TITLE- Adult Non Obstetric Major Haemorrhage Guideline

TARGET AUDIENCE	All clinical staff in all three acute sites
PATIENT GROUP	All Adult Non Maternity Patients

Clinical Guidelines Summary

This protocol will give guidance for clinical staff involved in managing adult non maternity patients experiencing a major haemorrhage (separate NHSL documents exist covering the management of major haemorrhage in maternity patients and in children).

The document details activation instructions, lines of communication, information required and clinical guidance to achieve the optimal care for patients.

A major haemorrhage protocol (MHP) flowchart specific to that acute hospital should be available in all relevant clinical areas and these are intended for reference during a major haemorrhage.

Objective

- **Allow rapid and appropriate response to major haemorrhage**
- **Open a channel of communication between clinical area and blood bank**
- **Provide quick and effective delivery of blood components for patients with major haemorrhage**

Major Haemorrhage Protocol for Non-Obstetric Adult Patients

CONTENTS

1. INTRODUCTION

This protocol will give guidance for clinical staff involved in managing adult non maternity patients experiencing a major haemorrhage (separate NHSL documents exist covering the management of major haemorrhage in maternity patients and in children). The document details activation instructions, lines of communication, information required and clinical guidance to achieve the optimal care for patients. A major haemorrhage protocol (MHP) flowchart

specific to that acute hospital should be available in all relevant clinical areas and is intended for reference during a major haemorrhage.

1.1 Objective

- **Allow rapid and appropriate response to major haemorrhage**
- **Open a channel of communication between clinical area and blood bank**
- **Provide quick and effective delivery of blood components for patients with major haemorrhage**

1.2 Target Population

- **Adults, not including obstetric patients**
- **All NHSL acute hospitals**

1.3 Definition of Major Haemorrhage

Subjective

Clinical concern that patient is experiencing bleeding problems requiring support with multiple transfusion products - at clinician discretion.

Objective

- **Blood loss > 150mls/min**
- **20% blood volume loss in < 1 hour**
- **50% blood volume loss in < 3 hours**
- **4 units RBC transfused in < 4 hours**

1.4 Trigger for MHP activation

A clinician determines that the patient fulfils one of the above criteria.

1.5 Responsibilities

It is imperative that everyone involved in major haemorrhage is aware of their role and responsibilities. It is the responsibility of the registered practitioner, in line with their professional body, to ensure they do not participate in any part of the process for which they have not been trained or where they may not be competent.

Clinical Staff

- **Identify when MHP activation is required**
- **Be aware of local protocol**
- **Trigger activation as per protocol**

- **Identify Major Haemorrhage Co-ordinator (essential role for every major**
- **haemorrhage) responsible for communication**

Major Haemorrhage Co-ordinator

- **Activate the MHP if not already done**
- **Ensure adequate staff available/ delegate other staff roles**
- **Ensure clear communication between the labs and clinical area**
- **Liaise with on-call Haematologist providing real time clinical information**
- **Request type and number of blood components required and state level of urgency**
- **Arrange initial blood tests and ensure adequate labelling including hand written transfusion samples**
- **Check for blood results and co-ordinate further blood tests at timely intervals**
- **Ensure an accurate log of events**
- **Ensure blood components are either used or returned to prevent unnecessary waste**
- **Ensure traceability of all blood products**
- **Handover Major Haemorrhage Co-ordinator role if patient is moving to another clinical area**
- **Ensure labs, switchboard and porter are notified when emergency is over (standing down)**

Blood Bank

- **Respond to the MHP activation immediately with MHP becoming priority of work**
- **Make contact with the clinical area and identify the blood transfusion needs**
- **Supply blood and blood components as required in line with the MHP**
- **Direct the designated porter for transport of blood components**

Switchboard

- **Trigger the MHP page and supply ward and contact number**

Porters

- **Attend blood bank for transport of blood components then await further instruction**

2. Activating the Major Haemorrhage Protocol

2.1 How to activate the MH response

All sites: Phone 2222 and say "activate the major haemorrhage protocol"

State: ward & extension number

Blood Bank, ITU/Anaesthetist, Porters and HECT (at night) are alerted via the speech bleeps.

Note: the speech bleeps for major haemorrhage are tested daily. Any identified issues must be reported to switchboard immediately.

2.2 General response measures

- **Control bleeding**
- **Gain optimal venous access**
- **Avoid hypothermia - warm fluids**
- **Take appropriate blood tests and send/deliver urgently to lab.**

Many of the measures in this document relate to the co-ordination of resuscitative and supportive measures in the setting major of blood loss. These measures are to be used in parallel with attempts to control the bleeding from its source(s). This may include external compression of bleeding site, endoscopic procedures, interventional radiology procedures or surgical interventions. It is beyond the remit of this document to be any more detailed or specific about these measures.

2.2.a Immediate blood tests

FBC, emergency cross match (hand written bottles only), coagulation screen, biochemistry (including calcium), blood gases if appropriate and any other tests appropriate for management of an individual patient

2.2.b Information required by blood bank

- **Urgency of the situation**
- **Patient details (minimum data set)**

- **Conscious patient - name, DOB, gender, CHI number (or other unique number e.g. temporary emergency number)**
- **Unconscious / unidentified patient - gender and unique number**
- **Location of patient**
- **Designated clinical contact person (the Major Haemorrhage Co-ordinator)**
- **Contact number**
- **Number and nature of components required in the first instance**
- **Patient diagnosis (if known)**
- **Any likelihood of transfer of patient, either to another clinical area (theatre, endoscopy) or off site**
- **Confirm which samples have been sent.**

3. Blood component support

Packed red cells (PRCs)

PRCs are necessary to maintain sufficient circulating volume and haemoglobin capable of oxygen delivery to the tissues. PRCs are stored as liquid at a cooled temperature and are readily available for use on all three acute sites.

There are three levels of 'matching' of PRCs, which correlate directly with clinical urgency, and indirectly with how well matched the unit is to the patient's blood.

O Neg – immediately available from each of the three blood bank fridges or from emergency blood fridges (currently the maternity blood fridge at University Hospital Wishaw) without prior knowledge of patient's blood group or further matching

Group Specific – available from blood bank once patient's blood group is known.

Compatible (to patient's ABO group) units are selected but not cross-matched. Typically available in 10-15 minutes

Fully Cross-Matched – available from blood bank once patient's blood group is known and further compatibility testing between selected unit and patient's plasma has been performed. Typically available in 30-40 minutes. This may take longer if the patient has known red cell antibodies.

The number of PRC units requested is dependent on the rate and volume of blood loss observed in conjunction with clinical observations and if time allows laboratory parameters.

Typically, 4-6 units of PRCs are requested initially with further requests of 2-4 units at a time dependent on on-going blood volume loss.

Special Requirements in setting of Major Haemorrhage - The patient should receive blood with appropriate special requirements (e.g. Irradiated) though only if these are readily available. The patient must not incur an excessive delay in transfusion that could lead to morbidity and mortality in a major haemorrhage situation whilst waiting for blood fulfilling special requirements to become available. In the setting of a major haemorrhage it would be inappropriate for transfusion to be delayed whilst awaiting Special Requirement blood to be delivered from a regional Blood Transfusion Centre (SNBTS).

Packed red cell units are red cells suspended in SAG-M, contain almost no plasma or platelets and are considered deficient for the purposes of replacing these. Additional blood products including FFP, platelets and cryoprecipitate are available on request on all three acute sites. FFP and cryoprecipitate are stored in a frozen state and require to be thawed prior to use. Platelets are frequently held as stock on all three sites however it may be necessary for them to be delivered urgently from SNBTS by emergency courier.

FFP

Typically, FFP is used to empirically replace clotting factors lost through haemorrhage and/or correct established coagulopathy. They are stored frozen and require up to 30 minutes to issue.

FFP should be used to maintain a PT ratio and APTT ratio <1.5.

The recommended replacement dose in adults is 15-20ml/kg. A unit of FFP typically contains around 275mls and 3-4 units are typically requested at a time. It is recognized that in some situations the rate of haemorrhage and the dynamic nature of the situation renders laboratory coagulation testing obsolete. In these circumstances the use of FFP should be empirical and judicious based on volume of blood lost, volume of PRCs anticipated to be used and the prospects of cessation of haemorrhage. Empirical FFP should be considered in large volume blood loss aiming for a minimum ratio of one unit of FFP for every two PRCs. For example in the event of a major haemorrhage

in which the patient has or is anticipated to receive approx. 8 units of PRCs the patient should receive a minimum of 4 units FFP.

A ratio of 1:1 used initially in trauma patients.

Cryoprecipitate

Typically used as an adjunctive blood product principally to replace low fibrinogen levels. Large volumes of FFP will often adequately replace fibrinogen levels on its own however if the fibrinogen level is deemed particularly low or has failed to improved adequately with FFP then cryoprecipitate is a good source of fibrinogen replacement. The typically adult replacement dose is 2 pools. Cryoprecipitate is also stored frozen and will require up to 40 minutes to thaw. Fibrinogen should be kept to greater than 1.5 g/l (>2g/l in obstetric haemorrhage)

Platelets

Typically used to replace platelets lost through haemorrhage and/or correct an established thrombocytopenia and/or platelet dysfunction. They are stored in a liquid state at room temperature and no defrost is required. Platelets should be used to maintain the platelet count >75x10^9/L. In cases of head injury, polytrauma and in patients on anti-platelet agents a target of >100x10^9/L should be aimed for.

Typically, one pool of platelets is used at a time. A pool of platelets would be expected to generate an increment of around 20-40x10^9/L. On occasions, two pools may be requested simultaneously when, for example, there is significant thrombocytopenia where one pool would not be expected to improve the platelet count to desired levels. Additional platelet pools may need to delivered from SNBTS, Edinburgh or Glasgow.

4. Additional interventions

Cell salvage - should be used where appropriate and available.

Tranexamic Acid (TXA) - the CRASH-2 study reported a reduction in mortality in patients given TXA who had massive bleeding following trauma. Trauma patients with severe haemorrhage should be given TXA within three hours of first contact with Emergency services. Dose: 1 gram over 10 minutes followed by infusion of 1 gram over 8 hours if bleeding persists. Alternatively, 1 gram over 10 minutes repeated every 8 hours instead of infusion. Recently the results of the HALT-IT study, a large randomized placebo controlled trial, suggests no reduction in death or blood product usage when tranexamic acid is given in acute GI bleeding. The study also shows an increase in VTE risk with TXA use. Therefore, its use is not recommended in this setting.

Recombinant Factor VIIa (rVIIa) - There is no evidence of beneficial effect of rVIIa outside of its licensed use in patients with Haemophilia. Therefore, its routine use in major haemorrhage is not recommended and it should only be considered when other treatment options are exhausted, the patient will clearly exsanguinate and in consultation with a Haematologist. This product is available from Blood Banks in each hospital after authorisation from Consultant Haematologist.

Initial dose; 90microgram / kg as an IV bolus over 2-5 minutes. A second dose can be considered after 2 hours.

Fibrinogen concentrates – These are currently unlicensed drugs in the setting of acquired hypofibrinogenaemia as seen in major haemorrhage and associated coagulopathy. In some centres in the UK these are used in place of cryoprecipitate. Their use is NHSL is limited and it is not currently recommended that they be used in place of cryoprecipitate out with a clinical trial.

Prothrombin Complex Concentrates (e.g. Prothromplex) – These are typically used in the setting of rapid reversal of the anticoagulation effect warfarin or other coumarin anticoagulants. It is thought more appropriate to use these initially rather than FFP in the setting of haemorrhage related to warfarin or other coumarins. The dose of Prothrombin Complex Concentrate is calculated based on body weight and the current INR. Dosing is typically 25-50 units/kg with a maximum initial dose of 5000 units. In the setting of major haemorrhage relating to warfarin, Vitamin K 10 milligrams iv should be given at the same time. This product is available from Blood Banks in each hospital after authorisation from Consultant Haematologist.

Protamine - Typically used in the reversal of anticoagulation with unfractionated heparin. If the patient has developed major haemorrhage whilst receiving an intravenous heparin infusion, the infusion should be stopped and protamine 25-50 milligrams given IV over 10 minutes.

Praxbind (Idarucizumab) – Specifically for reversal of the anticoagulant effect of Dabigatran. Praxbind is available via pharmacy on all three acute sites. It is not for use for reversal of other DOACs. Information on dosing is contained within the products Summary of Product Characteristics.

Andexanet alfa (Ondexxya) – Specifically for reversal of the anticoagulant effects of Apixaban or Rivaroxaban. The dose of Andexanet alfa is calculated dependent on a number of factors including anticoagulant drug and dose and timing of last dose prior to reversal. This product is available from Blood Banks in each hospital after authorisation from Consultant Haematologist.

Andexanet alfa is administered as an IV bolus over 15-30 minutes followed by an IV infusion over 2 hours. The below chart should be used for dosing calculations.

The use of Andexanet alfa for the reversal of Edoxaban is off license. Its use is supported by consensus within the Haematology/Blood transfusion community nationally and is covered in NHS Lanarkshire by a ULM agreement.

Factor Xa Inhibitor	Last dose taken	Timing of last dose before andexanet alfa infusion		
		< 8 hours/Unknown	≥ 8 hours	> 18 hours*
Apixaban	5mg or less	Low dose	Low dose	Not recommended as not included in clinical trial
	More than 5mg or dose unknown	High dose		
Rivaroxaban	10mg or less	Low dose	Low dose	
	More than 10mg or dose unknown	High dose		
Edoxaban (off label)*	30 mg or less	Low dose	Low dose	
	More than 30 mg or dose unknown	High dose		

as per Protocol published as supplement for: Connolly SJ, Crowther M, Eikelboom JW et all. Full study report of andexanet alfa for bleeding associated with factor Xa inhibitors. N Engl J Med 2019; 380: 1326-35

	Initial Intravenous Bolus	Continuous Intravenous Infusion	Total number of vials required
Low Dose	`400mg at a target rate of 30 mg/min	4 mg/min for 120 minutes (480mg)	5
High dose	800mg at a target rate of 30 mg/min	8 mg/min for 120 minutes (960mg)	9

Inherited Bleeding Disorder

Patients presenting to the Emergency Department in hospitals in the West of Scotland, other than Glasgow Royal Infirmary (GRI), with bleeding or trauma Patients with a known inherited bleeding disorder (e.g. Haemophilia or von Willebrands) presenting with bleeding or trauma (even minor trauma in those with severe Haemophilia) will often require urgent haemostatic treatment (e.g. coagulation factor infusion). Patients with inherited bleeding disorders (or acquired Haemophilia or acquired von Willebrands Syndrome) registered with the West of Scotland Haemophilia Centre (Adult Centre at GRI and Paediatric Centre at RHC, QEUH) should carry a bleeding disorder card stating their diagnosis, baseline factor level and usual treatment product.

Clinical advice should be sought from the Haemophilia Centre at GRI (Mon-Fri, 8:30am –4:30pm), or if out of hours the on-call Haematologist on duty at GRI.

Useful Contacts at Glasgow Royal Infirmary

Haemophilia Centre 0141 211 4840 Mon-Fri 8:30am-4:30pm

Haematology Registrar 0141 211 4000 bleep 13733 Mon-Fri 9am-5pm

Haematology Registrar on-call 0141 211 4000 via switchboard out of hours

All hospitals within the Greater Glasgow and Clyde Health Board can find summary details of the patient's bleeding disorder and their preferred treatment on Clinical Portal, under 'Care Plan - MDT plan' This is also available to most hospitals in the West of Scotland via the Regional Portal system

5. Management of immediate complications

The following complications should be anticipated and managed appropriately in patients receiving multiple units of blood components.

Hypothermia - monitor temperature, keep patient physically warm and use fluid warmers.

Hyperkalaemia - monitor potassium, initiate local protocol for treatment of hyperkalaemia (e.g. calcium gluconate, glucose + insulin + bicarbonate).

https://rightdecisions.scot.nhs.uk/media/yypdsmo5/acute-hyperkalaemia-guideline-revised-march-2.pdf

Acidosis - monitor patient (lactate, Hydrogen ion on ABGs) and take corrective action e.g. sodium bicarbonate

Hypocalcaemia- monitor calcium levels - if ECG changes or clinical evidence of hypocalcaemia give 10mls of 10% calcium chloride and if necessary repeat until ECG normal

https://rightdecisions.scot.nhs.uk/media/tr1p2ucm/management-of-hypocalcaemia-in-secondary-care.pdf

6. De-activation of the Major Haemorrhage response

It is essential that blood bank is informed whenever the clinical emergency has ended, to minimise wastage and allow lab staff to prioritise other work. It is possible that there is another Major Haemorrhage occurring simultaneously in the same hospital. This communication is the responsibility of the Major Haemorrhage Co-ordinator. This is known as 'Standing Down' the Major Haemorrhage.

7. Inter-hospital transfer

Occasionally it may be necessary to transfer a patient with ongoing bleeding to another hospital and sometimes blood is transferred along with the patient. It is essential that this process involves Blood Bank staff. This process is described in the Blood Bank SOP LP-1819 - 'Collection, Delivery and Transport of Blood'

8. Audit

Activations of the MHP will be audited by the local Hospital Blood Transfusion Committee, so that defects in the process can be identified, rectified and lessons learned then fed back to all staff involved in the major haemorrhage response

References/Evidence

Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-controlled trial. The Lancet Volume 376, Issue 9734, p 23-32, July 2010

Recombinant factor VIIa for the prevention and treatment of bleeding in patients without Haemophilia. Cochrane Database of Systematic Reviews. 2013

Effects of a high-dose 24-h infusion of tranexamic acid on death and thromboembolic events in patients with acute gastrointestinal bleeding (HALT-IT): an international randomised, double-blind, placebo-controlled trial. The Lancet Volume 395, p 1927-36, June 2020

Transfusion of plasma, platelets, and red blood cells in a 1:1:1 vs a 1:1:2 ratio and mortality in patients with severe trauma: the PROPPR randomized clinical trial. JAMA. 313(5):471-482. 2015

NHSL Refusal of Blood Policy (Including Jehovah's Witnesses)

NHSL Inpatient Hyperkalemia Guideline

bshguidelines@b-s-h.org.uk

1. Governance information for Guidance document

Lead Author(s):	Dr Andrew Fyfe
Endorsing Body:	Lanarkshire Transfusion Governance Group
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CONSULTATION AND DISTRIBUTION RECORD	
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Consultation Process / Stakeholders:	• Lanarkshire Hospital Transfusion Committees • Lanarkshire Transfusion Governance (LanTaG) Committee

Distribution	Divisional management team All acute site directors All acute site medical chiefs All acute site chief nurses All acute governance leads

CHANGE RECORD

Date	Lead Author	Change	Version No.
01/11/24	A Fyfe	Contact telephone numbers on flowcharts updated Addition of dosing and administration information for Andexanet alfa. Reference to ULM covering unlicensed use of Andexanet alfa in Edoxaban reversal. Clarification of licensed product in UK (Ondexxya). Addition of dosing and administration information for Protamine Addition of dosing and administration information for Tranexamic Acid Link to current hypocalcaemia management guidance Link to current hyperkalaemia management guidance Removal/replacement of reference to Beriplex which is being replaced by Prothromplex	1
			2
			3
		.	4
			5

9. Appendices

9.1 University Hospital Hairmyres; Major Haemorrhage Protocol Flowchart

Version No. 2 Date November 2024

9.2 University Hospital Monklands; Major Haemorrhage Protocol Flowchart

Version No. 2 Date November 2024

9.3 University Hospital Wishaw; Major Haemorrhage Protocol Flowchart

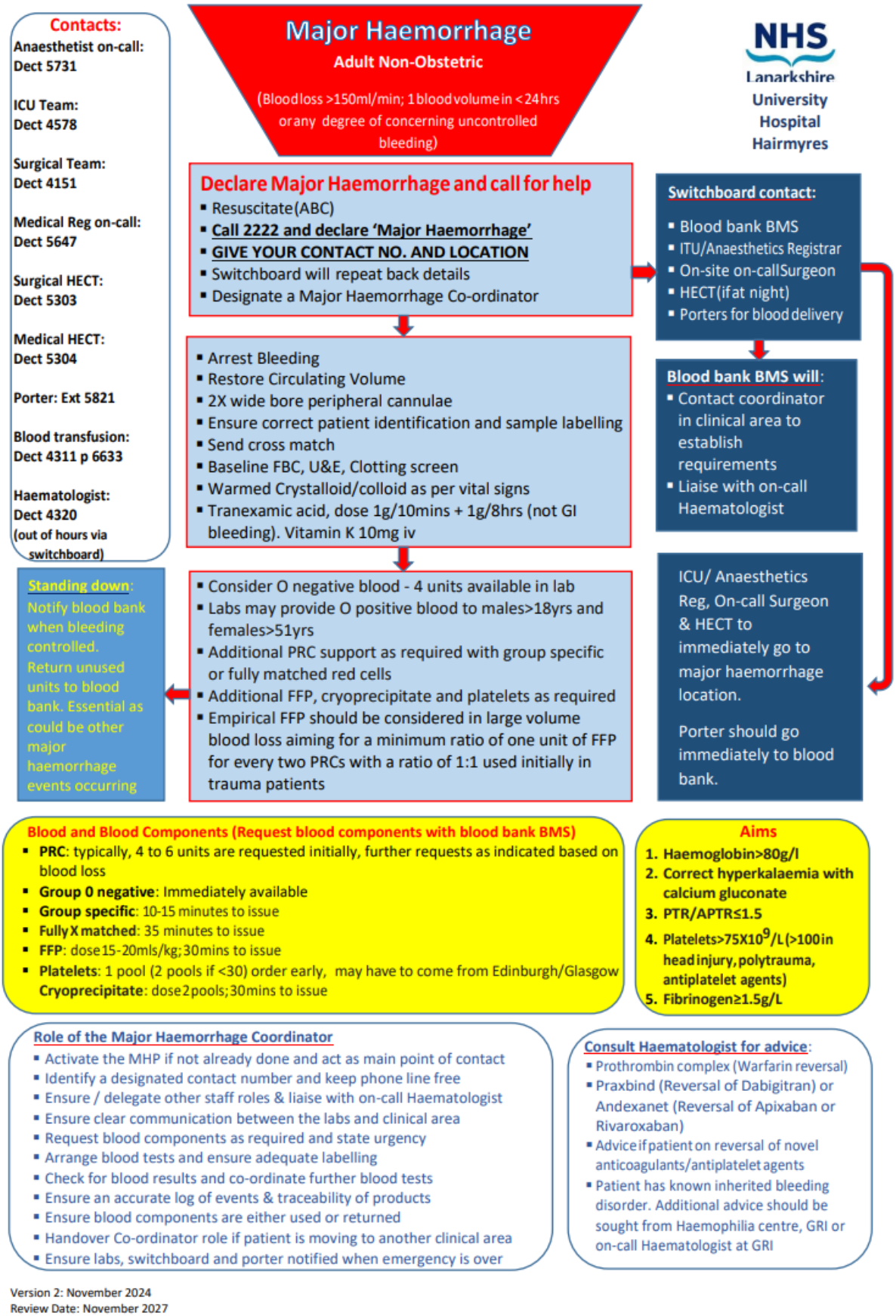
Version No. 2 Date November 2024

9.4 Major Haemorrhage Action Card

Version No. 1 Date November 2021

9.5 Blood bank log

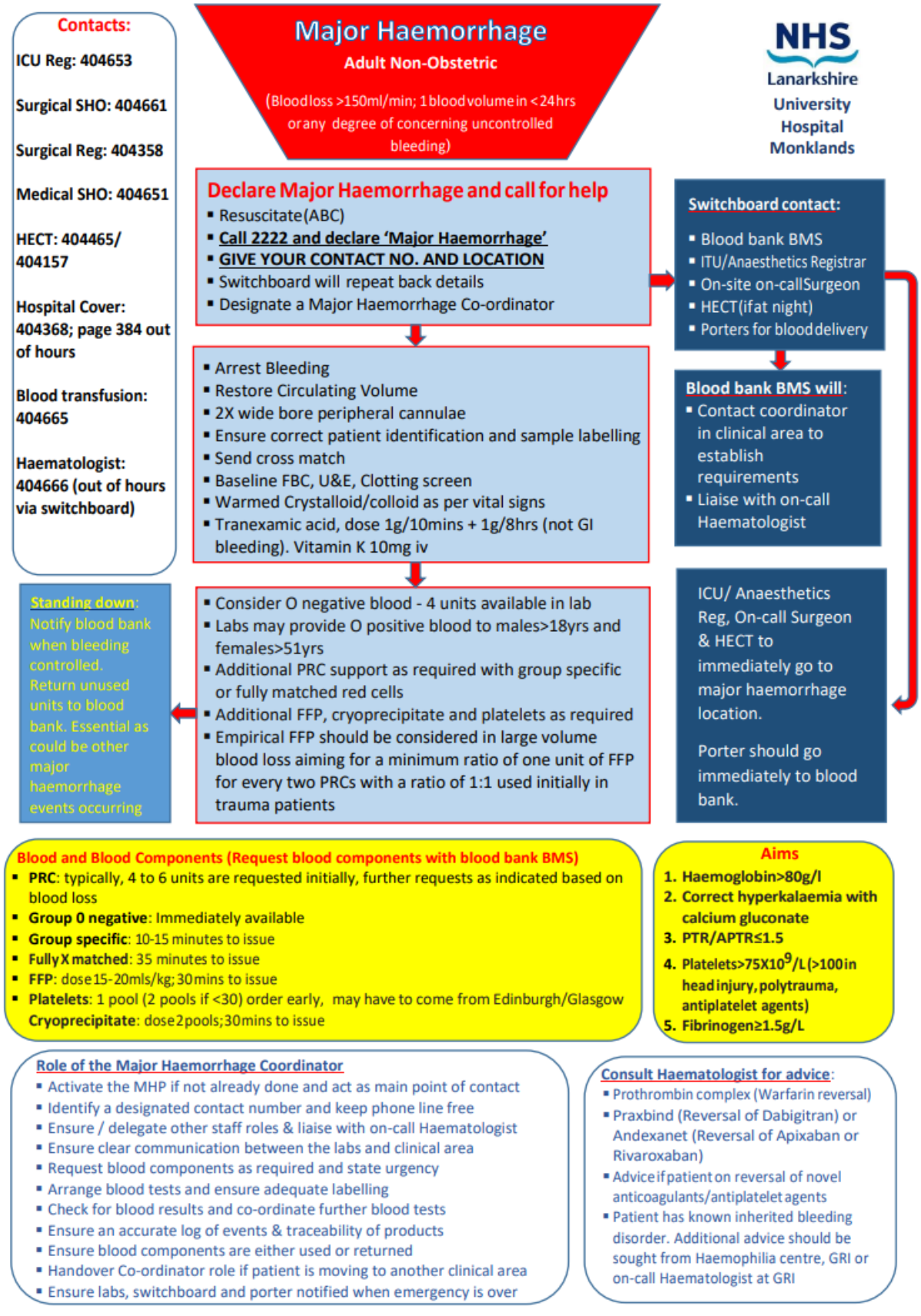
Version No. 1 Date November 2021



Version 2: November 2024
Review Date: November 2027

Lead Author	Dr Andrew Fyfe	Date approved	01/11/2024
Version	2	Review Date	01/11/2027

Adult Non Obstetric Major Haemorrhage Policy



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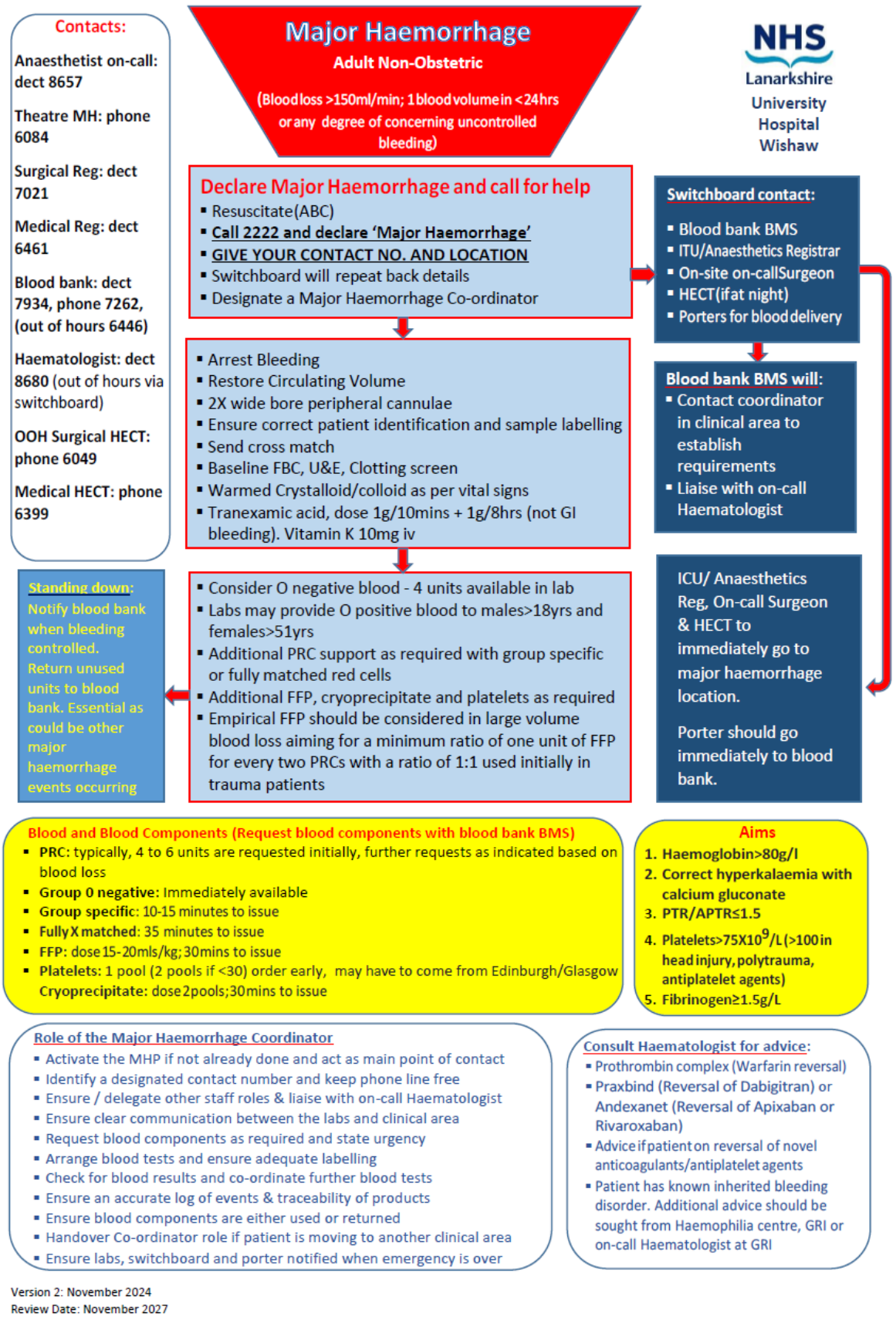
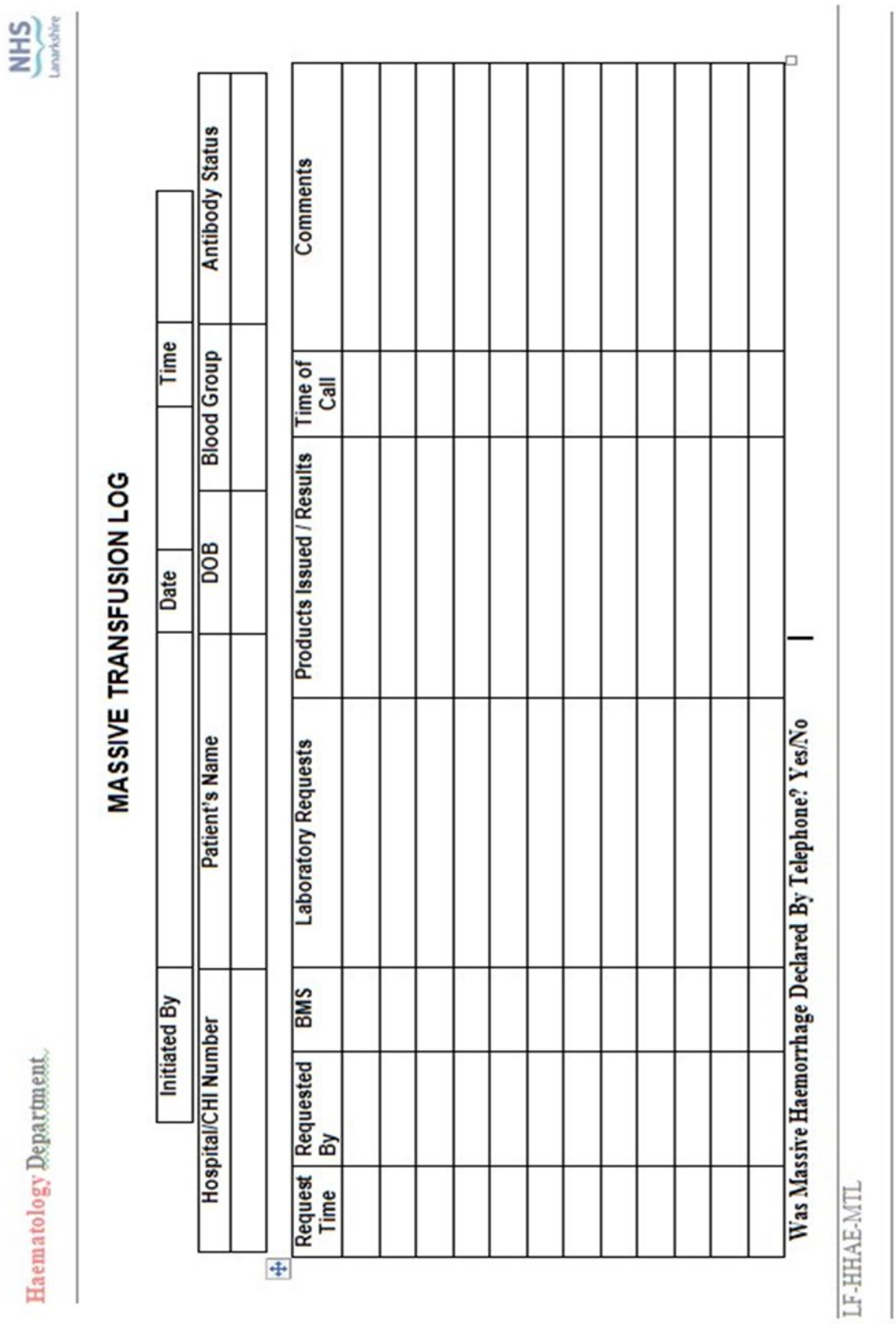
Adult Non Obstetric Major Haemorrhage Policy



Lead Author	Dr Andrew Fyfe	Date approved	01/11/2024
Version	2	Review Date	01/11/2027

Major Haemorrhage Action Card



NHS Lanarkshire

Haematology Department

MASSIVE TRANSFUSION LOG

Initiated By		Date		Time	
Hospital/CHI Number		Patient's Name		DOB	Blood Group	Antibody Status

Request Time	Requested By	BMS	Laboratory Requests	Products Issued / Results	Time of Call	Comments

Was Massive Haemorrhage Declared By Telephone? Yes/No

LF-HHAE-MTL