles outside the direct care of potentially affected patients are employed to help with rationing decisions related to transfusion, so that front-line clinicians are relieved of this burden. The triage team leader should have final responsibility, authority, and accountability over clinical decisions. It is important that all decisions are documented accurately and in real time in patient’s medical records. Teams should ensure adequate clinical handover between teams and between shifts.

**The emergency framework for rationing blood for patients predicted to need massive transfusion**

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Goal: To provide blood transfusions in an ethical, fair, and transparent way. All efforts should be made to minimise suffering and maximise the use of blood alternatives, as appropriate, for those who are triaged to ‘no transfusion’ due to insufficient resources. Use the Clinical Frailty Scale (CFS) when appropriate, available from the NHS Specialised Clinical Frailty Network, to assess baseline health and inform discussions on treatment expectations.  

Inclusion Criteria: All patients needing, or predicted to need, massive transfusion due to massive haemorrhage (as defined above) during a ‘Red Phase’ blood shortage.

All such patients should have access to all available blood conservation strategies. These include (but are not limited to) intravenous/oral iron, haemostatic agents (Prothrombin Complex Concentrate (PCC) Fibrinogen Concentrate, LyoPlas), anti-fibrinolytics, erythropoiesis-stimulating agents, intraoperative cell salvage, interventional radiological procedures, rapid access to endoscopy, and non-invasive surgery. Early surgical intervention, attention to the management of coagulopathy and where appropriate intra-operative cell salvage may be of value in patients with massive haemorrhage.

The first aim should be the early identification of those patients who might need massive transfusion, and to triage patients to optimise for transfusion support. Guidance and tools such as those developed by NICE and the Royal College of Physicians may be helpful for triaging patients. Triage is a dynamic process and patients should be actively re-assessed based on the following general and condition specific exclusion criteria.

Any decisions made to begin, withdraw, or withhold care should follow the shared decision-making policies of the NHS. This means that these decisions should include the patient and their wishes (as much as is possible for the given situation) and, if appropriate, the patient’s carers.

General Exclusion Criteria
The general exclusion criteria should be considered for all patients needing massive transfusion support (see Appendix A). An algorithm for triage is shown in Appendix A.

Reassessment for Triaged Patients should be led by relevant clinical lead with the aid of a member of the EBMG.
1) **Patients triaged to no blood components:**

Patients triaged to no transfusion care should be re-assessed at a minimum of every 24 hours. A system should be in place to support physicians caring for the patient if an improvement in a patient’s status would now qualify them to be re-triaged to active transfusion management or if the blood shortage is resolved.

2) **Patients triaged to blood components:**

Patients triaged to active transfusion care should be assessed at start of massive haemorrhage resuscitation, and after a minimum of every 8 units of red blood cells (adjusted for patient size, for example for children) or every 24 hours for patients receiving less than 8 units of blood or until cessation of haemorrhage (or more often – e.g., every 4 units if deemed necessary). If there is persistent bleeding following surgical intervention, there should be close attention to the correction of coagulopathy and consideration of return to theatre.

At each assessment, the triage team should assess and document the patient’s status and overall futility for continuation of active treatment, using the following variables to guide their decisions on the value of continued transfusions:

   i) sequential organ failure assessment (SOFA) score.
   ii) total blood components used.
   iii) the predicted need for ongoing transfusion support.
   iv) ability to control bleeding with either surgery or other procedure (e.g., interventional radiology, endoscopy).

Patients with a SOFA score >11, who have a continued need for large amounts of blood components, and where there is no foreseeable ability to control blood loss should be triaged to palliative care.

The ReSPECT document (Appendix B) from the resuscitation council can be used to document this as all multidisciplinary teams use it and it can be placed into patient notes.

**Ethical framework for triaging patients to active transfusion care**

There is existing guidance to aid decision making where two or more patients, who equally qualify for active transfusion management, require blood components at the same time. The British Medical Association has drawn attention to a Government ethical framework designed
to support thinking through strategic aspects of decision-making during a pandemic.\textsuperscript{12} It provides several guiding principles which equally apply to a blood shortage scenario' or where a pandemic may result in a severe blood shortage:

- **Equal respect:** everyone matters, and everyone matters equally, but this does not mean that everyone will be treated the same.
- **Respect:** keep people as informed as possible; give people the chance to express their views on matters that affect them; respect people’s personal choices about care and treatment.
- **Fairness:** everyone matters equally. People with an equal chance of benefiting from a resource should have an equal chance of receiving it – although it is fair to ask people to wait if they could get the same benefit later.
- **Working together:** we need to support each other, take responsibility for our own behaviour, and share information appropriately.
- **Reciprocity:** those who take on increased burdens should be supported in doing so.
- **Keeping things in proportion:** information communicated must be proportionate to the risks; restrictions on rights must be proportionate to the goals.
- **Flexibility:** plans must be adaptable to changing circumstances.
- **Open and transparent decision-making:** good decisions will be as inclusive, transparent, and reasonable as possible. They should be rational, evidence-based, the result of a reasonable process and practical in the circumstances.

Triage working group on behalf of the National Blood Transfusion Committee
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References


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10. ReSPECT. COVID-19 Resources: https://www.resus.org.uk/respect


Appendix A

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

Patient needing or predicted to need massive transfusion

NO

Follow guidance from Emergency Blood Management Group and the Contingency Blood Shortage Plan

YES

General Exclusion Criteria

A. Major burns with advanced, progressive multi-organ failure
B. Cardiac arrest where the cause is not considered reversible
C. Advanced, progressive baseline cognitive impairment
D. Advanced, progressive untreatable neuromuscular disease
E. Metastatic malignant disease with expected survival less than 6 months
F. Advanced and irreversible immunocompromise
G. Severe and irreversible acute neurologic event or condition
H. End-stage organ failure meeting the following criteria:
   i) Heart – NYHA class III or IV heart failure
   ii) Lungs – COPD with FEV1 <25% predicted, baseline PaO₂ <7 KPa, or secondary pulmonary hypertension; Cystic fibrosis with post-bronchodilator FEV1 <30% or baseline PaO₂ <55mmHg; Pulmonary fibrosis with VC or TLC <60% predicted, baseline PaO₂ <7 KPa, or secondary pulmonary hypertension; primary pulmonary hypertension with NYHA class III or IV hear failure, right atrial pressure >10mmHg, or mean pulmonary arterial pressure >50mmHg.

Review NICE clinical frailty score

Does patient meet one of the above general exclusions?

YES

Supportive care without transfusion

Re-assess as per guidelines

NO

Specific Exclusion Criteria based on clinical factors specific to patient populations

- Trauma with significant or non-survivable brain injury
- Ruptured Abdominal Aortic Aneurysm with cardiac arrest, or unresponsive to fluid resuscitation or not eligible for surgery
- Extracorporeal Membrane Oxygenation/Ventricular Assisted Device with multi-organ failure
- Organ transplant
- Other: mortality likely >80%

Go to part 2 of algorithm

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Emergency Framework for Blood Rationing - Algorithm for Triage Team (Part 2)

Does patient meet one of the above specific exclusions?

Supportive care without transfusion
Re-assess as per guidelines

Is there enough inventory to meet current demand at hospital level?

Is inventory concern related to competing patients eligible for transfusion?

Supportive care without transfusion
Re-assess as per guidelines

Principles for prioritisation
1. Maximisation of benefits
2. Fair allocation of resources

Is a patient meeting these criteria?

Re-evaluate at specified intervals for eligibility for ongoing transfusion:
1. Every 24 hours
2. Every 8 units of RBC (to be adjusted by the EBMG as determined by blood availability)
3. Re-assess according to the reassessment criteria for triaged patients.

Supportive care without transfusion
Re-assess as per guidelines

 Figures for Appendix A have been adapted from Emergency framework for rationing of blood for massively bleeding patients during a red phase of a blood shortage.¹

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Appendix B – taken from ReSPECT. COVID-19 Resources. [https://www.resus.org.uk/respect](https://www.resus.org.uk/respect)