Guideline

Postpartum Haemorrhage

1. Purpose

This document outlines the guideline details for managing primary postpartum haemorrhage at the Women's. Where processes differ between campuses, those that refer to the Sandringham campus are differentiated by pink text or have the heading **Sandringham campus**.

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[1]. 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[2].

Factors which contribute to maternal death have been reported [3]; 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. Other factors that contribute to suboptimal care include[4]:

- 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 [5]. Training should be provided to all maternity care staff regarding assessment of blood loss [4].

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 On-going 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 [6].

Secondary PPH is defined as a blood loss of more than 500mL after 24hours and up to 6 weeks postpartum [6]

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[6].

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 homoeostatic 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.

Misoprostol is a heat-stable prostaglandin analogue that can be administred orally, sublingually, vaginally and rectally. Traditionally, rectal misoprostol has been used (off-label) in the suite of uterotonics used to manage postpartum haemorrhage. The time to reach peak plasma level depends upon the route of administration. Oral/sublingual administration has a quicker onset with a peak plasma concentration around 15-30 minutes falling steeply within 60 minutes[14]. Vaginal/rectal administration has a slower onset (around 45-120 minutes) and the fall is gradual (over 240 minutes.) Although current evidence is weak, this different pharmacokinetic profiles of misoprostol administration suggests that the rectal route is not the optimal route for immediate management of brisk blood loss but could be considered prophylactically when there is an increased risk of blood loss, e.g. emergency caesarean after a long labour, multiple birth etc. Oral/sublingual misoprostol *may* be administered as part of the usual suite of uterotonics used to manage brisk blood loss with consideration given to the time it takes to reach peak onset. Rectal administration is not recommended for the management of brisk blood loss. Shivering and pyrexia (> 40 degrees C) are typical side-effects and their severity is dose-related. These are generally transient[15].

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.

Sandringham - Blood product support for bleeding patients is provided by the Alfred Pathology Service. Consider notifying major PPH to the Alfred Hospital Blood Bank and the Laboratory Haematologist on call (03 9076 3100).

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 [6]. 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 [6].

4.2 Incidence

The incidence of PPH within Australia and New Zealand is between 5-15% [6].

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[7].

Table 1 - Common Risk Factors for PPH

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

4.4 Assessment [6]

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 [4].

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 [7]

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. **All women birthing at Sandringham have a 'group and hold' on admission.**

- Active management of the third stage with IM syntometrine ® 1mL, unless contraindicated
- This may include having 40 units oxytocin infusion available to commence when needed.

Planned caesarean section[8]

- 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. **Note – not available at Sandringham.**
- 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[7,11]

Sandringham – Activate Massive Transfusion Guideline and communicate with Haematology/ Anaesthesia.

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 (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.

Transfuse blood as soon as possible if clinically required. The decision to transfuse is based on both clinical and haematological assessment[11].

Until blood is available infuse up to 3.5L of warmed clear fluids. Initially 2L of warmed isotonic crystalloid. Further fluid resuscitation can continue with additional isotonic crystalloid or colloid[11].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.

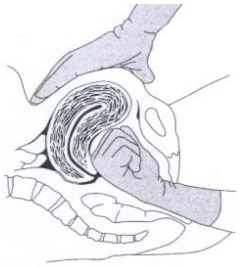

Diagram - Illustrating internal bimanual compression of the uterus

4.8 PPH after delivery of the placenta

Sandringham – If bleeding persists, early transfer to theatre and proactive communication. Refer to the guideline Transfer to Tertiary - W@S, as necessary.

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 and/or 250 micrograms intramuscularly. Alternatively repeat bolus oxytocin 10 units intravenous and/or 10 units intramuscular (if concerned about maternal hypertension)
- Administer antiemetic Ondansetron 4mg IV
- Prepare and commence an oxytocin infusion 40 units oxytocin in 1000 mL Hartmann's solution or sodium chloride 0.9 %) at a rate of 250mLs/hr over 4 hours
- **If fluid restricted**: 40 units oxytocin in 46mL Sodium Chloride 0.9% in a 50mL syringe driver at a rate of 10mL/hr
- Check that the placenta is complete
- If bleeding is brisk, consider administering 400 micrograms sublingual misoprostol.
    - Note: 400 micrograms of misoprostol is only administered rectally if there is concern about the woman's conscious state. Rectal administration has no place in the immediate management of PPH.
    - Sublingual and rectal misoprostol must not be administered concurrently and rectal misoprostol must not be administered within 1 hour of oral/sublingual administration.
- **If no response to treatment**: Carboprost (Hembate®) 250 micrograms (1mL) by deep intramuscular injection repeated at intervals of no less than 15 minutes to a maximum of 8 doses (2mg).
    - Note: if more than one dose is required, the woman must be transferred to theatre for further management and the duty consultant must attend.
- **Tranexamic acid**- 1G IV in 10mL via syringe driver set at 1mL/minute administered over 10 minutes, ensuring this does not delay other therapies (ampoule available in medication room cupboard).
    - Consider if there is likelihood of delay in accessing an operating theatre e.g. out of hours. This may reduce the overall blood loss whilst waiting
    -

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 indcated
- 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 Carboprost 500 micrograms (2mL) by direct intramyometrial injection (consider contraindications which include known cardiac, pulmonary, renal or hepatic disease) [8, ,10,11].
  Note: The manufacturer does not recommend intramyometrial use. Therefore this method of administration is the responsibility of the administering clinician - in consultation with a consultant obstetrician. See procedure *Postpartum Haemorrhage - Carboprost (Hemabate®)*
- 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.
- Management of rapid PPH is as section 4.7

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.

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. Appendices

Appendix 1: Postpartum Haemorrhage Algorithm

Appendix 2: Contents of Postpartum Haemorrhage Box

Appendix 3: Postpartum Haemorrhage Medication Guide

Please ensure that you adhere to the below disclaimer:

PGP Disclaimer Statement

The Royal Women's Hospital Clinical Guidelines present statements of 'Best Practice' based on thorough evaluation of evidence and are intended for health professionals only. For practitioners outside the Women's this material is made available in good faith as a resource for use by health professionals to draw on in developing their own protocols, guided by published medical evidence. In doing so, practitioners should themselves be familiar with the literature and make their own interpretations of it.

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You are encouraged to consult other sources in order to confirm the information contained in any of the guidelines and, in the event that medical treatment is required, to take professional, expert advice from a legally qualified and appropriately experienced medical practitioner.

NOTE: Care should be taken when printing any clinical guideline from this site. Updates to these guidelines will take place as necessary. It is therefore advised that regular visits to this site will be needed to access the most current version of these guidelines.

Appendix 1

Postpartum Haemorrhage Algorithm

PPH Management

PPH recognised

Summon HELP and simultaneously:

- Reassure the woman
- Massage uterus (rub up)
- IV and IM **ergometrine** 0.25mg & IV **ondansetron** 4mg
- Indwelling urinary catheter

Resuscitation including:

- Insert large bore IV (≥ 16G)
- Collect blood for group & cross match, FBE,
- Continue to measure blood loss
- Commence Fluid Balance Chart
- Anaesthetist help

Ensure third stage drug management has been completed

First line uterotonic management

IV **ergometrine** 0.25mg and IM **ergometrine** 0.25mg plus IV **ondansetron** 4mg, if not already given

OR

IV oxytocin 10 units if blood pressure elevated

PLUS

Commence **IV OXYTOCIN INFUSION** (40 UNITS) 1 litre in Hartmann's or Normal Saline Via infusion pump @250mL/hr

Assess the woman

Inadequate response

Second line uterotonic management

1. 250 microcgrams (1mL) deep IM injection **carboprost (Hemabate ®)** at no less than 15 min intervals to max 2mg. *First dose may be given on Birth Centre.*
2. **Misoprostol** 400 micrograms (2 tabs) sublingually **OR** rectally as per woman's condition
3. **Tranexamic acid** 1 ampoule (1g/10mL) IV via syringe pump @ 1mL/minute, over 10 minutes

Assess the woman

ESCALATE

On-call consultant to attend when:

- Inadequate response to management
- Bleeding continues
- Blood loss approaching or exceeding 1000 mL

Assess the woman

CONSIDER the multidisciplinary team, including anaesthetist, haematologist, gynae-oncology fellow/consultant, operating department staff.

CONSIDER implementing the Massive Transfusion Protocol

Inadequate response

Consider other causes

TISSUE

- **Deliver placenta** by controlled cord traction (CCT)
- Examine placenta for completeness
- Placenta undelivered – manual removal of placenta

TRAUMA

- Episiotomy
- Tears (lower and upper genital tract)

THROMBIN

- Coagulation studies if failure to respond to first line management
- Be aware of risk factors

Examine under anaesthetic

- Vaginal tears
- Cervical tears
- Retained products (incomplete placenta/membranes)
- Uterine rupture

Transfer to Operating Suite

Continue resuscitation

- ABC (Airway/Breathing/Circulation)
- Continue to Replace Fluid
  - **–Volume expanders**
  - **– Packed cells**
  - **– Clotting factors**
- **Analgesia**
- Massage uterus

CONSIDER

- Bimanual uterine compression
- Aortic compression

Still bleeding- CONSIDER

- Uterine artery ligation
- Bakri balloon
- Internal iliac artery ligation
- B-Lynch suture before hysterectomy
- Hysterectomy
- Interventional radiology
- Packing uterus – leave pack in for maximum 24 hours
- **IV Antibiotics**
- **Oxytocic infusion** as required

Third line uterotonic management

- **Carboprost** 250mcg (1mL) as deep IM injection 250mcg as intramyometrial injection into each cornu or 500mcg into the fundus, at intervals no less than 15mins and to a max 2mg (8 doses)

CONSIDER (if not already given)

- **Misoprosto**l 400 micrograms (2 tabs) sublingually if condition permits
- **Tranexamic acid** 1 ampoule (1g/10mL) IV via syringe pump @ 1mL/minute over 10 minutes.

CONSIDER implementing the Massive Transfusion Protocol

Transfer to ICU or Complex Care Unit

IV **Oxytocin** infusion 40 Units in 1 litre of Hartmann's or Normal Saline

CONSIDER

400 micrograms **misoprostol** rectally (max 1000mcg)

4mg IM

Appendix 2

PPH Box contents

The PPH box consists of two components:

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

2. A clearly labelled container for refrigerated items

Contents are dependent on the location of the box. Contents are listed within the box for consistent restocking of items. Boxes are restocked by ward areas.

All areas excluding Birth Centre:

Box 1: Top Shelf

For cannulation: 16G IV cannulae *2 18G IV cannulae *2	**For blood pathology** 23G 1¼" needles (blue) *2 21G 1½" needles (green) *2
Skin prep swabs (for IV cannulation)	Blood tubes: • EDTA KE/9mL and 2.7mL • Serum gel Z/7.5mL • Coagulation 9NC/3mL
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

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- Alaris pump *1	

Box2: kept in fridge (restocked by ward area after use)

Drugs: Oxytocin 10unit (box of 5 ampoules) Ergometrine 500mcg (box of 5 ampoules) Metoclopramide 10mg (2 ampoules) Misoprostol 200mcg x 2 tablets	Syringes: 3mL x 3 5mL x 3
	Needles : 1G *3 23G *3
IV infusion label x 2	

Appendix 2

PPH Box contents

Birth Centre:

Box 1

1L sodium chloride 0.9%	1 x syringe / needle kit containing: 5mL syringe x 2 3mL syringe x 2 10mL syringe x1 21G needle x 2 19G needle x 2 IV infusion labels
Gelofusine (plasma expander) x 1	
IV giving sets- standard	
IV giving set- Alaris pump	
Extension line for syringe pump	
3-in-1 extension LS-connector (octopus)	

Box 2: Kept in fridge (restocked by ward area after use)

Drugs: Oxytocin 10unit (box of 5 ampoules) Ergometrine 500mcg (box of 5 ampoules) Metoclopramide 10mg (2 ampoules) Misoprostol 200mcg x 2 tablets	Syringes: 3mL x 3 5mL x 3
	Needles : 21G x 3 23G x 3 25 G Spinal needles x2 (for IMM carboprost)
IV infusion label x 2	

Appendix 3

Postpartum Haemorrhage Medicines Guide

Medicine	Dose	Route	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	400 microgram (2 tablets)	Rectal	Nausea, vomiting, diarrhoea, abdominal pain, pyrexia	Hypersensitivity to misoprostol	Use when oxytocin and ergometrine are not successful Rectal administration has a slower onset (around 45-120 minutes) and the fall is gradual (over 240 minutes)
Misoprostol	400 microgram (2 tablets)	Oral/sublingual	Nausea, vomiting, diarrhoea, abdominal pain, pyrexia	Hypersensitivity to misoprostol	Oral/sublingual administration has a quicker onset with a peak plasma concentration around 15-30 minutes falling steeply within 60 minutes[14]
Ergometrine/ oxytocin (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
Carboprost (Hemabate ®)	After vaginal birth: 250 micrograms in 1mL ampoules by deep IM injection or intramyometrially, at intervals of no less than 15minutes to a maximum of 2mg (8 doses) OR 2mL into each cornu to maximum 2mg Laparotomy: as above-	IM	bronchospasm, pulmonary oedema, hypoxia, acute hypertension (usually transient and requiring no treatment), acute hypotension, cardiac arrhythmia,flushing, syncope and palpitations, abdominal cramps, diarrhoea and vomiting, an increase in temperature greater than 1.1°C, convulsions (rarely),	Hypersensitivity to any component of the preparation: carboprost, tromethamine, sodium chloride, benzyl alcohol Patients with known active cardiac, pulmonary, renal or hepatic disease Acute pelvic inflammatory disease	Third line medicine for PPH unresponsive to first and second line treatment. Intramyometrial injection is not recommended by the manufacturer however off-label use is supported by evidence- see PPH- Carboprost procedure.

	500micrograms intramyometrially to a max of 2mg		flushing, shivering, uterine rupture, headache (usually mild and transient)		
Tranexamic acid	1 g in 10mL ampoule of tranexamic acid intravenously via syringe pump at a rate of 1mL per min administered over 10 minutes.	IV	Nausea, vomiting, diarrhoea, allergic dermititis.	Hypersensitivity to tranexamic acid or any of its excipients Patients with a history or risk of thrombosis should not be given tranexamic acid, unless at the same time it is possible to give treatment with anticoagulants. Active thromboembolic disease such as deep vein thrombosis (DVT), pulmonary embolism and cerebral thrombosis.	Second-line management of PPH when bleeding unresponsive to 40U oxytocin infusion and IV/IM ergometrine. Consider when there is likelihood of delay in accessing an operating theatre e.g. out of hours. This may reduce the overall blood loss whilst waiting.