

## 1. Purpose

This document outlines the guideline details for managing primary postpartum haemorrhage at the Women's.

Whilst major PPH is no longer the leading cause of maternal death in Australia, suboptimal care is persistently identified as a major factor for those who die. For every maternal death, it is estimated that there are around 80 instances of 'near-miss' where women experience a life-threatening complication, sometimes with continuing morbidity<sup>2</sup>. Whilst most women with postpartum blood loss less than 1000mL suffer no significant morbidity, the percentage of women who suffer a major PPH at the Women's is comparable with local and international figures of 1-2%. Long term morbidity includes renal impairment, Sheehan Syndrome and the risk of blood-borne infections from blood transfusions<sup>4</sup>.

Factors which contribute to maternal death have been identified in the latest CEMACH report; lack of routine observation in the postpartum period, failure to appreciate that bleeding was occurring, lack of optimal post-operative measurement of pulse and blood pressure or recognition of abnormal vital signs such as oxygen saturation and respiratory rate, even when it was known the mother had sustained a large bleed<sup>3</sup>. Other factors that contribute to suboptimal care include<sup>17</sup>:

- Lack of awareness of the signs and symptoms that could signal deterioration, and the role of vigilant monitoring in early detection
- Vital signs not monitored consistently, or not monitored at all
- Changes in vital signs not detected
- Lack of recognition of the implications of changes in vital signs
- Uncertainty about when to trigger assistance, resulting in delays in notifying medical staff of signs of deterioration
- Delays by medical staff in responding to notification, or provision of an inappropriate response
- Inconsistent skills of ward medical and nursing staff on how to manage the deteriorating patients
- A delay or not seeking supervision or advice in a timely manner
- Ineffective communication and handover of critically ill patients.

It is recommended that all maternity staff should have a recognised procedure for managing PPH which is rehearsed on a regular basis<sup>5</sup>. Training should be provided to all maternity care staff regarding assessment of blood loss<sup>4</sup>.

This guideline has been developed to assist clinicians managing primary postpartum haemorrhage in order to reduce the morbidities and mortality associated with major blood loss after childbirth. For guidance on postnatal observations and care after a major PPH, please refer to the procedure '[Postpartum Haemorrhage - Immediate and Ongoing Postnatal Care after Major PPH](#)'.

## 2. Definitions

**Primary postpartum haemorrhage** (PPH) is traditionally defined as blood loss greater than or equal to 500 mL, within 24 hours of delivery<sup>6</sup>.

**Secondary PPH** is defined as a blood loss of more than 500mL after 24hours and up to 6 weeks postpartum<sup>6</sup>.

**A major PPH** is defined as such when there is continued bleeding and failure to respond to first-line management and cases where blood loss is approaching or exceeding 1000mL<sup>6</sup>.

**DIC-** Disseminated intravascular coagulation.

**Bakri balloon** is a balloon tamponade indicated for women not responding to uterotonics and uterine massage. It is used to control haemorrhage due to uterine atony in the upper segment of the uterus and to control bleeding in the lower uterine segment secondary to placental implantation in the lower uterine segment. Please see procedure '[Postpartum Haemorrhage - Bakri Balloon Tamponade](#)' for more information.

**Hypovolaemic shock** is a life-threatening condition in which reduced circulatory volume results in inadequate tissue perfusion. In the early phases of haemorrhage, the body compensates for blood loss by raising systemic vascular resistance in order to maintain blood pressure and perfusion to vital organs. Clinically, this corresponds to a narrowing of the pulse pressure. As bleeding continues, however, further vasoconstriction is impossible, resulting in decreased blood pressure, cardiac output, and end-organ perfusion. Compensatory homeostatic

mechanisms are activated, including vasoconstriction, increased cardiac activity, reduced fluid excretion and increased platelet numbers. Blood flow to the heart, brain and adrenal glands is optimized at the expense of other organs. When persistent, irreversible cell damage occurs, and falling myocardial perfusion leads to a vicious cycle of myocardial failure and death. The clinical signs are delayed in newly parturient women due to the increased blood volume of pregnancy. By the time these vital signs are abnormal the woman will have lost at least 1500mL.

**B-Lynch suture:** uterine compression sutures running through the full thickness of both uterine walls (posterior as well as anterior) for surgical management of atonic PPH. The B-Lynch suturing technique (brace suture) is useful because of its simplicity of application, life-saving potential, relative safety and capacity for preserving the uterus and subsequent fertility. The adequacy of haemostasis can be assessed both before and immediately after application of the suture. This technique is an alternative to major surgical procedures for controlling pelvic arterial pulse pressure or hysterectomy. It has been shown, when applied correctly, to be successful with no problems and no apparent complications. Only if it fails, need other more radical surgical methods be considered<sup>16</sup>.

### 3. Responsibilities

**Obstetric and midwifery staff** are responsible for recognising and promptly managing postpartum haemorrhage, for collaborating with other clinicians necessary for the woman's care, escalating to senior clinicians in cases of major PPH.

**Senior medical staff (on-call Obstetric Consultant)** are responsible for attending all cases of major PPH or on request.

**Anaesthetic staff** are responsible for providing and advising on clinical care in cases of major PPH when intensive monitoring and resuscitation are required.

The **Haematology Consultant** should be consulted early to co-ordinate the provision of blood products and provide advice regarding transfusion support and management of coagulopathy..

**Other available specialists** such as Gynae/Oncology Consultant should be consulted early when bleeding is intractable, where hysterectomy or ligation/embolisation of uterine arteries are being considered.

### 4. Guideline

#### 4.1 Principles of care

PPH is recognised early and prompt treatment initiated in order to reduce the associated morbidities and mortality. Effective teamwork and communication is essential with resuscitation, monitoring, investigation and directed treatment conducted simultaneously<sup>6</sup>. Management includes addressing the 4 causes of PPH; uterine atony, retained tissue, genital tract trauma and clotting disorders. These are commonly known as the '4 T's'; tone, tissue, trauma and thrombin.

Active management of third stage is recommended to all women as this reduces the risk of PPH and the need for blood transfusion<sup>6</sup>.

#### 4.2 Incidence

The incidence of PPH within Australia and New Zealand is between 5-15%<sup>6</sup>.

#### 4.3 Risks

The table below outlines some common risk factors for PPH. These risks should be identified both antenatally and during labour. Other risk factors to consider are a previous history of PPH and any previous uterine surgery, including but not limited to caesarean birth, myomectomy, STOP, dilatation and curettage (D and C). However two thirds of women who have a PPH have no known risk factors<sup>8</sup>.



Table 1 - Common Risk Factors for PPH

Tone	Trauma	Tissue	Coagulopathy
Prolonged labour	Operative delivery	Retained placental tissue	Pre-eclampsia
Precipitate labour	Cervical / vaginal lacerations	Abnormal placentation	HELLP Syndrome
Dysfunctional labour		Morbidly adherent placenta	Placental abruption
Grand Multiparity			FDIU>4/52
Multiple pregnancy			Amniotic Fluid Embolism
Polyhydramnios			Sepsis
Macrosomia			Bleeding disorders
Abnormalities: fibroids			Drugs (aspirin / heparin)
Intrauterine infection			
Uterine relaxing agents such as Magnesium sulphate / general anaesthetic/ tocolytics (terbutaline)			

#### 4.4 Assessment<sup>6</sup>

**Assessment** includes effective team management, recognition, communication, resuscitation, monitoring and investigation as well as directed management. Whilst uterine atony is the leading cause of PPH, all causes of should be considered: tone, trauma, tissue and thrombin.

**Recognition:** visual estimation of blood loss has been recognised as unreliable. Where possible blood loss should be estimated by weighing linen, drapes pads and swabs. It is important to remember that the clinical signs of haemorrhagic shock are delayed in the newly parturient woman due to the increased blood volume of pregnancy.

**Communication:** includes communication between all members of the multidisciplinary team with timely escalation to senior obstetric and midwifery staff, the involvement of haematologists and anaesthetists in clinical care. The woman and her support people must be included in the communication.

**Resuscitation:** initial resuscitation is based on the ABC approach with advanced resuscitation guided by the clinical situation.

An increasing trend in the incidence of PPH has been noted and all maternity clinicians should remain alert to the possibility of PPH<sup>4</sup>.

**Minimum observations** include vital signs at regular intervals, measuring on-going blood loss and awareness of total blood loss volume, oxygen saturation and establishing IV access. A designated 'PPH Box' is considered a good risk management approach as all necessary equipment is gathered in one area and quickly available. For suggested contents, see [Appendix 2](#).

**Investigations:** include basic haematological investigations. Further investigations are guided by the clinical situation.

#### 4.5 Management of women at risk for PPH<sup>8</sup>

##### Planned vaginal birth

- Confirm labour management plan when the woman is diagnosed in labour
- Establish intravenous access (16 gauge cannula)

- Send sample for Blood Group and Antibody screen.
  - **NOTE:** women who have a red cell antibody should have a group and hold when she presents in labour or prior as blood provision takes longer in this circumstance
- Active management of the third stage
- This may include having a 40 units oxytocin infusion available to commence when needed.

#### **Planned caesarean section<sup>8</sup>**

- May be associated with placenta praevia or other cases with a high risk of haemorrhage
- An experienced obstetrician should be physically present in theatre
- An experienced consultant anaesthetist should provide anaesthesia
- A valid blood group and antibody screen result should be available (within 72 hours of collection)
  - **NOTE:** women who have a red cell antibody should have a group and hold when she presents in labour or prior as blood provision takes longer in this circumstance
- Insert two large bore cannulae (at least 16 gauge)
- Intravenous fluids should be warmed (use temperature controlled fluid warming device e.g. blood warmer) to avoid hypothermia
- Ensure that devices to infuse fluid under pressure are in theatre
- Consider warming of the woman e.g. using a forced air warmer.

#### **Suspected abnormal adherence of placenta**

- Arrange the back-up of another experienced obstetrician, gynaecologist, urologist or vascular surgeon
- Preoperative consultation with an interventional radiologist to determine the availability and feasibility of embolisation should the need arise.
- Perioperative notification to the Women's blood bank must occur

#### **4.6 Management of PPH if placenta is not expelled**

- Perform uterine massage to expel clots and repeat oxytocin e.g. oxytocin 10 units intravenous, or 10 units intramuscular. Avoid ergometrine or Syntometrine® (this is a combination of oxytocin and ergometrine) for retained placenta because it causes tonic uterine contraction, which may delay expulsion)
- Empty the bladder / catheterise
- Repeat controlled cord traction
- Insert IV access (16 gauge cannula)
- Perform portable ultrasound (if not already done) +/- vaginal examination to confirm if placenta has separated (trapped) or still adhered. Remove placenta if trapped and remove any clots present.

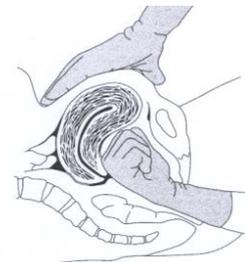
#### **4.7 With rapid PPH >1500 mL<sup>8</sup>**

- Call for help – midwifery, obstetric and anaesthetic (MET call/ Pink Alert)
- Ensure the 'massive transfusion' box is brought to the room
- Stop the bleeding – e.g. vaginal examination to exclude causes other than atony, remove any clots present, apply pressure to minimise bleeding
- Administer oxygen at 8-12 litres via re-breathing mask
- Intravenous access x 2 using 16 gauge cannulae
- Arrange urgent pathology testing for Blood Group and Antibody Screen, Full Blood Count (FBC), Coagulation Screen (INR, APTT, fibrinogen)

- If emergency transfusion is required (before pre-transfusion testing is complete), emergency O Negative red cells should be requested by telephone from the blood bank
- In the case of massive blood loss, the senior obstetrician / anaesthetist should liaise with the haematologist to arrange further appropriate blood product support
- Lower head of bed, position woman flat (may remain with legs bent or in lithotomy)
- Resuscitate with appropriate intravenous fluid, e.g. sodium chloride 0.9 %, Hartmann's solution (crystalloid) or colloid volume expander (Gelofusine, Albumin 4% or 20%). When using crystalloid, the ratio of resuscitative intravenous fluid required to blood lost is 3:1
- To resuscitate more quickly, administer intravenous fluids using a pressure infusion device
- Hypothermia increases the risk of disseminated intravascular coagulation and other complications. This may be prevented by pre-warming resuscitation fluids, e.g. use temperature controlled blood warmers and warm air blankets
- Avoid hypotension by adequate fluid replacement in relation to ongoing measured blood loss
- Administer second bolus dose of oxytocin 10 units intravenously
- Prepare woman for theatre for manual removal of placenta with anaesthesia after adequate pre-operative resuscitation
- Monitor maternal observations for clinical signs of shock (e.g. tachycardia, tachypnoea, decreased blood pressure, weakness, sweating, restless, nausea) and resuscitate if present
- Monitor oxygen saturation with pulse oximeter
- Consider prophylactic antibiotics in theatre
- Consider the possibility of an abnormally adherent placenta.

If at any time bleeding is rapid or the woman is haemodynamically unstable:

- Delegate two people (e.g. anaesthetist plus midwife or theatre nurse) to continue with resuscitative measures
- Bimanually compress the uterus by placing a fist in the anterior fornix of the vagina and the other hand rubbing up the uterine fundus (see diagram)
- If unsuccessful, perform aorto-caval compression.



**Diagram - Illustrating internal bimanual compression of the uterus<sup>18</sup>**

#### **4.8 PPH after delivery of the placenta**

- Management as above for retained placenta
- Ensure the uterus is contracted.

If the uterus is not contracted:

- Continue uterine massage to stimulate a contraction and expel any clots present. If the uterine fundus feels bulky and uterine massage does not expel clots, put on sterile gloves and perform vaginal examination to remove clots
- Insert indwelling catheter
- Administer bolus ergometrine 250 micrograms intravenously or 250 micrograms intramuscularly. Alternatively repeat bolus oxytocin 10 units intravenous and/or 10 units intramuscular (if concerned about maternal hypertension)
- Prepare and commence an oxytocin infusion 40 units oxytocin in 1000 mL Hartmann's solution or sodium chloride 0.9 %)
- Check that the placenta is complete
- If no response to oxytocin infusion and no contraindication to the use of ergometrine, repeat ergometrine 250 micrograms intravenous or 250 micrograms intramuscular after 2 to 3 minutes



- Consider misoprostol 800 to 1,000 micrograms per rectum

OR

- 1mg intramyometrial injection of Prostaglandin F2 $\alpha$  (dinoprost), repeat up to a maximum dose of 3mg. Please refer to procedure [‘Postpartum Haemorrhage - Prostaglandin F2 Alpha’](#) for guidance on preparation and administration.

If bleeding continues despite a well contracted uterus look for other causes:

- Position the woman in lithotomy with adequate anaesthesia / analgesia
- Ensure adequate lighting, assistance and instruments to provide adequate exposure
- It may be necessary to take the woman to theatre to examine under anaesthesia
- Inspect vulva, vagina, cervix and perineum for trauma. Consider uterine rupture
- Suture and repair as indicated
- Consider coagulation abnormalities
- In addition to full blood count, check D-dimer, coagulation studies including INR, APTT, fibrinogen
- Treat coagulation abnormalities with appropriate components which may include fresh frozen plasma (FFP), platelets and cryoprecipitate
- Consider underlying cause if disseminated intravascular coagulation (DIC) present
- Consult with haematologist regarding appropriate blood products supports
- If DIC is secondary to sepsis, also consult with microbiologist.

If bleeding persists:

- Contact the theatre and anaesthetist if not already done
- Ensure adequate consultant obstetric / specialist support available
- Consider repeating ergometrine
- Transfer woman to theatre.

In theatre management:

- Consider intramyometrial injection of 1mg of Prostaglandin F2 $\alpha$  (dinoprost). Can be repeated up to a maximum dose of 3mg. Please refer to procedure [‘Postpartum Haemorrhage - Prostaglandin F2 Alpha’](#) for guidance on dosage and reconstitution
- Consider exploration of uterine cavity under anaesthesia
- Consider uterine tamponade with the Bakri balloon
- Consider packing the uterus and vagina
- Bimanually compress the uterus by placing a fist in the anterior fornix of the vagina and the other hand rubbing up the uterine fundus
- If this controls the bleeding, maintain this compression for at least 30 minutes
- If uterotonics and mechanical compression techniques are unsuccessful, decide whether to perform
  - B-lynch brace suture
  - Hysterectomy
  - Angiography and embolisation
  - Ligation of the internal iliac vessels.

#### 4.9 Documentation

Complete mandatory documentation including:

- Mandatory observations
- Date/time of Bakri balloon/uterine pack insertion
- Proposed date/time of Bakri balloon/uterine pack removal.

#### 4.10 Complications of PPH

Please refer to [Appendix 4 – Complications of Major Postpartum Haemorrhage](#).

### 5. Evaluation, monitoring and reporting of compliance to this guideline

Compliance to this guideline will be monitored, evaluated and reported through the notification of clinical incidents on VHIMS and by monthly clinical audit of PPHs greater than 1500mLs.

### 6. References

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## 7. Legislation related to this guideline

Not applicable.

## 8. Appendices

Appendix 1: [Postpartum Haemorrhage Algorithm](#)

Appendix 2: [Contents of Postpartum Haemorrhage Box](#)

Appendix 3: [Postpartum Haemorrhage Medication Guide](#)

Appendix 4: [Complications of Major Postpartum Haemorrhage](#)

### PGP Disclaimer Statement

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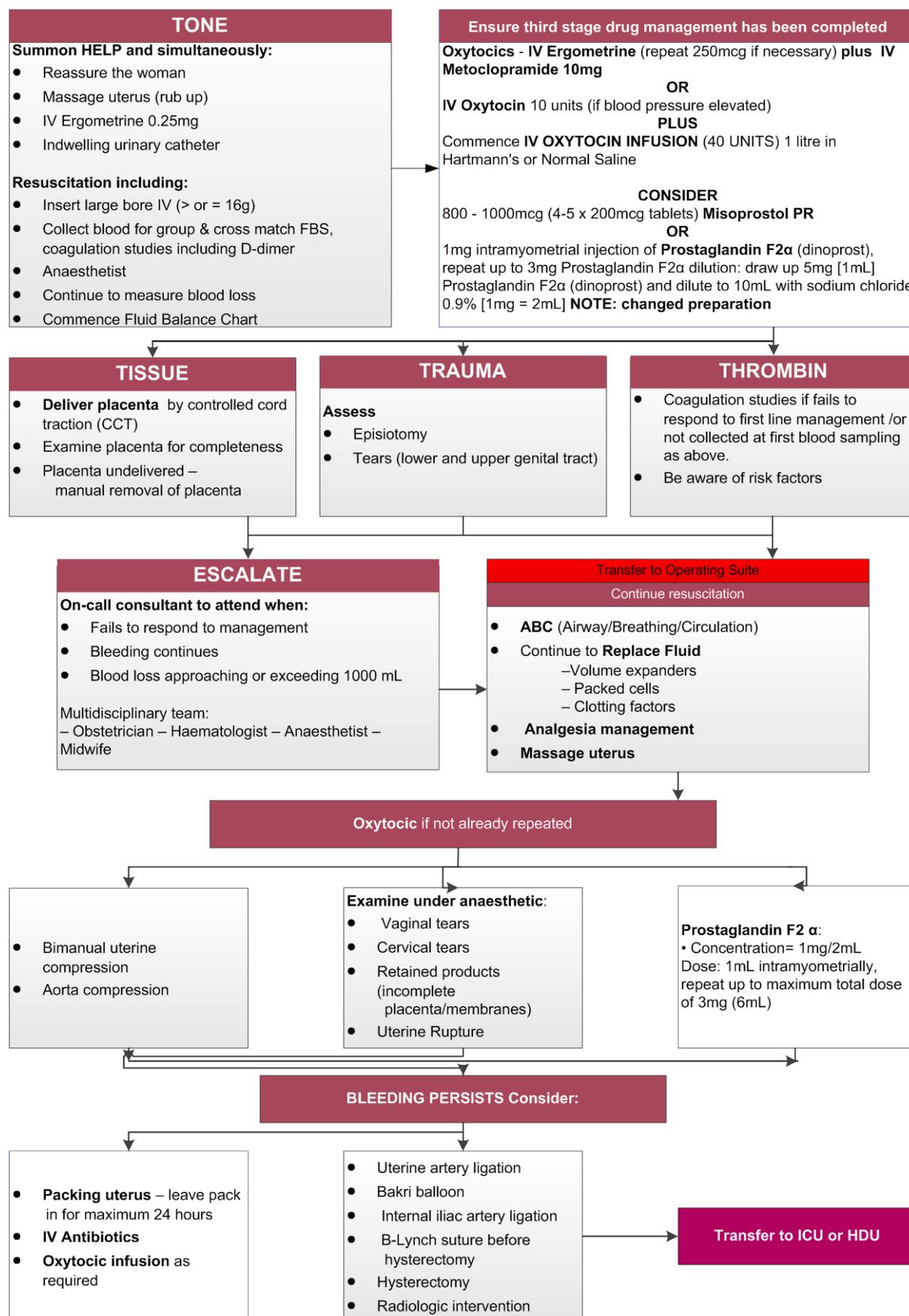
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# Postpartum Haemorrhage Algorithm



# Contents of the Postpartum Haemorrhage Box



1. A fishing tackle box with a bright lid works well as a light-weight, easily recognised and transportable box. It also precludes over-stocking.

2. A food container/lunch box with clickable lid-locks works well for the items that need refrigerated.

Contents are listed within the box or on the lid for consistent restocking of items.

## Box 1: Top Shelf

<b>For cannulation:</b> 16G IV cannulae *2 18G IV cannulae *2	<b>For blood pathology</b> 23G 1¼" needles (blue) *2 21G 1½" needles (green) *2
Skin prep swabs (for IV cannulation)	Blood tubes: <ul style="list-style-type: none"> <li>• EDTA KE/9mL and 2.7mL</li> <li>• Serum gel Z/7.5mL</li> <li>• Coagulation 9NC/3mL</li> </ul>
Tegaderm (or similar for securing IV cannulae)	
Transpore tape	
Luer-lock connectors	
Sodium chloride ampoules 10mL *2	Tourniquet
Water for injections ampoule 10mL*2	Alcohol swabs
Additive labels	Specimen transport bags
Multi-adapters	Pathology request slips
3-way adapter (for IV giving set)	10mL syringe *3
Misoprostol 200mcg tablets (box of 5 tablets)	

## Bottom Shelf

1L sodium chloride 0.9% or Hartmann's solution	Foley catheter 14ch Urine drainage bag or Urimeter *1 10mL ampoule water for injections 10mL syringe
Gelofusine (plasma expander)	
IV giving sets- standard *2	
IV giving set-pump *1	

## Box2: kept in fridge

Drugs: Oxytocin 10unit (box of 5 ampoules) Ergometrine 500mcg (box of 5 ampoules) Dinoprost (prostaglandin F2α) - pharmacy only pack, 1 ampoule with sodium chloride 0.9% x 10mL  Note: stability of refrigerated misoprostol is unknown therefore keep in main box	Syringes: 2mL *2 5mL *2
	Needles : 19G *3 23G *3 25G *3 25 G Spinal needles *2 (for IMM PGF2α)
Additive labels	

## Postpartum Haemorrhage Medicines Guide



Medicine	Dose	Route	Reconstitution	Side effects	Contraindication	Comments
Ergometrine	250 microgram, repeat as needed to max of 4 doses	IV or IM	-	Tonic uterine contraction, Nausea, vomiting and raised BP	Severe hypertension and cardiac disease Hypersensitivity to ergometrine	+ metoclopramide 10mg IV  Avoid use if placenta not expelled
Oxytocin	10 units, repeat bolus	IV or IM	-	Painful contraction, nausea or vomiting, water intoxication, hypotension	Hypersensitivity to oxytocin	In place of ergometrine if blood pressure elevated
	40 units in 1L sodium chloride 0.9% at rate of 250mL/h if placenta is out	IV infusion	-			
Misoprostol	800 to 1000 microgram (4 to 5 tablets)	Rectal	-	Nausea, vomiting, diarrhoea, abdominal pain, pyrexia	Hypersensitivity to misoprostol	Use when oxytocin and ergometrine are not successful
Prostaglandin F2 alpha (Dinoprost)	1mg, repeat to max total dose of 3mg (6mL)	Intramyometrial	Draw up 9mL 0.9% sodium chloride in a 10mL syringe. Add 1mL of 5mg/mL prostaglandin F2 alpha to the 9mL to make a 10mL solution & mix well (0.5mg/mL)	Bronchoconstrictor	Severe asthma and cardiac disease	Discard 4mL of solution to reduce chances of overdose.  Please note changed preparation.
Syntometrine®	1mL, repeat if necessary to max of 3mL total  (1mL = ergometrine 0.5mg & oxytocin 5 units)	IM	-	Nausea, vomiting and raised BP	Severe hypertension and cardiac disease Hypersensitivity to medicine	Alternative first line drug



## Appendix 4: Complications of major PPH

Complications of major PPH	
Haemorrhagic shock	Clotting disorders
Severe anaemia	Acute renal failure
Acute lung injury	End organ damage
Side effects from uterotonics	
Headache (PGF2 alpha, misoprostol)	Nausea and vomiting (oxytocin, ergometrine, PGF2alpha, misoprostol) Water intoxication (oxytocin)
Hypertension (ergometrine)	Diarrhoea (PGF2 alpha, misoprostol)
Hypotension (ergometrine, rarely)	Flushing (PGF2 alpha, misoprostol)
	Chills (PGF2 alpha, misoprostol)
Clinical manifestations of Hypovolaemic shock	
Low blood pressure	Shivers/Cold
Anxiety/ Confusion/Delirium/ Decreased level of consciousness	Pale and clammy
Shortness of breath/ Air hunger/ Hyperventilation	Appetite for salty food
Restlessness	Thirst
Palpitations/ Tachycardia	Decreased urine/ Anuria/ Oliguria
Signs and symptoms of acute renal failure	
Renal tubules become ischaemic due to reduction in blood supply leading to acute renal failure exhibited as:	
Rising serum urea and creatinine levels, and/or	
Oliguria of less than 400 ml/24 hours, and/or	
Hyperkalaemia and/or hyponatraemia	
Metabolic acidosis, and/or uraemic symptoms of drowsiness, nausea, hiccough and twitching	
Risk Factors For Venous Thromboembolism In Pregnancy And The Puerperium (* risk factors specific to postpartum VTE only)	
Age over 35 years	Obesity (BMI > 30) either pre-pregnancy or in early pregnancy
Parity > 4	Gross varicose veins
Essential thrombocythaemia, polycythaemia vera	Surgical procedure in pregnancy or puerperium, e.g. evacuation of retained products of conception, postpartum sterilisation
Dehydration	Immobility (> 4 days bed rest)
Pre-eclampsia	Excessive blood loss
Prolonged labour	Mid-cavity instrumental birth
Immobility after birth	