

Major Haemorrhage Simulations – Toolkit for Transfusion Practitioners

This document is aimed to be utilised by Transfusion Practitioner’s as a toolkit / guide in facilitating effective simulation-based education in their role. The document has been split into categories with information / guides / proformas listed below:

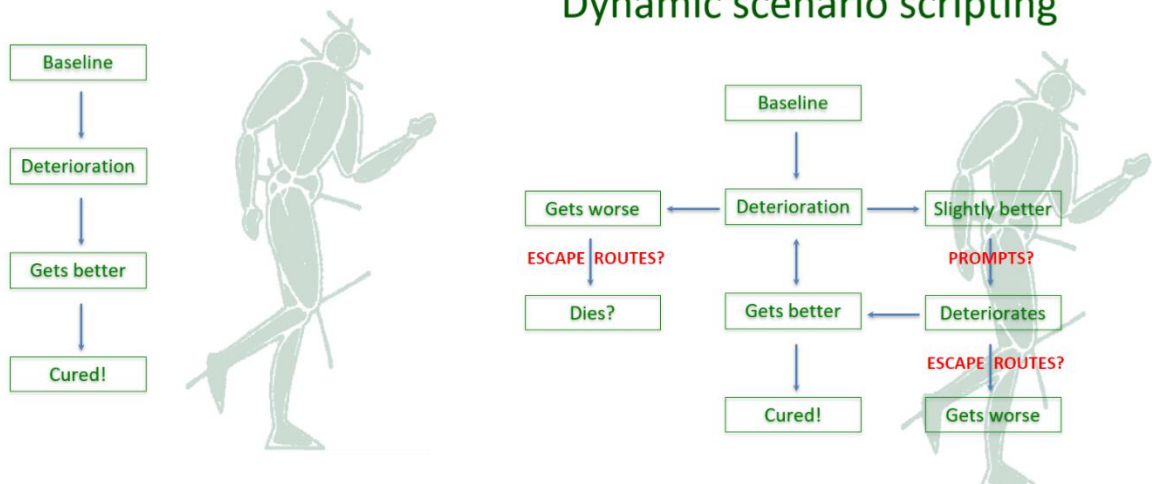
1. [Process flow chart](#)
2. [Generic learning / educational objectives](#)
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1.0 Process flow chart

A simulation needs to be believable and educationally useful to all participants.

- Learning Objectives (see section 2.0)
- Identify the scenario and plan a dynamic scenario script – ‘moulage’

Dynamic scenario scripting



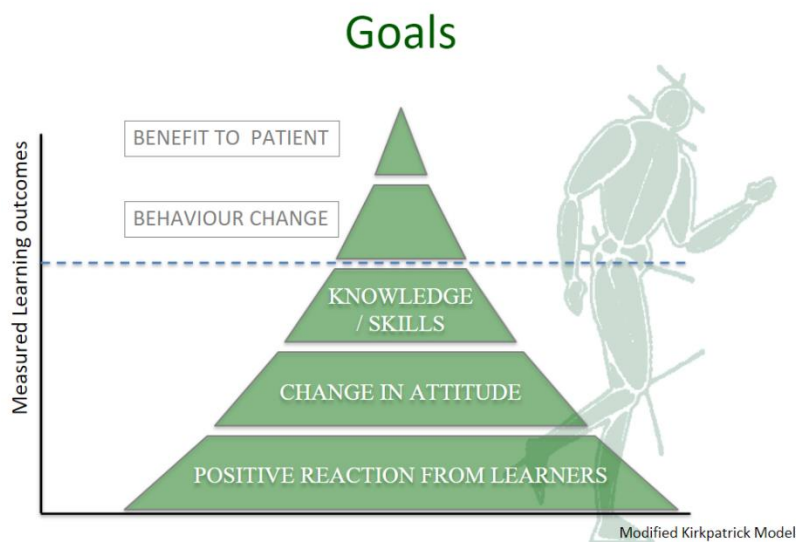
- Identify the learners and roles with the aim to have the correct people there. Examples include:
 - Nurse/Midwife/AHP
 - Patient
 - Laboratory
 - Transfusion Practitioner
 - Switchboard
 - HCA/support staff
 - Porter
 - Doctors (any level)
 - Relative
 - Observers

- Scribe/timings
- Location
- Equipment/resources (see section 5.0)
- Duration/defined end point
- Questions/reflection
- Debrief
- Learning Outcomes - Take home messages and learning

2.0 Generic Learning / educational objectives

Learning objectives will vary depending on the design of the simulation. Questions to remember are:

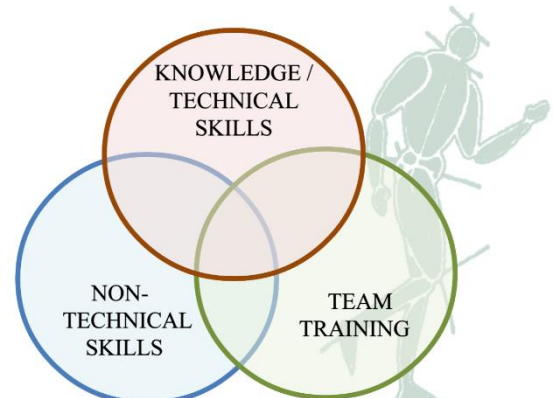
1. Who am I/we teaching?
2. What do they need to learn?
3. How many students/staff?
4. Where will it be held?
5. How long do I/we have?
6. Is simulation the most appropriate method?



Defining educational objectives:

- Technical skills: task based and cognitive
- Non-technical skills: individual development
- Human Factors: team development
- Quality improvement: system review and development
- Patient Safety: policy development / implementation, assessment

Learning Objectives



The following are a standardised list of general / common learning outcomes that could be used to formulate the learning outcome design of a Major Haemorrhage Simulation. Please note, this is not an exhaustive list and may not be relevant and/or appropriate to all Major Haemorrhage simulation exercises. Learning outcomes are measurable achievements that the participant(s) will be able to understand after the learning is complete.

Learning Objectives	Objective category
Participants will be able to recognise the deteriorating patient	Technical
Participants will be able to escalate the deteriorating patient to correct team/staff	Non-technical Team Development
Participants are aware and understand the process to activate the Major Haemorrhage Protocol	Non-technical
Emergency blood components are collected and delivered to the area safely and in an appropriate time frame	Technical Non-technical Team Development
Any additional / other blood components are issued, transported and arrived in an appropriate timeframe – handling and storage of blood objective	Technical Non-technical Team Development
All participants performing transfusion related tasks/roles were trained in doing so (e.g. competency to administer blood; competency to collect blood from fridge, competency to use rapid infuser)	Technical (Quality)
Participants are provided with a practical understand of the importance in communication and team leadership in the successful management of Major Haemorrhage	Non-technical Team Development

Expected actions checklist <i>(not exhaustive and some may not be applicable)</i>			
MHP activation	y/n	Major Haemorrhage Pack use	y/n
Major Haemorrhage Pack contents	y/n	Contact with lab staff - good communication	y/n
ABO Compatibility	y/n	Calling TP staff to attend (if applicable)	y/n
Urgent blood for patients with antibodies	y/n	Estimated Blood Loss	y/n
When to take the sample (electronic issues)	y/n	Anticoagulation reversal	y/n
Taking sample BEFORE emergency group O given	y/n	ROTEM/TEG	y/n
TXA (unless contraindicated)	y/n	Paediatric MHP	y/n
Any other noteworthy practice observed?			

4.0 Equipment list for Major Haemorrhage simulation

NB. list is not exhaustive and may require adapting for local use

Staff taking part in exercise

- Script for exercise
- Staff ID badges (if using PDAs)
- PPE
- Clock / timer / stopwatch

Items from the Transfusion Lab

- Blood bags for transfusion (mock units / photocopies of real units)
- Blood bag labels as per issue by NHSBT
- Compatibility labels added by lab staff
- Any other bag label (ie emergency stock, Rh D group etc)
- Blood Box(es)
- Cool packs
- Cold chain paperwork

Items from the Clinical Area

- Sample bottles, request forms, phlebotomy trays
- Fluid administration pumps / rapid infuser
- Blood / platelet / IV giving sets
- Other IV fluid as required
- Electronic Blood Tracking PDA and printer (set to training mode?)

Items for the patient

- Wristband(s)
- Blood Prescription paperwork
- Observation equipment and chart
- Other relevant clinical documentation / results

Items for communication

- Telephones
- Bleeps
- Telephone recording sheets
- Scribe notebook
- MH board

Prompts for the exercise

- Blood loss assessment
- Need for pre-transfusion sample
- Major Haemorrhage call activation
- Feedback on recorded observations ongoing
- Pathology/POCT results (response to actions / patient reassessment etc)
- Use of emergency blood (Rh group / when to switch etc)
- Patient Blood Management (IOCS, TXA, etc)

5.0 Clinical Parameters

The following are a list of clinical parameters that are useful to facilitate a major haemorrhage simulation exercise. These clinical parameters may change throughout the progression of the simulation (dependent on the design), and some may not be applicable. The monitoring of the patient needs to match the current clinical picture in the simulation.

A to E Assessment:	Observations:
A: B: C: D: E: NEWS2 =	B) Respiratory Rate: X/min B) O2 sats: X % C) Blood Pressure: X / X mmHg C) Heart Rate: X bpm C) CRT: X seconds D) PERL: X mm+ D) BM: X mmols E) Temperature: X °C

Blood Gas:	ROTEM / TEG:
pH = pO2 = pCO2 = BE = Lactate = Hb = iCa =	

Estimated Blood Loss: X ml

Chest X-Ray:	ECG:

Pathology results:
FBC Clotting Screen (INR) U&E's

Fluid balance:

6.0 Bibliography / useful reference list

British Society for Haematology Guideline: A guideline for the haematological management of major haemorrhage.

Health Education England (HEE). Standards for organisations that deliver simulation based education
<https://www.hee.nhs.uk/sites/default/files/documents/Standards%20for%20organisations%20that%20deliver%20simulation.pdf>

Health Education England (HEE). Enhancing education, clinical practice and staff wellbeing. A national vision for the role of simulation and immersive learning technologies in health and care
<http://www.hee.nhs.uk/sites/default/files/documents/National%20Strategic%20Vision%20of%20Sim%20in%20Health%20and%20Care.pdf>

Health Education England (HEE). Enhancing UK Core Medical Training through simulation-based education: an evidence-based approach
<https://www.hee.nhs.uk/sites/default/files/documents/Enhancing%20UK%20Core%20Medical%20Training%20through%20simulation-based%20education.pdf>

iRIS – The Intuitive, Collaborative, Simulation Authoring Platform www.irissimulationauthoring.com

Toolkit and information compiled by the South West Transfusion Practitioner Major Haemorrhage working group

- Dr Karen Mead, Specialist Practitioner of Transfusion, North Bristol NHS Trust
- Pedro Valle Vallines, Lead Transfusion Practitioner, Royal Cornwall Hospitals NHS Trust
- Stuart Lord, Lead Transfusion Practitioner, Gloucestershire Hospitals NHS Foundation Trust

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- Samantha Timmins, PBM Practitioner, NHSBT
- Kate Gatling, Resuscitation & Simulation Officer, Gloucestershire Hospitals NHS Foundation Trust
- Jackie McMahon, South West RTC Administrator, NHSBT

7.0 APPENDIX 1 – Example of MHP Simulation: Upper GI bleed

Please note this is just an example to demonstrate how the toolkit can be utilised

Learning Objectives:

- Participants can recognise the deteriorating patient.
- Participants can escalate the deteriorating patient to correct team/staff.
- Participants can activate the Major Haemorrhage Protocol.
- Participants understand the importance of communication and team leadership in the successful management of Major Haemorrhage.

Brief:

Mr Kane is a 55-year-old male that was admitted yesterday to the Gastroenterology Ward with abdominal pain, reported reduced oral intake for weeks, feeling weak and mild jaundice.

PMH: duodenal ulcers (2022), HTN, ETOH excess, GI bleeds.

Duration:

45-60 minutes. Allowing time for brief, simulation, debrief and questions.

Equipment:

- Script for exercise (this document), *assessment and feedback sheet* and *expected actions checklist*.
- Hospital bed
- Vomit bowl x 2
- Tissues
- Fluid with food colouring (mock up blood)/expired blood
- Giving set
- Phone
- Clock
- Gloves/aprons as available in a clinical setting
- Staff ID badges
- Training patient wristband
- Drug chart (to record administration of the blood)

(Ideally this simulation is to be performed in a clinical area, as that would give realism and ease of access to the equipment needed)

Roles/participants:

- Patient (can be a simulation mannequin or a staff member)
- HCA
- Nurse
- Doctor
- 2nd HCA (Optional)
- 2nd Nurse (Optional)

Scenario (dynamic scenario script):

During teatime routine observations (deterioration 1), HCA observes Mr Kane is complaining of abdominal pain and he has bloody tissues on his tray as he has been coughing.

(Expected that the nurse is alerted to review the patient)

With HCA and Nurse present Mr Kane vomits bright red blood into the bowl on two occasions, losing around 250 mL each time, becoming pale and responsive only to voice (deterioration 2).

(Expected MHP activation, estimated blood loss, adequate escalation and treatment: emergency blood collected/received, G&S taken if possible before administering emergency blood, blood warmer used if available (do not delay), emergency blood given, (cured)).

Clinical parameters:

	Baseline	Deterioration 1	Deterioration 2	Improvement	Cured
Resp Rate	18	26	26	22	20
SpO2	96%	95%	93%	99%	98%
Inspired O2	Air (21%)	Air (21%)	Air (21%)	5L (100%)	2L
BP	122/86	86/74	62/44	76/54	98/70
Heart Rate	81	95	118	112	90
ACVPU	Alert	Alert	Voice	Alert	Alert
Temp	36.7	36.1	35.9	35.7	35.7
Oxygen dev	Air	Air	Air	Non-rebreath mask	Nasal specs
EWS	0	7	13	10	5

pH	pO2	pCO2	Lact	BE	HCO3	Hb	INR
7.57	10.7	5.0	3.1	+5	31	6.2	1.1
(7.35-7.45)	(10-14)	(4.5-6.0)	(0.5-2.2)	(-2 to +2)	(22-26)	(14.0-17.5)	(0.9-1.1)

De-brief:

Useful questions to guide the assessment of the outlined learning objectives	
Question	Response
How long into the SIM was emergency group O called for? Discuss O pos/O neg and availability of components.	

Was the lab contacted to check for sample availability BEFORE group O collected? Discuss crossmatched blood vs emergency blood.	
Was a sample taken if not already in lab? Discuss the importance of taking the sample before administering emergency blood.	
1 or 2 group O units collected? Discuss the 30-minute rule, importance of paperwork/scanning units when collecting and returning blood	
Sufficient staff trained and competent in transfusion collection? Discuss importance of having up to date training for situations like this.	
Was a timescale established for blood availability? Discuss importance of communication with the lab. Was a person designated to communicate with the lab?	
Positive Patient ID performed?	
Hb assessed? Did they ask for an ABG?	
Anticoagulants considered/reversal (if appropriate)?	
Was the Major Haemorrhage Protocol (MHP) activated? Discuss how to activate it, and if small team alerted, get them to activate it in real life 2222 clearly stating MHP and location.	

Learning Outcomes/Take home message:

Learning objectives met. How to collect/obtain emergency blood.

How to activate MHP (local protocol may differ), etc.