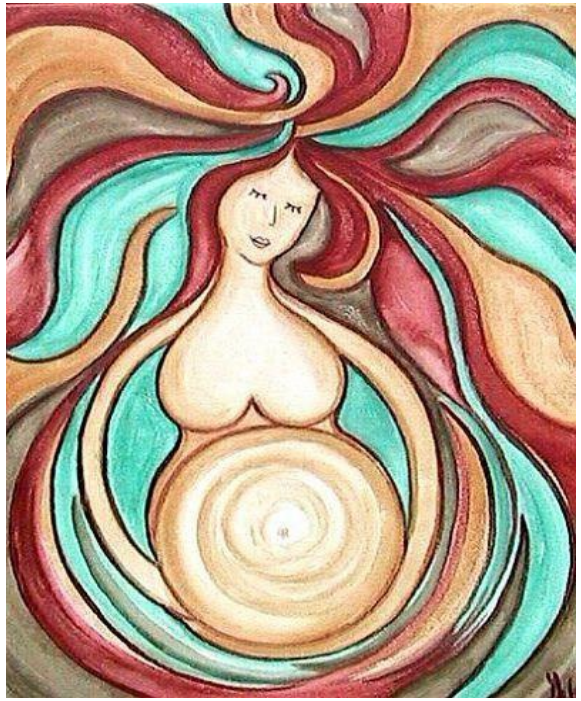
Obstetric Haemorrhage

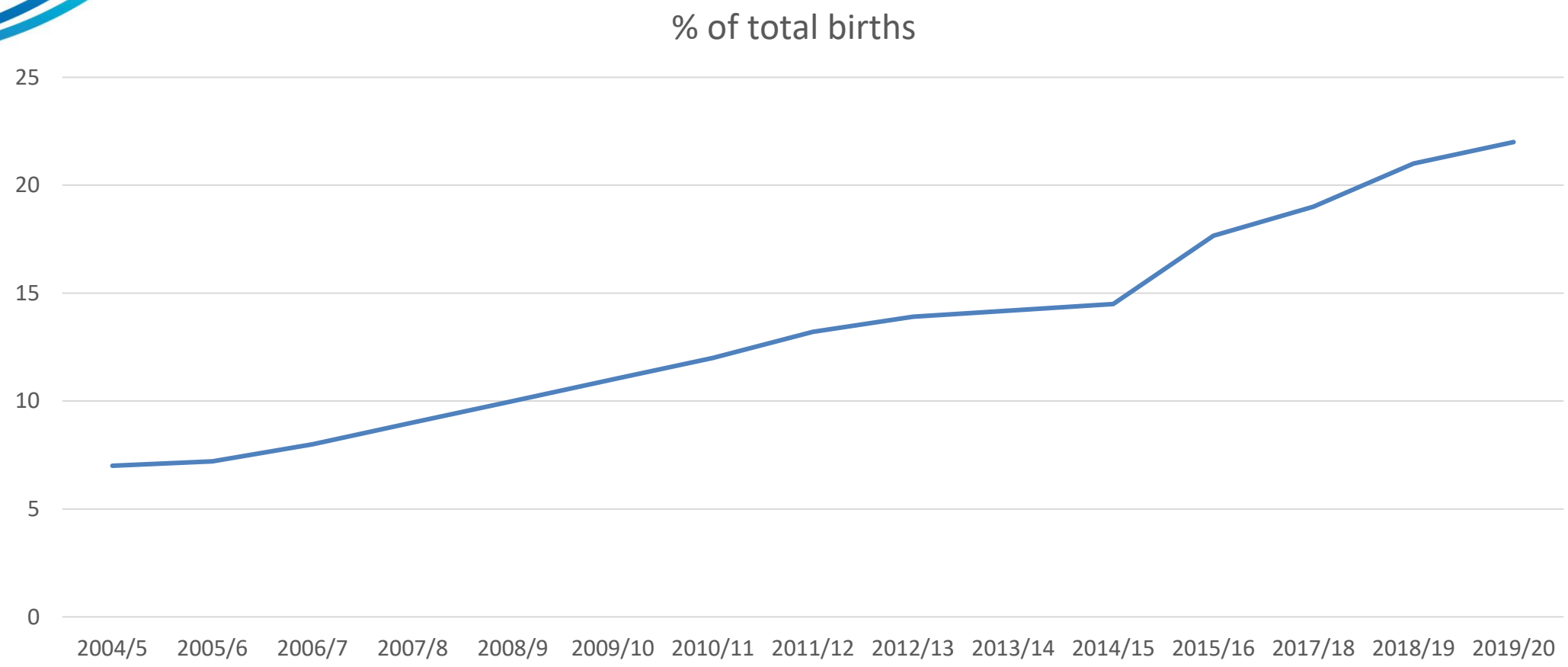


Should it have its own protocol

Dr Sue Pavord
Consultant Haematologist
Oxford University Hospitals NHS FT

Oxford University Hospitals NHS
NHS Foundation Trust

PPH rate in England



NHS Maternity Statistics

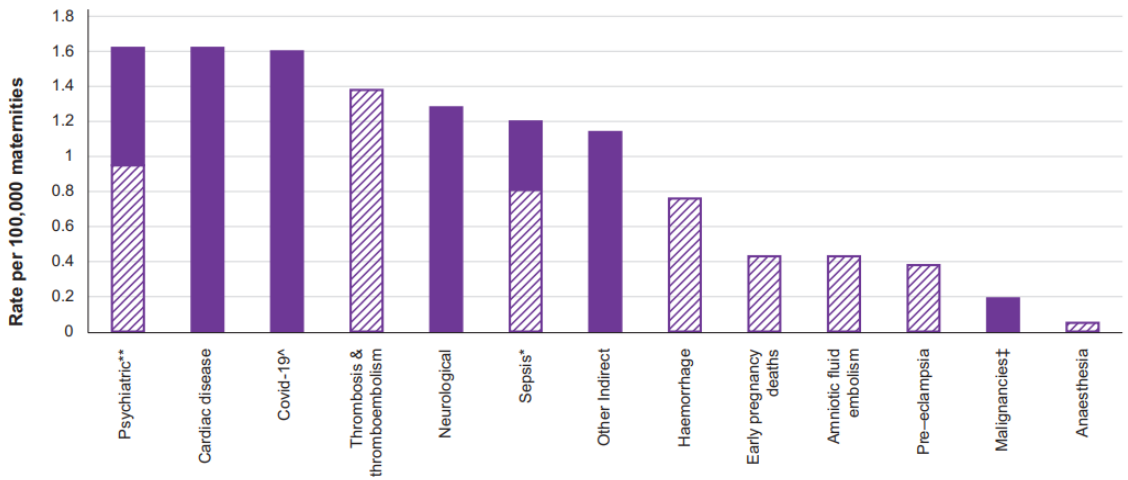
Influencing factors

- Rise in assisted reproduction
- Maternal age
- BMI
- Increasing caesarean section rates
  - 31%
  - Placenta praevia (1 previous CS overall OR 2.7, ART independent risk)
  - Placenta accreta (increases with number of previous CS, age >35y)
- Increasing rates of induction of labour
  - 2007/8 20.4% 2021/2 33.6%

NHS Maternity Statistics

Maternal death from haemorrhage

Figure 2.3: Maternal mortality by cause 2018-20



Hatched bars show direct causes of death, solid bars indicate indirect causes of death;
*Rate for direct sepsis (genital tract sepsis and other pregnancy related infections) is shown in hatched and rate for indirect sepsis (influenza, pneumonia, others) in solid bar;
**Rate for suicides (direct) is shown in hatched and rate for indirect psychiatric causes (drugs/alcohol) in solid bar;
‡Rate for indirect malignancies (breast/ovary/cervix);
^Rate for Covid-19 deaths calculated using maternities March to December 2020 as denominator.
Source: MBRRACE-UK

MMBRACE: deaths from haemorrhage

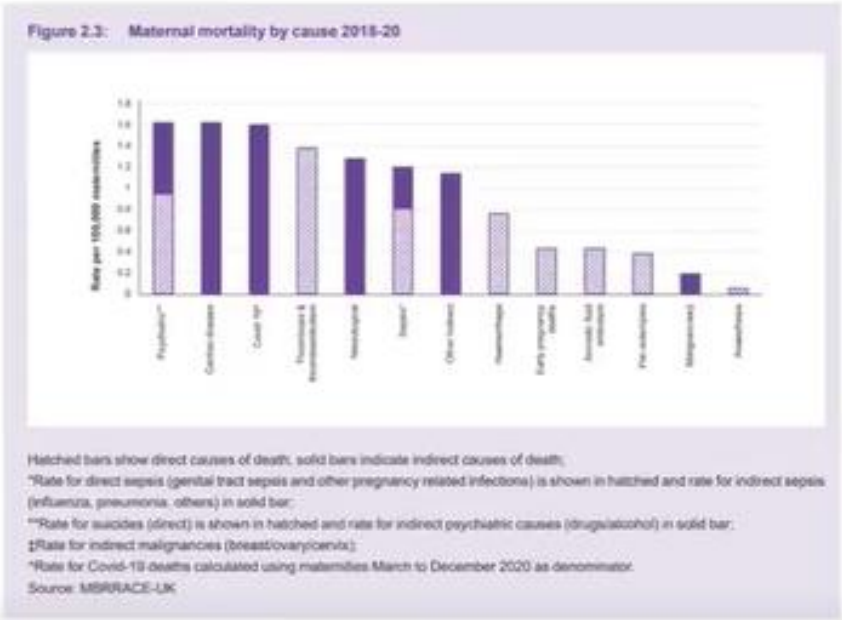


Figure 2.3: Maternal mortality by cause 2018-20

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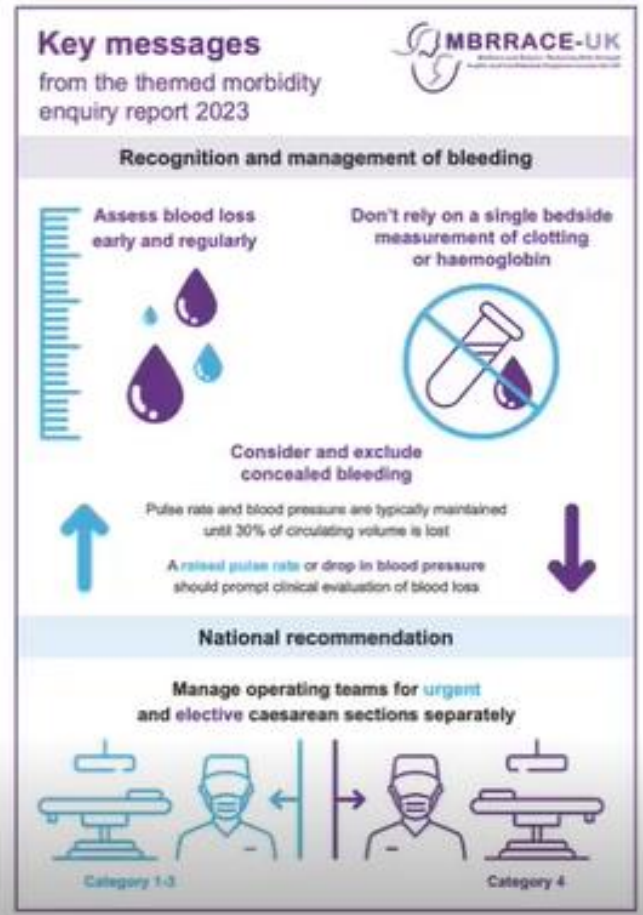
‡Rate for indirect malignancies (breast/ovary/cervix);
^Rate for Covid-19 deaths calculated using maternities March to December 2020 as denominator.
Source: MBRRACE-UK

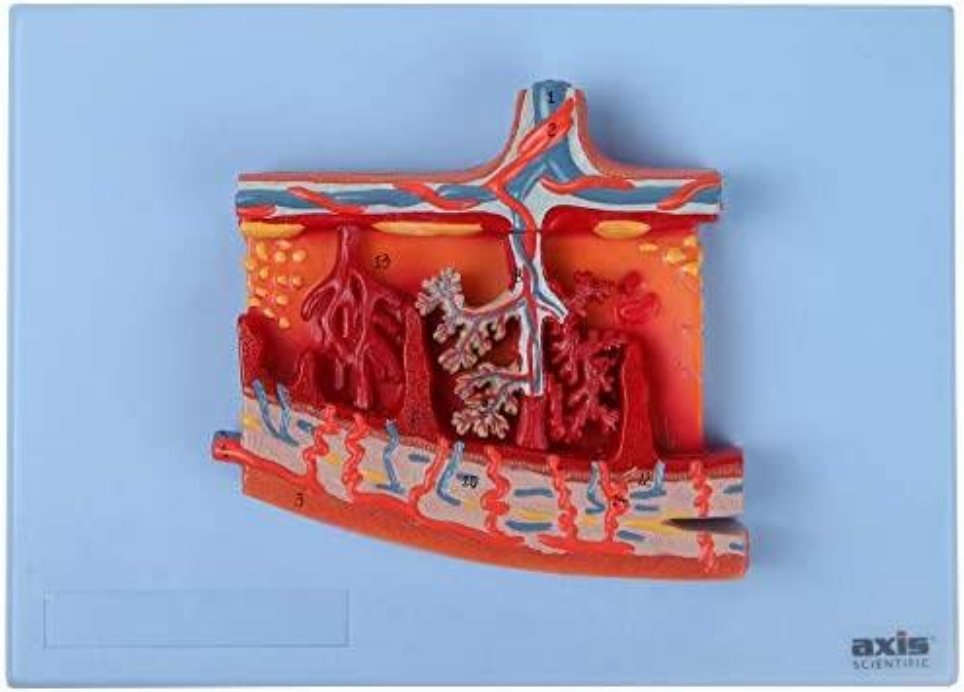
20 of the 22 deaths had substandard care

- Transfer delays from a midwifery unit
- Failure to recognize hidden bleeding
- Failure to recognize coagulopathy
- Inadequate or excessive fluid volume replacement
- Delays in hysterectomy for placenta accreta or uterine rupture



Uterine Blood flow

	Non-preg	40 weeks
Uterine blood flow (mls/min)	<50	>700
% cardiac output	<1	>10



Risk Assessment for Obstetric Haemorrhage

PPH RISK ASSESSMENT

Complete on admission in labour, prior to second stage and following delivery

NHS University Hospitals of Leicester NHS Trust

ANTENATAL RISK FACTORS	Points
Placenta Praevia / Accreta	10
Placental Abruption	10
Multiple Pregnancy	6
Current Hb ≤90	6
Parity ≥6	6
Massive Polyhydramnios (AFI>30)	6
Pre-eclampsia / gestational hypertension	4
Maternal clotting Disorder	3
Previous PPH or Retained Placenta	3
Parity >4	3
Intrauterine death	2
BMI ≥40 at booking	2
Uterine Fibroids	2
Recurrent APH (minor)	2
Polyhydramnios (AFI >20)	2
Elective Caesarean Section / Recurrent Caesarean Section	2
Antenatal Score	

PERINATAL RISK FACTORS	Points
Induction of labour / Augmentation of labour	2
Sepsis / Pyrexia in Labour >38 degrees	2
Prolonged 1st stage of labour > 12 hours (active stage of labour)	2
>12 hours of Syntocinon	2
Prolonged 2nd stage of labour > 4hours	2
Perinatal Score prior to second stage	
Perinatal Score after delivery	

POSTNATAL RISK FACTORS	Points
Retained Placenta	6
Emergency Caesarean Section	6
Baby estimated or actual weight > 4kg (see note on next page)	2
Operative Vaginal Delivery	2
Postnatal Score	
Total Score (Antenatal + Perinatal score after delivery +Postnatal score)	

Management for 3rd stage and following delivery – alternative plans should be documented in the notes		
Score less than 6	**Score 6 – 9**	**Score 10 or more**
Syntometrine IM at delivery or if contraindicated give Syntocinon 10 units IM / 5 units IV	**Follow green action PLUS**	**Green and Amber actions PLUS**
	IV access – Grey venflon	2nd Grey Venflon Use Cell Salvage at Caesarean
Measure all blood loss	Send Group & Save and FBC	Cross match 2 units of blood if not suitable for electronic release
	Syntocinon infusion 40 units in 36ml 0.9% Saline @ 10ml / hour	Give one of the following (even if not bleeding): 250mcg Ergometrine IM OR 250mcg Carboprost IM (OR 800mcg Misoprostol PR)
Routine Postnatal observations	Commence MEOWS and record observations at least every 30 minutes for 2 hours	
	Consider Carboprost - EARLY	
BE AWARE OF THE CONTRA-INDICATIONS WHEN USING ERGOMETRINE		

Risk factors for PPH

LOW RISK	MEDIUM RISK	HIGH RISK
• Singleton	• Previous caesarean section or uterine surgery	• Placenta previa, accreta, increta, percreta
• Fewer than four previous deliveries	• More than four previous deliveries	• Placental abruption
• Unscarred uterus	• Multiple gestation	• Ante-, intra-partum bleeding
• Absence of PPH history	• Large uterine fibroids	• History of PPH
	• Chorioamnionitis	• Preexisting coagulation defect
	• Magnesium sulfate use	• Haematocrit <30%
	• Prolonged use of oxytocin	

PPH, postpartum haemorrhage

1. From ACOG Practice Bulletin #183. *Obstet Gynecol* 2017;130:e168–e186

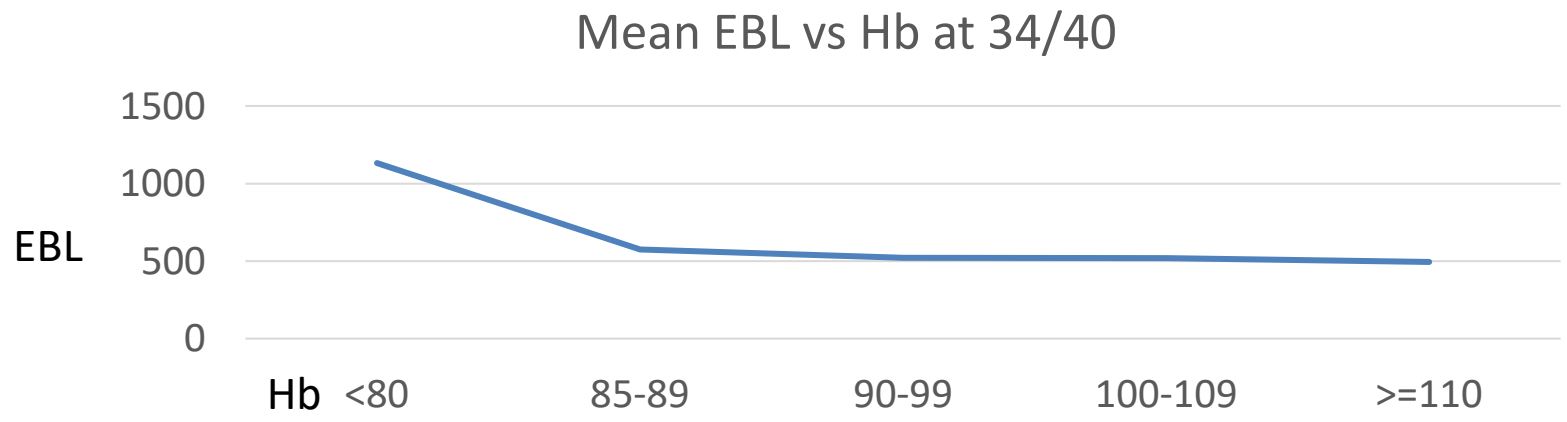
Oxford University Hospitals NHS
NHS Foundation Trust

Postpartum haemorrhage

Large UK prospective observational study 10,213 women

- 62% of women with Hb <85 g/l sustained PPH >500mls
- 25% progressed to severe PPH >1500mls (Briley *et al*, **2014**).

Oxford Observational study of PPH n=6322



(Lacey, **2019**).

Oxford University Hospitals NHS
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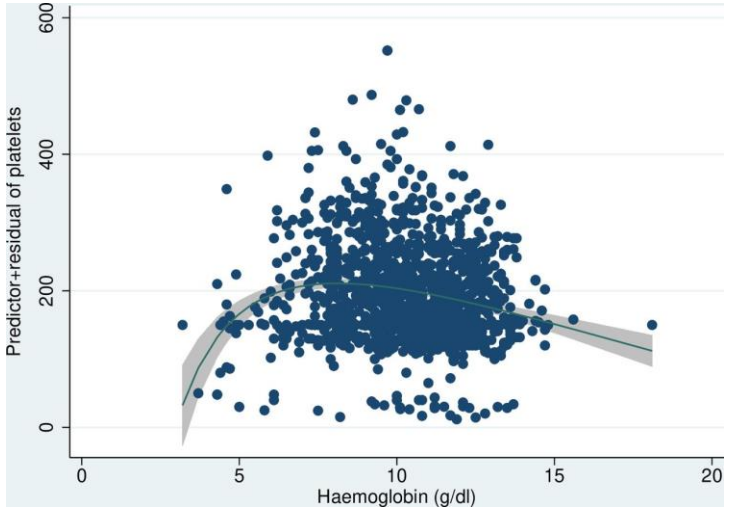
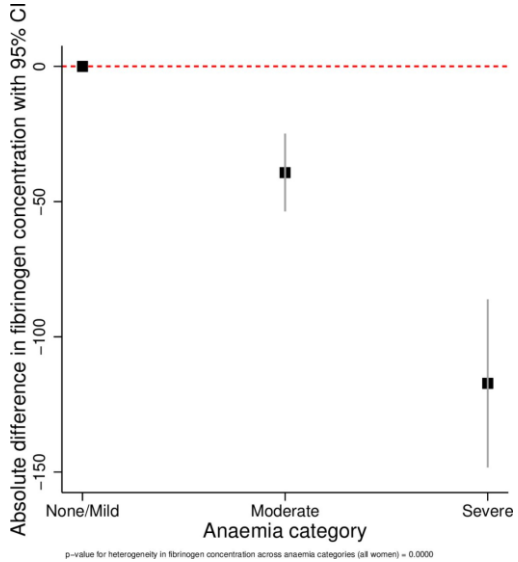
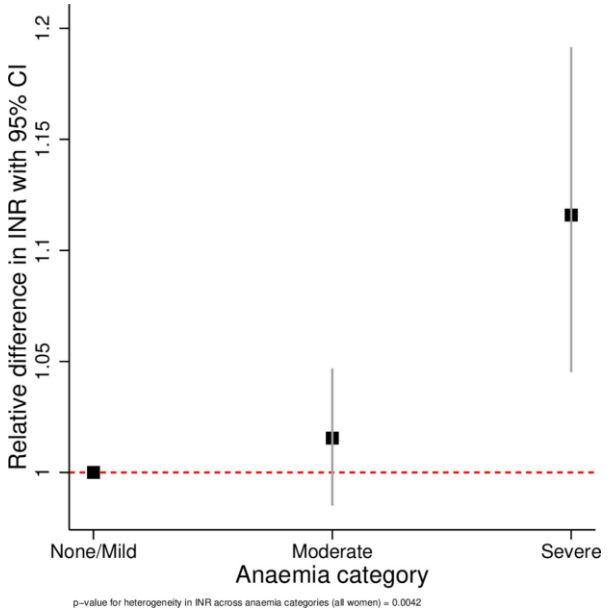
Anaemia and Coagulation disturbances

Prospective cohort study
1342 pregnant women in India
third trimester
Severe anaemia <7 g/L c.f. mild anaemia >=10







Mean Platelets 38 x 10^9 lower

D Dimer 27% higher

x5 higher incidence of PPH

Mean Fibrinogen 1.2 g/L lower

Mean INR 12% increased

Nair, *BMJOpen* 2021;**11:**e050815

Maternal mortality

Observational studies:
WHO systematic analysis

For each 10g/L increase in Hb

maternal death was reduced by 29%

- OR 0·71 [95% CI 0·60–0·85]).

Say L, Lancet Global Health 2014

Multilevel analysis:

WHO data on >300,000

Adjusted for confounding factors and found Hb<70g/L was associated with 2-fold increase in maternal mortality

Daru J, Lancet Global Health 2018

Risk factors for PPH

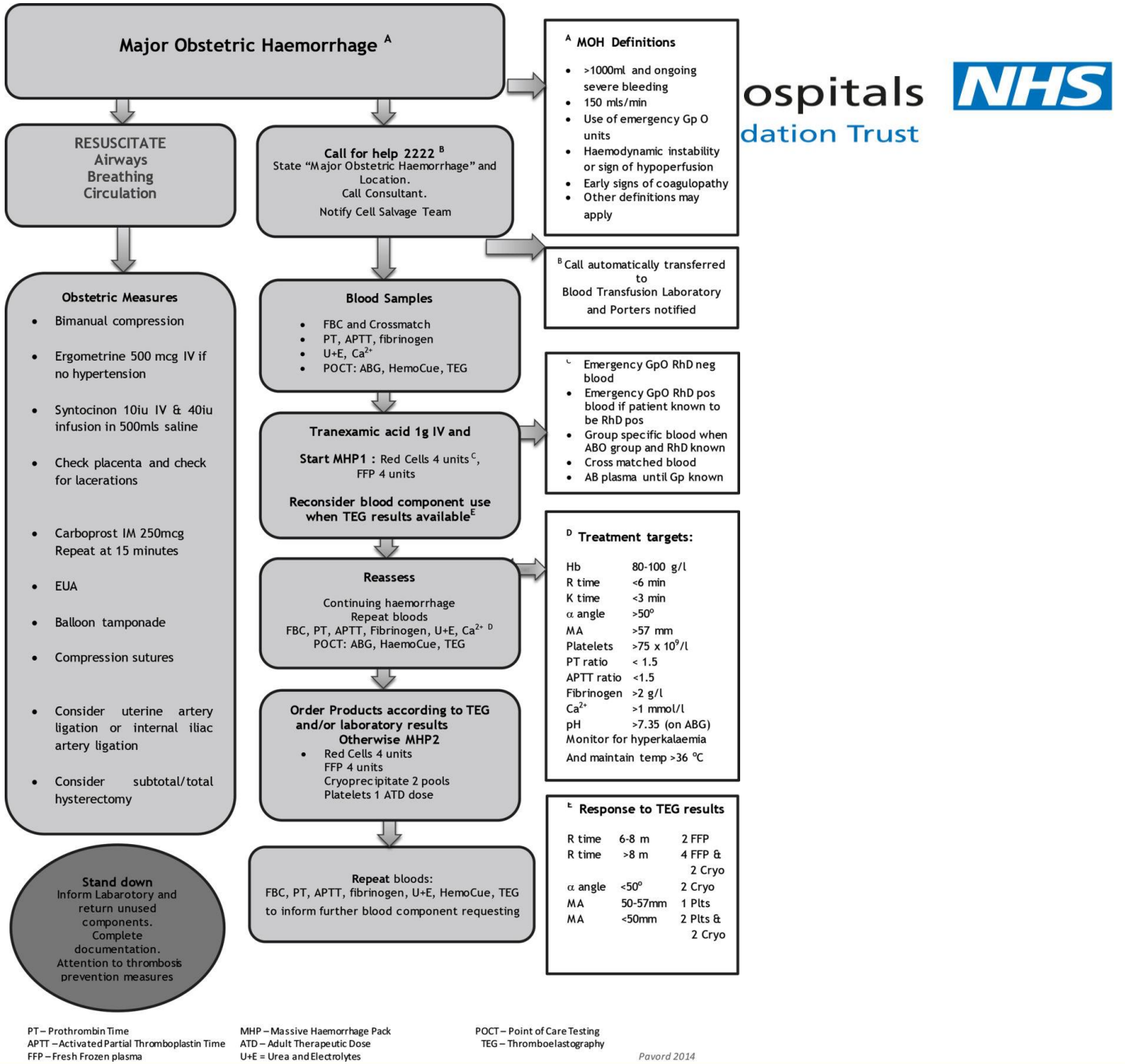
LOW RISK	MEDIUM RISK	HIGH RISK
• Singleton • Fewer than four previous deliveries • Unscarred uterus • Absence of PPH history	• Previous caesarean section or uterine surgery • More than four previous deliveries • Multiple gestation • Large uterine fibroids • Chorioamnionitis • Magnesium sulfate use • Prolonged use of oxytocin	• Placenta previa, accreta, increta, percreta • Placental abruption • Ante-, intra-partum bleeding • History of PPH • Preexisting coagulation defect • Haematocrit <30%

However, most cases display no risk factors

PPH, postpartum haemorrhage

1. From ACOG Practice Bulletin #183. *Obstet Gynecol* 2017;130:e168–e186

Major Haemorrhage Protocol



Pavord S. How I treat PPH
Blood 2015

DETECT AND TREAT POSTPARTUM HAEMORRHAGE EARLY

The NEW ENGLAND JOURNAL of MEDICINE

E

Early detection and trigger criteria

- Calibrated drape for blood loss collection with trigger lines at **300ml and 500ml** for the first hour after birth
- Observations (blood loss, blood flow, uterine tone) every **15 minutes** documented on the blood loss monitoring chart
- Blood pressure and pulse carried out once in the **1st hour** postpartum and documented on the blood loss monitoring chart

Trigger criteria

1 Clinical judgement

2 Blood loss 500ml or more

3 Blood loss 300ml or more plus one abnormal observation

M

Massage of uterus

- Massage until uterus has contracted or for **one minute**

O

Oxytocic drugs

- **10 IU IV oxytocin injection** or diluted in **200-500ml crystalloid** over **10 minutes** plus a maintenance dose for **20 IU IV oxytcin** diluted in **1000ml saline** over **4 hours** (+- misoprostol 800mcg PR/SL if used)

T

Tranexamic acid

- **1g IV injection of tranexamic acid** or diluted in **200ml crystalloid** over **10 minutes**

IV

IV fluids

- IV fluids in addition to the infusion should be given if clinically indicated for resuscitation and will require a **2nd IV access**

E

Examination and escalation

- Ensure bladder is empty, evacuate clots, check for tears with an internal examination and placenta for completeness
- Escalate if bleeding does not stop after first response or you are unable to identify or manage cause of bleeding

Implementation strategies

Audit newsletters: sharing with all staff monthly detection and bundle use rates along with PPH, severe PPH, blood transfusion, laparotomy and death from PPH rates and given feedback at monthly departmental meetings

Champions: midwife and doctor to oversee change, troubleshoot, give feedback on audit newsletters, connect with other champions through chats, meeting and websites for sharing knowledge and lessons learnt

Trolley and/or carry case: including all medicines and devices required for the treatment of PPH restocked after every use and complete a stocking checklist at the start of every shift

Training: on-site, simulation-based, and peer-assisted training of 90 minutes to a whole day facilitated by the use of provider guides, flipcharts and job aids displayed in labour wards

World Health Organization hrp

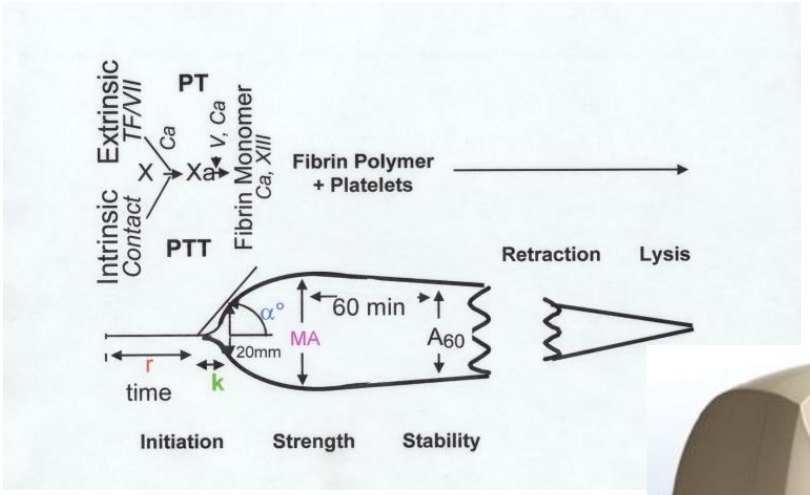
- RCT of >200,000 women with vaginal births from LMICs
- EMOTIVE vs standard care

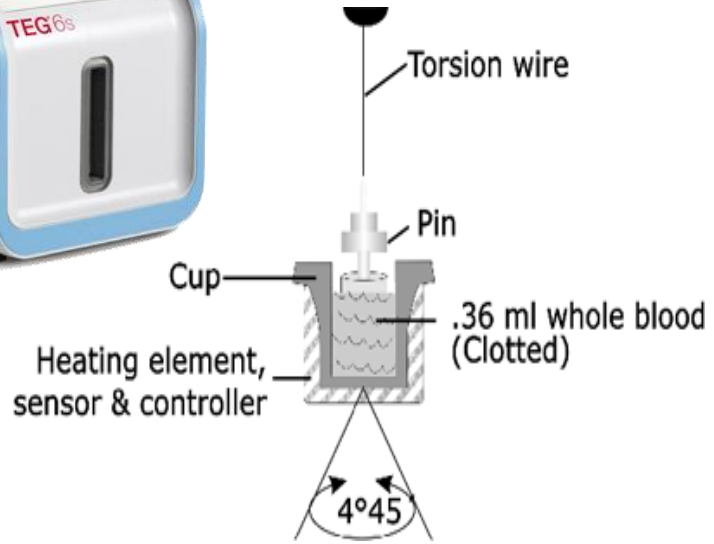
EMOTIVE reduced incidence of severe PPH by 62%

Oxford University Hospitals NHS
NHS Foundation Trust

Thromboelastography (TEG)

A rapid, near-patient test of whole blood haemostasis





Coagulopathy

- Major haemorrhage after 2-3 L blood loss
- Placental abruption
- Amniotic fluid embolism
- Other causes of DIC – sepsis, retained stillbirth

Consider the cause of haemorrhage!

Management of haemostasis

- Early use of tranexamic acid
- Regular monitoring – labs, POCT
- Targeted use of blood components
- maintain platelets >75 $x10^9/l$
- cryoprecipitate / Fibrinogen concentrate

Oxford University Hospitals NHS
NHS Foundation Trust

Fibrinogen

- Admission fibrinogen Simon *et al. Br J Anaesth* 1997;78:678–83
  - Admission fibrinogen <2.9 g/L (before labour) associated with PPH with odds ratio of 19.7
- Decrease in fibrinogen predicts severity Charbit *et al J Thromb Haemost* 2007; 5: 266-73
  - Fibrinogen only independent predictive marker
  - Fibrinogen <2 g/L: 100% PPV, fibrinogen >4 g/L: 79% NPV
  - ROC AUC 0.75
- OBS1-Women who had a fibrinogen above 4g/L or an A5 > 23mm rarely needed any blood products at all.
  - A fibrinogen of <3g/L or A5 <16mm + on-going bleeding is associated with the need for an average of 8 units of blood products.

Fibrinogen replacement

Fibrinogen replacement is required when hypofibrinogenaemia is identified:

by Clauss fibrinogen <2g/L
or TEG6: CK R time >9 m. α angle <50 °or MA <52µµ

Dose:

Fibrinogen concentrate (Fibryga)- 3-4g intravenously

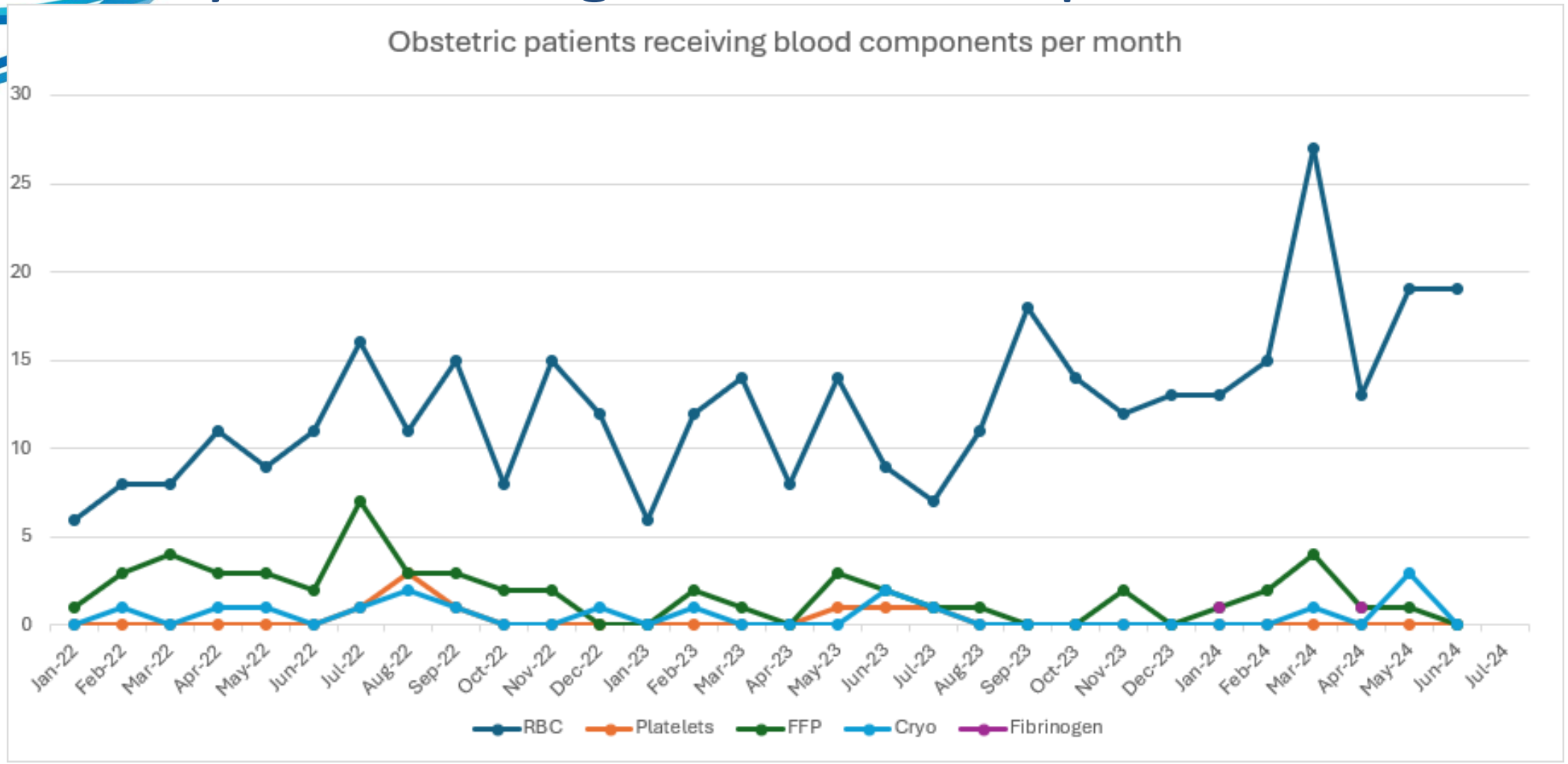
Fibrinogen replacement

Source of fibrinogen	Dose to raise fibrinogen by about 1 g/L in adult patient
Fibrinogen concentrate[a]	3 to 4 g
Cryoprecipitate	2 five-unit pools
Fresh frozen plasma (FFP)	4 units (about 15 mL/kg)

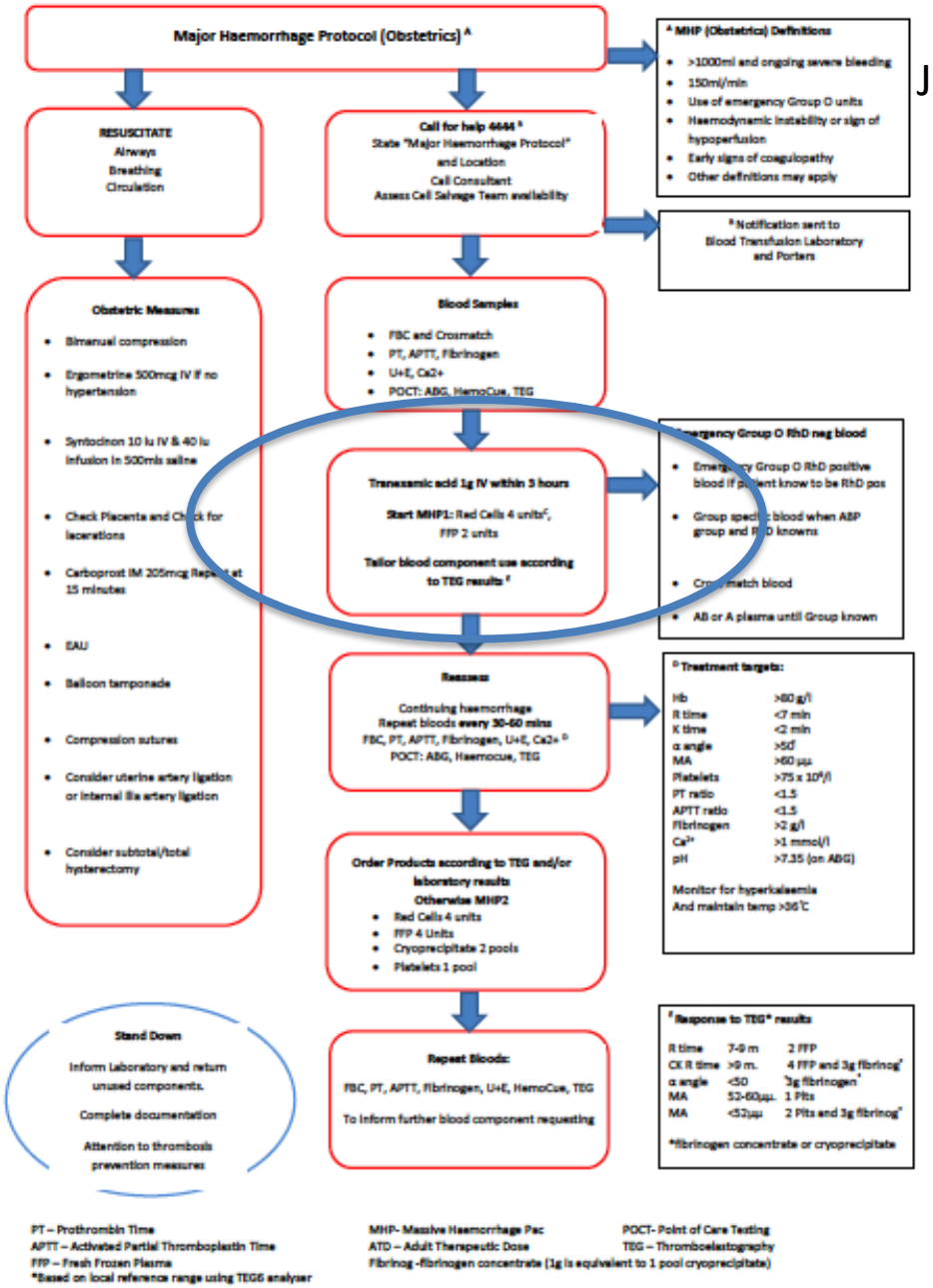
[a] Fibryga is licensed in the UK for acquired hypofibrinogenaemia

Oxford University Hospitals NHS
NHS Foundation Trust

Monthly monitoring of blood component transfused



July 2023

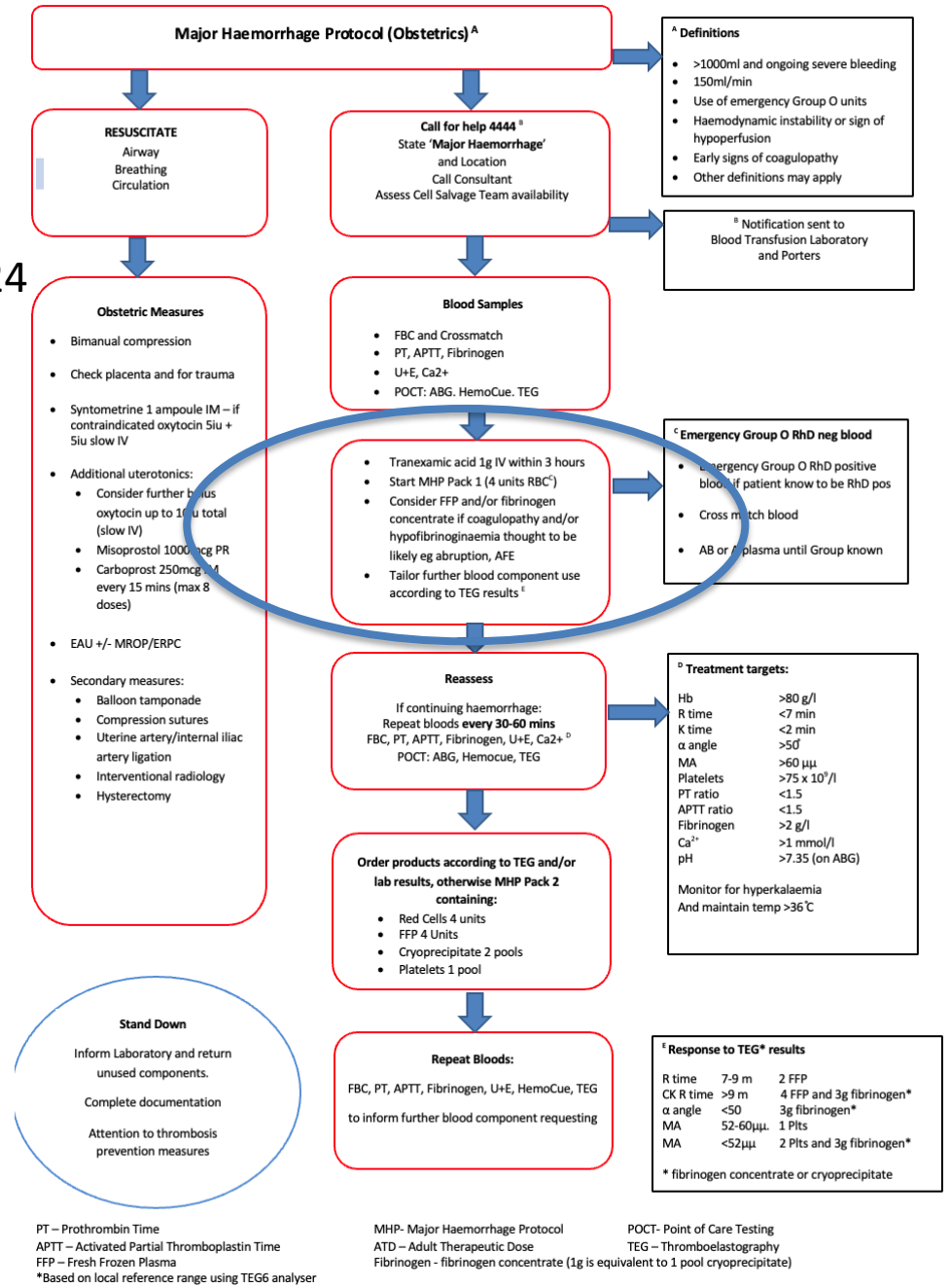


PT – Prothrombin Time
APTT – Activated Partial Thromboplastin Time
FFP – Fresh Frozen Plasma
*Based on local reference range using TEG6 analyser

MHP- Massive Haemorrhage Pac
ATD – Adult Therapeutic Dose
Fibrinog -fibrinogen concentrate (1g is equivalent to 1 pool cryoprecipitate)

POCT- Point of Care Testing
TEG – Thromboelastography

April 2024



PT – Prothrombin Time
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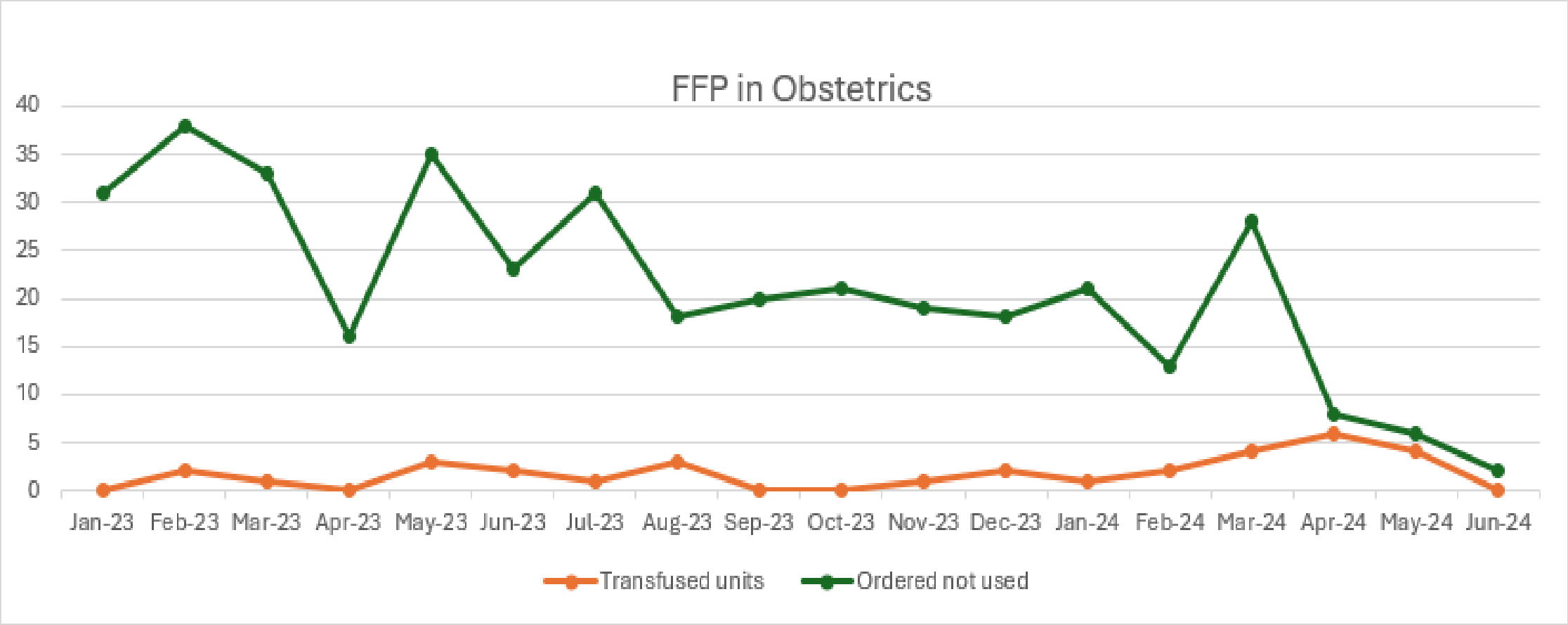
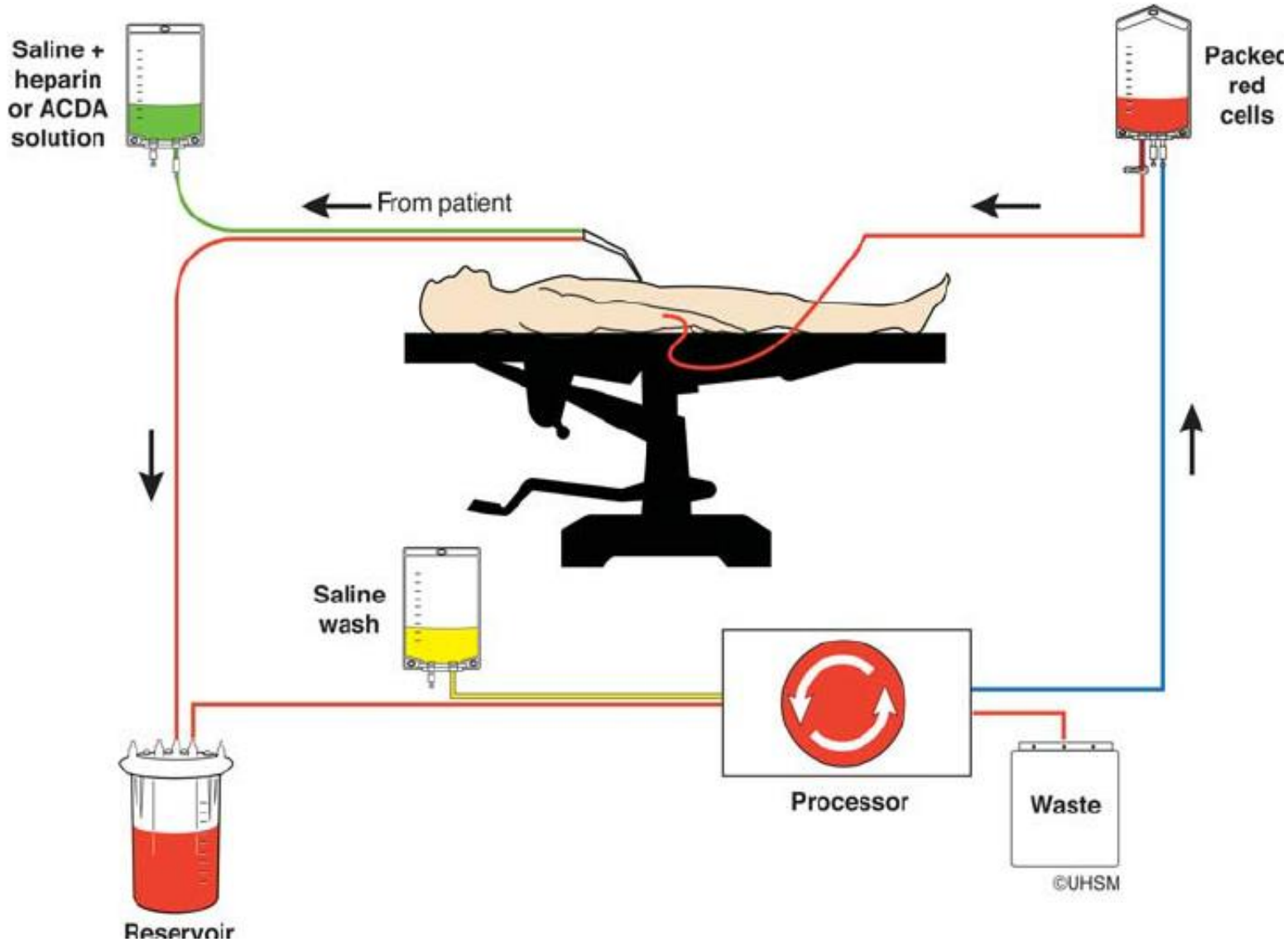
MHP- Major Haemorrhage Protocol
ATD – Adult Therapeutic Dose
Fibrinogen - fibrinogen concentrate (1g is equivalent to 1 pool cryoprecipitate)

POCT- Point of Care Testing
TEG – Thromboelastography

FFP orders in obstetrics



Cell Salvage



Prevent MOH

- Identify at risk cases
- Recognise it when it occurs
- Understand the haemostatic changes
- Prompt, coordinated approach
- Guideline and process in place
- Training
- Practice drills

Management of postpartum anaemia

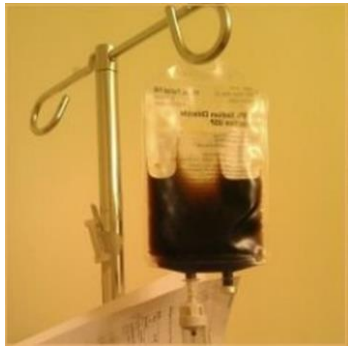
IV iron is the treatment of choice in women requiring rapid response or being intolerant to oral iron

- More rapid and more frequent Hb normalisation than with oral iron
- In contrast to oral iron, IV iron effectively repletes iron stores
- IV iron is well tolerated

Blood transfusion should be reserved for those with:

- Risk of further bleeding
- Imminent cardiac compromise

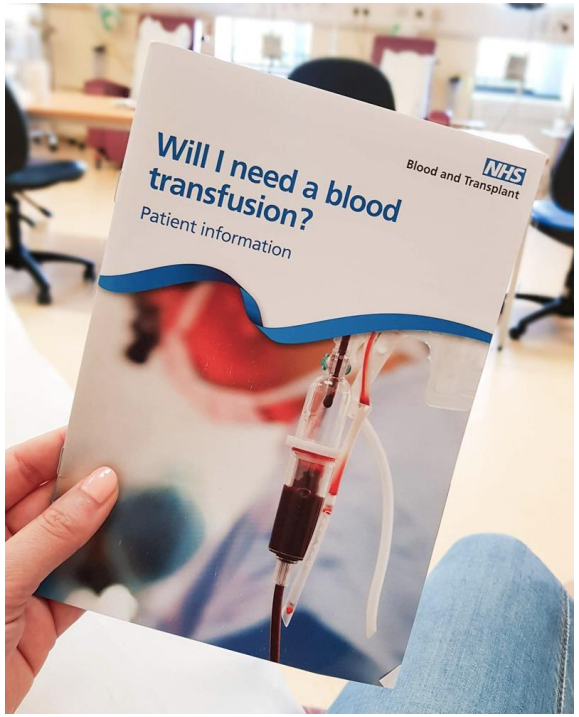
Blood transfusion



Postpartum women, not bleeding:

Transfusion is not indicated if Hb >70g/l, unless there is a significant risk of re-bleeding or cardiac compromise

Transfusion at Hb below <70 g/l should only be necessary if the patient is symptomatic



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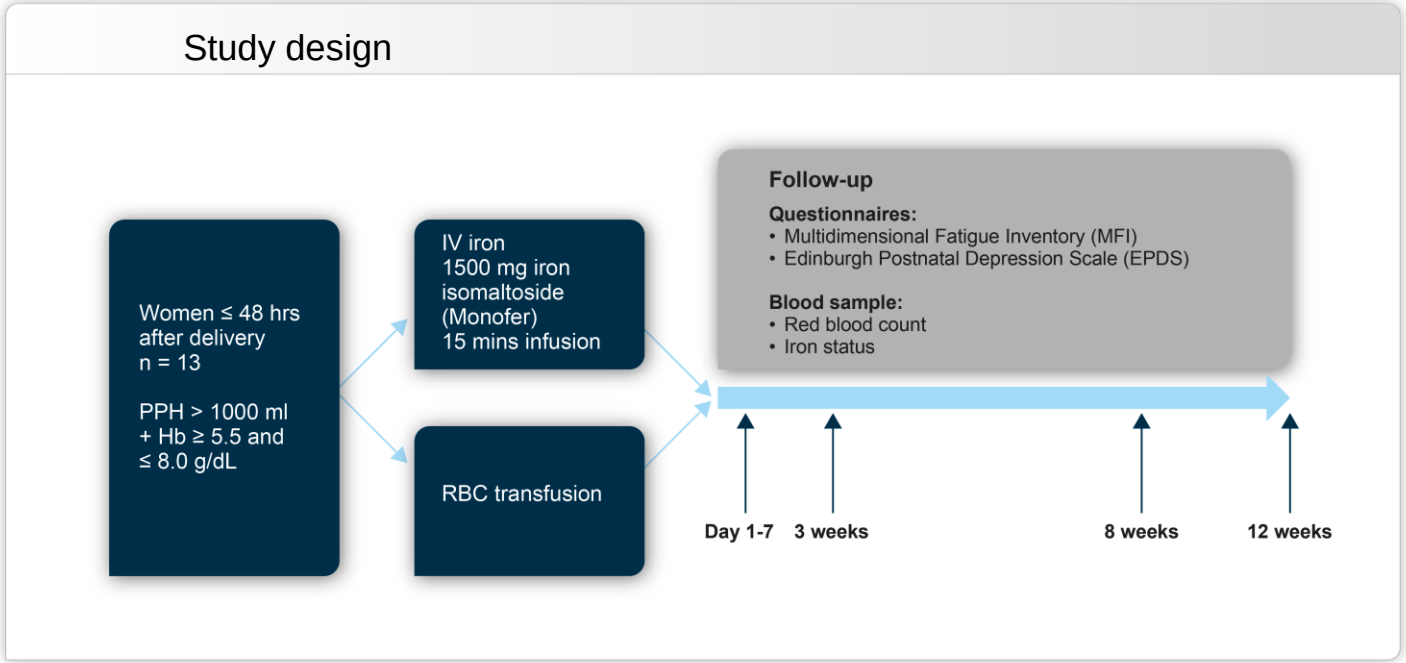
The PROACT Trial

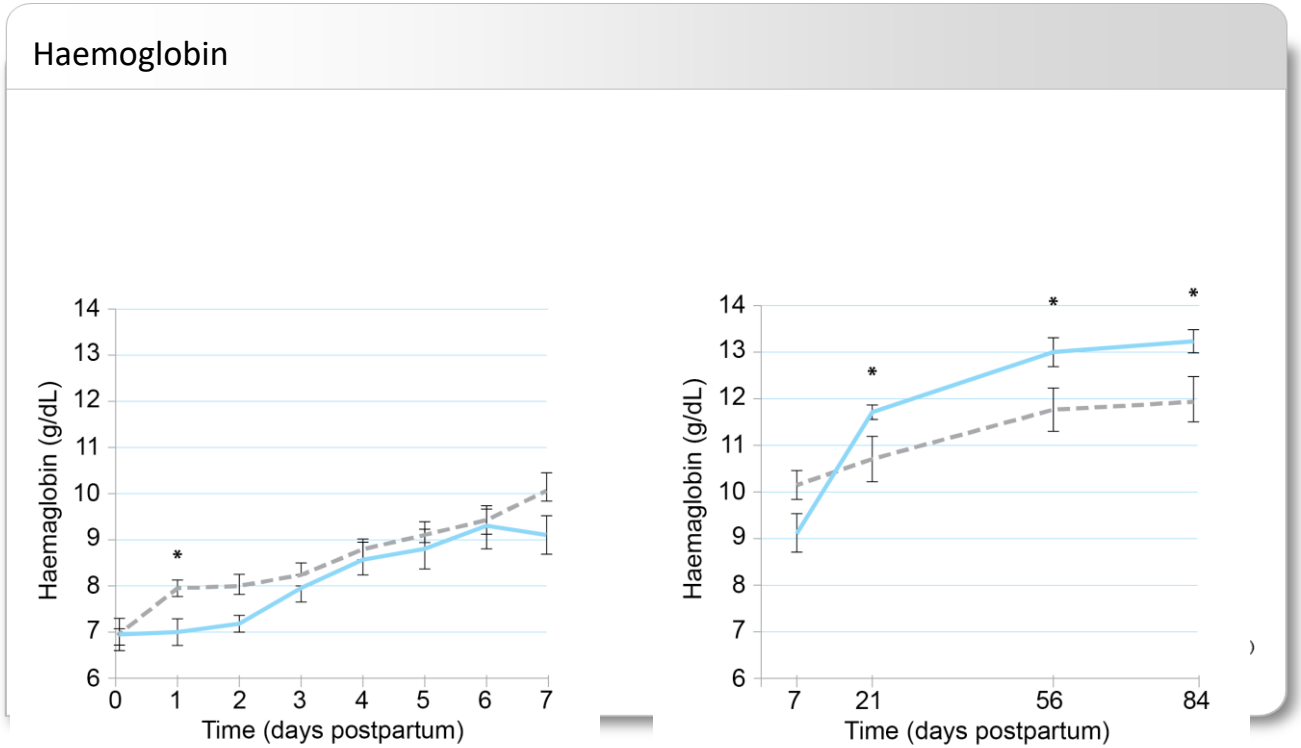
Explorative, prospective, open-label, randomized, superiority, single-centre feasibility trial that involved 13 patients; FDI n=7, RBC transfusion n=6 and 11 patient visits during a 12-week period



FDI = ferric derisomaltose
FDI is also known as iron isomaltoside

Holm et al., Vox Sang . 2017 Feb;112(2):122-131

IVI resulted in a significantly higher Hb from week 3 and onwards compared to RBC transfusion



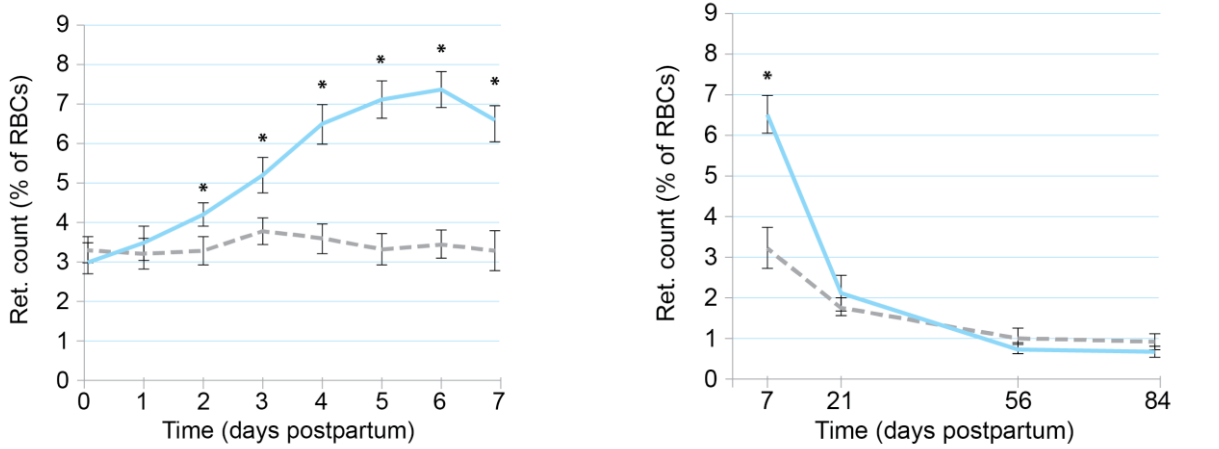
FDI = ferric derisomaltose
FDI is also known as iron isomaltoside

Mean haemoglobin in the iron isomaltoside (Monofer) and transfusion group from baseline to 12 weeks postpartum. Whiskers indicate standard error. Between-group comparisons: *P < 0.05.

Holm et al., Vox Sang . 2017 Feb;112(2):122-131

A rapid and significant increase in red blood cell production was seen with IVI

Reticulocyte count



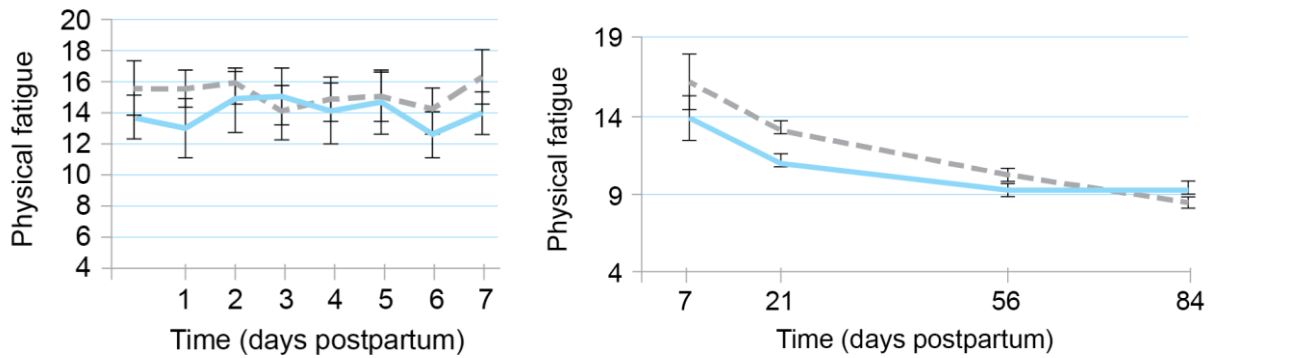
Mean Reticulocyte count in the iron isomaltoside (Monofer) and transfusion group from baseline to 12 weeks postpartum. Whiskers indicate standard error. Between-group comparisons: *P < 0.05.

FDI = ferric derisomaltose
FDI is also known as iron isomaltoside

Holm et al., Vox Sang . 2017 Feb;112(2):122-131

Physical fatigue decreased similarly over time for RBC transfusion and IVI

Physical fatigue



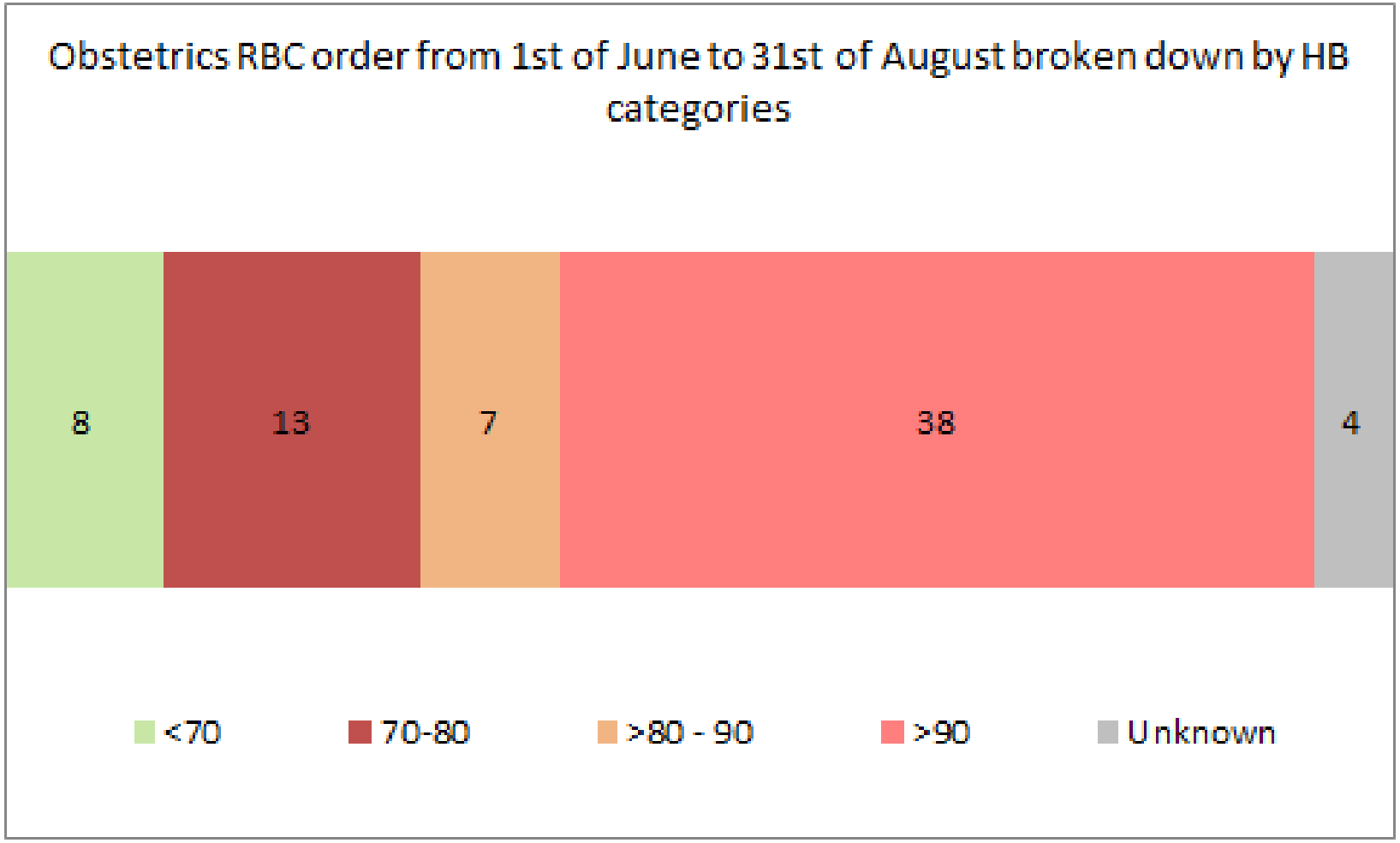
Physical fatigue is shown as mean scores of the Multidimensional Fatigue Inventory in the iron isomaltoside (Monofer) and transfusion groups from baseline to 12 weeks postpartum. Whiskers indicate standard error.

Iron isomaltoside (Monofer)
RBC transfusion

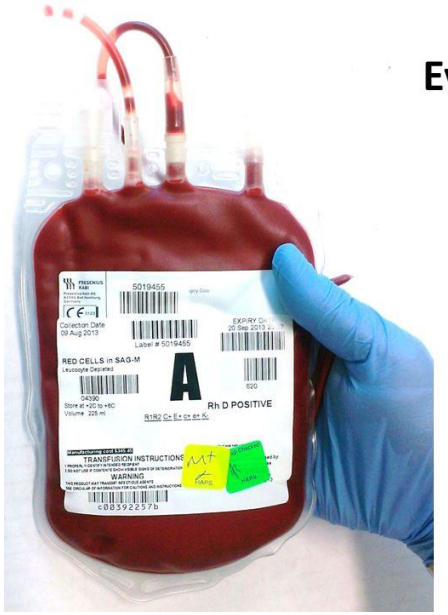
FDI = ferric derisomaltose
FDI is also known as iron isomaltoside

Holm et al., Vox Sang . 2017 Feb;112(2):122-131

Appropriate transfusion practice



Appropriate transfusion practice



Every ONE matters

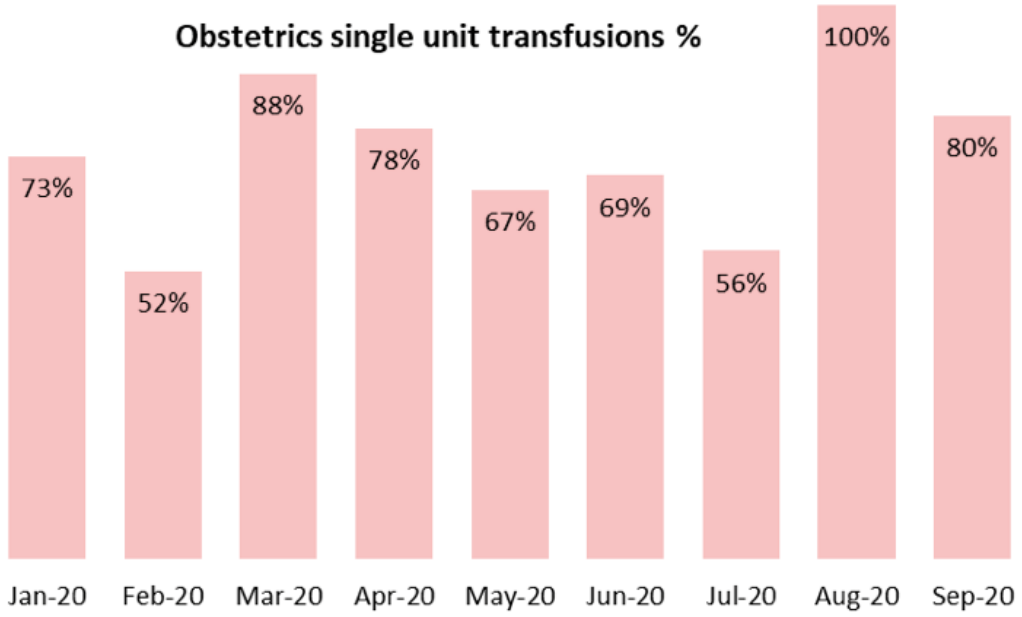
Transfuse **One** Unit

↓

Re-assess the patient

↓

Don't increase the RISKS
if
NO BENEFIT



Transfusion Updates for Obstetric Staff

Obstetric Blood Bites

Created by the OUH Transfusion Medicine Team September 2018 Edition

Transfusion of blood and its components is an essential part of healthcare, however there are clinical risks associated with the use of allogenic blood. Our aim is to ensure that the process of transfusion is safe for both the administrator and the patient, thus mitigating these risks and help to conserve this precious resource.

Always use Blood Appropriately

The threshold for considering transfusion in a patient who is not actively bleeding is <70 g/dl (<80g/dl if there is risk of bleeding or cardiac compromise)

Orbit + data for Transfusion of red cells in respect to Hb Thresholds
Breakdown for last 3 months

Orbit data from EPR

4% of Hb's not recorded

Don't Give 2 without review
Each unit transfused should be an independent clinical decision. Always re check the Hb and reassess (as per NICE guidelines)

Units requested per patient

Single unit Transfusions are up from 44% last quarter to 56% this quarter
No Red cell wastage

Safe Administration

To turn the PDA on use a flat finger and light pressure

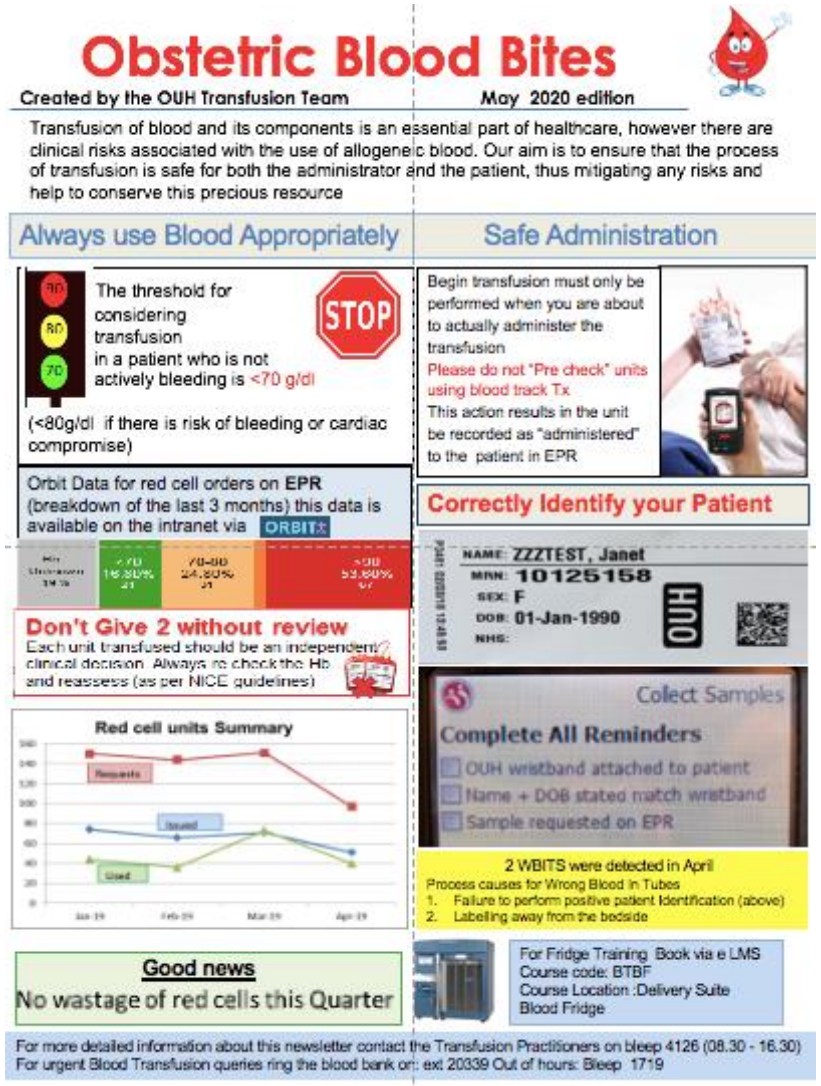
Pressing too hard will switch the PDA off

For Fridge Training Book via e LMS
Course code: BTBF
Course Location :Delivery Suite Blood Fridge

Wrong Blood in Tube(WBiT's)
100% Human error 100% Preventable
Don't scan the wristband away from the bedside and correctly identify your patient

Link Nurse Study day 27th November 2018 book on e LMS

For more detailed information about this newsletter contact the Transfusion Practitioners on bleep 4126 (08.30 - 16.30)
For urgent Blood Transfusion queries ring the blood bank on: ext 20339 Out of hours: Bleep 1719



Obstetric Blood Bites

Created by the OUH Transfusion Team **May 2020 edition**

Transfusion of blood and its components is an essential part of healthcare, however there are clinical risks associated with the use of allogeneic blood. Our aim is to ensure that the process of transfusion is safe for both the administrator and the patient, thus mitigating any risks and help to conserve this precious resource

Always use Blood Appropriately

The threshold for considering transfusion in a patient who is not actively bleeding is <70 g/dl

(<80g/dl if there is risk of bleeding or cardiac compromise)

Orbit Data for red cell orders on EPR (breakdown of the last 3 months) this data is available on the intranet via ORBIT

Don't Give 2 without review
Each unit transfused should be an independent clinical decision. Always re check the Hb and reassess (as per NICE guidelines)

Red cell units Summary

Good news
No wastage of red cells this Quarter

Safe Administration

Begin transfusion must only be performed when you are about to actually administer the transfusion
Please do not "Pre check" units using blood track Tx
This action results in the unit be recorded as "administered" to the patient in EPR

Correctly Identify your Patient

NAME: ZZZTEST, Janet
MRN: 10125158
SEX: F
DOB: 01-Jan-1990
NHS:

Collect Samples
Complete All Reminders
- OUH wristband attached to patient
- Name + DOB stated match wristband
- Sample requested on EPR

2 WBITS were detected in April
Process causes for Wrong Blood in Tubes
1. Failure to perform positive patient identification (above)
2. Labelling away from the bedside

For Fridge Training Book via e LMS
Course code: BTBF
Course Location :Delivery Suite
Blood Fridge

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Oxford University Hospitals NHS
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Obstetric Transfusion Committee Membership

- Doctors
  - Haematologist
  - Obstetrician
  - Obstetric Anaesthetist
  - Fetal Maternal Medicine Specialist
- Midwives
  - Delivery suite
  - Observation area
  - Assessment area
  - Community MW
  - Antenatal Screening
- Transfusion Lab Staff
  - Blood bank manager
  - Senior BMS
- Nurses
  - Transfusion nurses
- Clinical Governance
  - Transfusion
  - maternity
- IT
  - obstetric lead
  - transfusion

Oxford University Hospitals NHS
NHS Foundation Trust

Patient Blood Management in Obstetrics

	Optimise erythropoiesis	Minimise blood loss	Manage anaemia
ANTENATAL	**Identify and treat iron deficiency**		
INTRAPARTUM		**Prevent and manage primary postpartum haemorrhage**	
POSTNATAL			**Iron supplements after delivery**

Concluding messages

Obstetric haemorrhage needs its own protocol

1. Risk factors can be assessed before delivery and preparations made
2. Obstetric-specific laboratory and POCT parameters are required
3. Coagulopathy is unusual with speedy intervention and FFP is not needed
4. Coagulopathy is often dominated by hyperfibrinolysis and hypofibrinogenaemia – this can be identified and replaced promptly
5. Iron infusion is more appropriate than further blood transfusion for management of post partum anaemia

THANK YOU