Maternity - Prevention, Detection, Escalation and Management of Postpartum
Haemorrhage (PPH)

Summary
This Guideline provides direction to NSW Public Health Organisations (PHOs) regarding
the prevention, early detection, escalation and management of postpartum haemorrhage
(PPH).

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Health, NSW Health Pathology, Private Hospitals and day Procedure Centres, Public
Hospitals

Distributed to
Divisions of General Practice, Government Medical Officers, Health Associations Unions,
Ministry of Health, NSW Ambulance Service, Private Hospitals and Day Procedure
Centres, Public Health System, Tertiary Education Institutes

Audience
All Clinicians in Maternity Services, Operating Theatre and Recovery, Emergency
Departments
MATUREITY – PREVENTION, DETECTION, ESCALATION AND MANAGEMENT OF POSTPARTUM HAEMORRHAGE (PPH)

PURPOSE

This Guideline provides direction to NSW Public Health Organisations (PHOs) regarding the prevention, early detection, escalation and management of postpartum haemorrhage (PPH).

KEY PRINCIPLES

This document applies to all NSW PHOs and guides the:

- Identification of women with risk factors for PPH and the development of strategies to prevent and/or manage PPH
- Prompt, appropriate management of women experiencing a PPH

USE OF THE GUIDELINE

The Chief Executives of NSW PHOs are responsible for:

- Implementation of this Guideline within their services/facilities
- Development and implementation of evidenced based local procedures and escalation plans for the prevention, detection, escalation and management of primary PPH that are aligned and consistent with the Guideline
- Development of a Maternity Massive Transfusion Protocol (MTP) for use in obstetric critical bleeding
- Ensuring that all clinicians who may be required to care for women before, during and after birth have access to education and training in relation to PPH. This may be mandatory or targeted education and training at the discretion of the health entity, based on its assessment of local needs.

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<thead>
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1 BACKGROUND

Postpartum haemorrhage (PPH) occurs after approximately 5-15% of all births. It remains a leading cause of preventable maternal morbidity and mortality and the incidence and severity appear to be increasing. The majority of cases of PPH occur in women without risk factors, are minor and cause little or no morbidity. Rapid blood loss and/or death can occur however, if prevention and/or immediate management strategies are not implemented appropriately.

This Guideline informs the development and implementation of local protocols for the prevention and management of PPH, including appropriate escalation plans and a Maternity Massive Transfusion Protocol.

1.1 About this document

This Guideline replaces the previous Policy Directive: PD2010_064 Maternity - Prevention, Early Recognition and Management of Postpartum Haemorrhage. The main changes include:

- The addition of Carboprost as a second line pharmacological treatment (see Appendix 4)
- Guidance in relation to fluid resuscitation
- A recommendation for a Massive Transfusion Protocol applicable to maternity (see Section 5.1)
- A recommendation that Local Health Districts (LHD) ensure relevant clinicians receive appropriate education and training in relation to PPH. This may be in the form of mandatory or locally determined, targeted education and training dependent on the professional group, the workplace and / or role of the staff member (see Section 8).

1.2 This guideline should be read in conjunction with:

PD2005_406 Consent for Medical Treatment – Patient Information
PD2013_049 Recognition and Management of Patients who are Clinically Deteriorating
PD2009_003 Maternity – Clinical Risk Management Program
PD2014_028 Open Disclosure Policy
PD2014_004 Incident Management Policy
PD2014_032 Prevention of Venous Thromboembolism
GL2016_018 NSW Maternity and Neonatal Service Capability Framework
PD2010_022 Maternity – National Midwifery Guidelines for Consultation and Referral
National Blood Authority’s 2015 Patient Blood Management Guidelines Module 5
1.3 Key definitions

Clinical Emergency Response System (CERS) - Is a process outlined in PD2013_049 Recognition and Management of Patients who are Clinically Deteriorating to access and obtain expert assistance from appropriate clinicians in an appropriate timeframe.

Minor PPH - Blood loss of ≥500-1000ml during or after childbirth with no clinical signs of shock.

Severe PPH - Blood loss of ≥1000ml OR any amount of blood loss that causes signs of haemodynamic compromise (shock).

Massive postpartum haemorrhage (also known as obstetric critical bleeding) - Any amount of pregnancy/postpartum blood loss that causes signs of severe shock (i.e. usually ≥2000mls) OR is life threatening OR is likely to result in the need for massive blood transfusion.

Massive Transfusion Protocol applicable to maternity - A protocol for multidisciplinary escalation and a simultaneous response plan that lists the dose, timing and ratio of blood and blood component therapy specifically for use in women with massive postpartum haemorrhage (or obstetric critical bleeding).

Primary PPH - Occurs within the first 24 hours following birth.

Secondary PPH - Occurs after 24 hours and before 6 weeks postpartum.

Should - Indicates actions that are to be followed unless there are justifiable documented reasons for not taking a different course of action.

2 PREVENTION OF PRIMARY PPH

Risk factors for primary PPH may be identified in the antepartum period, or can arise during or after birth (see Appendix 2).

2.1 Risk assessment and care planning

- All women should be assessed throughout the antepartum, intrapartum and postpartum periods for the development of risk factors for primary PPH

- A clear plan should be developed in consultation with the woman, that includes the identified risk factors/maternal choices, and the strategies to be used to mitigate or control identified risk/s

- The care of women who have risk factors for primary PPH should be undertaken within a maternity service with the appropriate service capability in line with GL2016_018 NSW Maternity and Neonatal Service Capability Framework.

The process outlined in PD2010_022 Maternity - National Midwifery Guidelines for Consultation and Referral may be helpful where a woman plans care outside the recommendations in this guideline (or in an environment or facility that may not have the service capability to meet their risks/clinical needs).
2.2 Women who decline or are unsuitable for blood or blood component transfusion

Guidance is provided in the Patient Blood Management Guidelines Module 5.

2.3 Antepartum anaemia

Maternal morbidity from primary PPH is higher in women with moderate or severe anaemia prior to birth. Antepartum anaemia should be investigated and treated prior to birth. The following should be considered the minimum levels of haemoglobin:

- ≥0-20 weeks: 110mg/dL
- ≥20 weeks: 105mg/dL

2.4 Labour and birth

2.4.1 Intravenous access

Intravenous access is recommended in labour in the presence of identified risk factors (see Appendix 2).

2.4.2 Prophylactic oxytocin

Prophylactic administration of an oxytocic following birth and prior to the delivery of the placenta reduces the risk of severe PPH and the need for blood transfusion. Syntocinon is the drug of choice (see Appendix 3).

2.4.3 Caesarean section operation

- Women undergoing a caesarean section operation should have a current Group and Hold (or cross-match where clinically indicated)
- Abnormal placentation is associated with repeat caesarean section and carries a risk of severe PPH. Clinicians should ensure the following:
  - All women who have had a previous caesarean section should have their placental site confirmed via ultrasound scan (USS)
  - Women with an abnormally adherent placenta require a clear management plan documented in their clinical record prior to labour and birth.

3 DETECTION OF PRIMARY PPH

3.1 Recognition of shock

Assessment for the signs and symptoms of shock is vital in the detection of PPH. The incidence of primary PPH may be underestimated by up to 50%, due to the clinical difficulty in accurately estimating blood loss. The clinical signs and symptoms of shock (Table 1) usually parallel the volume of (intravascular) blood lost.
The single most important and early warning sign of diminishing blood volume and mild shock is tachycardia. This often precedes a fall in blood pressure and/or a noticeable blood loss.

Table 1: Clinical signs and symptoms of shock in primary PPH

<table>
<thead>
<tr>
<th>Blood loss</th>
<th>BP (Systolic)</th>
<th>Signs and Symptoms</th>
<th>Degree of shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>500-1000ml (10-15% total blood loss)</td>
<td>Normal (80-90mmHg)</td>
<td>Palpitations, dizziness, tachycardia</td>
<td>Compensation</td>
</tr>
<tr>
<td>1000-1500ml (15-25% total blood loss)</td>
<td>Slight decrease (70-80mmHg)</td>
<td>Weakness, sweating, tachycardia</td>
<td>Mild</td>
</tr>
<tr>
<td>1500-2000ml (25-35% total blood loss)</td>
<td>Marked decrease (50-70mmHg)</td>
<td>Restlessness, pallor, oliguria</td>
<td>Moderate</td>
</tr>
<tr>
<td>2000-3000ml (35-45% total blood loss)</td>
<td>Profound decrease (30-50mmHg)</td>
<td>Collapse, air hunger, anuria</td>
<td>Severe</td>
</tr>
</tbody>
</table>


3.2 Routine maternal assessment following birth

The majority of PPHs occur in the first hour after birth. Following birth, all women should be assessed as follows:

- **First hour following birth**: regular assessment of vital signs and uterine tone conducted at least every 15 minutes. Assessments to include: accurate and ongoing estimation of cumulative blood loss, fundal height and tone, blood pressure (BP) and pulse

- **First four hours following birth**: after the first hour, close monitoring needs to continue and the frequency of assessments should be individualised to the woman’s risk factors and clinical condition

- **Accurate measurement of blood loss**
  A combination of the two methods may be the most practical:
  - Direct measure of blood lost
  - Items splattered with blood or used to clean up blood should be weighed (e.g. sponges, drapes).

All assessments are to be recorded on the appropriate NSW Health standard observation chart (see Section 6.2).

Escalation of a woman having a PPH is to occur in accordance with the Between the Flags criteria and local (CERS) PD2013_049 Recognition and Management of Patients who are Clinically Deteriorating. Assessment of blood loss and other observations are to be continued after transfer from the birth environment as clinically indicated.

4 MANAGEMENT OF PRIMARY PPH

Management of primary PPH should be tailored to the woman’s individual clinical circumstances and the degree of shock. Management should occur using the
following step-wise approach (see Appendix 1) although it is acknowledged that many of
these actions may need to occur simultaneously:

- **Respond** - with basic measures
- **Identify and treat the cause** - using mechanical and pharmacological measures as
  required
- **Resuscitate** - using the ABC approach and prevention of hypothermia
- **Reassess**.

### 4.1 Respond - Basic Measures

Immediate actions to stem the bleeding and prevent deterioration are required when
primary PPH is identified.

Most cases of PPH are treated effectively with basic measures.

**In the first instance for all women when a PPH is detected:**

- **Call for assistance**
- **Administer an oxytocic** - if the first dose of Syntocinon was given prior to delivery of
  the placenta, a repeat dose may be given (see Appendix 3)
- **Lie the woman flat**
- **Evaluate uterine tone, expel clots, and perform fundal massage** (if the placenta is
delivered)
- **Monitor pulse, blood pressure, respirations and oxygen saturation every 5 minutes
  and temperature every 15 minutes and record appropriately** (see Section 6.2)
- **Empty the woman’s bladder**
- **Gain IV access**
- **Keep the woman warm**
- **Inspect the lower genital tract for trauma and repair where indicated**
- **Inspect the placenta and membranes for completeness**.

Immediate escalation to a medical officer or as per local CERS protocol if basic treatment
measures fail to stem the bleeding.

### 4.2 Identify and treat the cause

Use the Four T’s: **Tone Trauma Tissue and Thrombin** to rapidly identify the cause and
for urgent treatment options (see Appendix 1)

Full resuscitation measures are required if bleeding continues despite basic measures
OR for blood loss ≥ 1000mls, OR signs of shock are present.
4.3 Resuscitate

4.3.1 Airway and breathing
- Administer oxygen by face mask at 10-15 litres per minute (dependent upon the woman’s oxygen saturation)
- Where the woman’s breathing is compromised anaesthetic assistance should be sought immediately.

4.3.2 Circulation - Fluid therapy and initial blood volume replacement

IV access and pathology
If not already insitu, insert two large bore intravenous cannulas (14F or 16F gauge):
- Blood should be collected and sent for urgent pathology: full blood count (FBC), coagulation screen, group and hold
- If appropriate to the clinical situation also consider: LFTs; UECs; Ca2+; lactate and cross match (4 units).

Urine output
If not already insitu, insert an indwelling catheter. Urine output should be monitored as an indication of circulating volume adequacy. Urine output should be maintained at 0.5ml/kg/hr. Use the weight of the woman to calculate the required urine output per hour (i.e. a woman weighing 60kg (x 0.5) should have a urine output ≥30mls / hour)12.

Fluid therapy - to restore circulating volume
To restore immediate circulating (intravascular) volume:
- Commence rapid infusion of (ideally warmed) fluids
- To avoid fluid overload, a maximum of 3.5 litres of fluid should be infused. If further fluid replacement is required, blood transfusion is recommended.

Initial blood volume replacement

Blood transfusion should be considered early to restore oxygen carrying capacity. The clinical picture should be the main determinant in the decision to proceed with blood transfusion, irrespective of laboratory results.

Blood transfusion should be considered if:
- The measured blood volume loss is ≥1500mls, or at a lesser threshold if the bleeding is rapid or ongoing, and/or signs of ≥ moderate shock are present,
  OR
- Bleeding is ongoing after 3.5 litres of warmed clear fluid has been rapidly infused.

O negative blood should be used until fully cross matched blood is available.

Prevent hypothermia
It is crucial that hypothermia is avoided13. Clinicians should ensure that:
- When possible, all resuscitation fluids are warmed using a temperature controlled fluid warming device (e.g. blood warmer)
- A forced air warming blanket is used if available (warmed air is forced through low-pressure blankets to diffuse air evenly over the patient to prevent hypothermia)
- Body exposure is minimised during clinical procedures such as uterine massage
- Wet linen, drapes and other items are removed promptly.

4.4 Reassess

Maternal reassessment is vital throughout resuscitation efforts to determine the effectiveness of treatment, and the need for additional strategies. During active bleeding this should include, as a minimum:

- Observation for and measurement of ongoing blood loss
- Assessment of fundal height and uterine tone every 5 minutes
- BP, pulse, respiratory rate and SaO₂ every 5 minutes
- Temperature every 15 minutes to detect and treat hypothermia
- Blood pathology such as arterial blood gases (ABGs) where clinically indicated.

After stabilisation and cessation of bleeding, close maternal observation and assessments are to be continued in a suitable environment. Consider transfer to a higher level of care (e.g. high dependency unit, intensive care).

5 MASSIVE PPH

The majority of episodes of PPH are treated before the criteria of massive postpartum haemorrhage are reached. Where it occurs, clinicians should consider the need for the additional measures described below.

5.1 Massive transfusion protocol (MTP) applicable to maternity

All services should have a Maternity Massive Transfusion Protocol (MTP) applicable to maternity. This is to trigger a multidisciplinary response specific to the needs of the local service. Guidance is provided in the Patient Blood Management Guidelines Module 5.

5.2 Recombinant Human Factor VIIa (rFVIIa)

Factor VIIa is a central protein in the coagulation pathway. Recombinant FVIIa (rFVIIa, NovoSeven®) is a manufactured form of this protein originally developed for treatment of haemophilia. The use of rFVIIa in pregnancy, where women are already at increased risk of thromboembolism, requires special consideration of the risks and benefits.

Local MTPs should include guidance on the use of rFVIIa in consultation with a haematologist. Use of rFVIIa should be overseen by a multidisciplinary group of clinicians in consultation with relevant committees.
5.3 Tranexamic Acid

Tranexamic acid is an antifibrinolytic drug that prevents binding of plasminogen and plasmin to fibrin. Tranexamic acid is recommended for the treatment of PPH if oxytocin and other uterotonics fail to stop the bleeding or it is thought that the bleeding may be partly due to trauma. “The authors of the Cochrane review on the use of tranexamic acid in the prevention of PPH conclude that further studies are required to investigate the risk of serious adverse effects, including thromboembolic events, and the use of tranexamic acid in women considered to be at high risk of PPH.” The evidence regarding the use of tranexamic acid continues to evolve.

5.4 Surgical Management

Surgical management of primary PPH should be initiated promptly if pharmacological and initial mechanical measures do not control the bleeding.

Intrauterine balloon tamponade is an appropriate first-line ‘surgical’ intervention for most women where uterine atony is the only or main cause of haemorrhage.

The most appropriate choice of surgical procedure/s depends on the woman’s individual clinical circumstances and the service capability of the facility in which she is receiving care. Guidance in relation to surgical procedures is outside the scope of this document, however:

- Early recourse to hysterectomy is recommended, particularly where bleeding is associated with placenta accreta or uterine rupture
- The decision to proceed to hysterectomy should be made by an experienced consultant obstetrician, ideally in consultation with a second experienced colleague
- Consent for emergency procedures should be in line with PD2005_046 Consent for Medical Treatment – Patient information.

For further information regarding surgical management see Appendix 1.

6 MANAGEMENT FOLLOWING PRIMARY PPH

Prior to discharge, all women who have had a primary PPH with signs of severe shock and/or who required initiation of a Maternity Massive Transfusion Protocol should:

- Be screened for inherited coagulopathies if concern exists that this was the cause of the PPH
- Have a clear plan and arrangements made for follow-up.

6.1 Venous thromboembolism (VTE) prophylaxis

Severe PPH increases the risk of VTE. All women who have had a severe or massive PPH require VTE prophylaxis in line with PD2014_032 Prevention of Venous Thromboembolism.
6.2 Documentation, debriefing, disclosure and follow-up

Clear, thorough, and concise documentation during the event, or as soon as possible after a PPH episode, is required by all clinicians involved. This aids future understanding of the event, informs appropriate clinical review, and initiates improvements in practice or systems where necessary.

All assessments are to be recorded on the appropriate NSW Health standard observation chart.

A PPH can be traumatic for the woman and her support persons. Debriefing, particularly with women who have experienced a PPH ≥1500mls, should occur at the earliest opportunity by a clinician (preferably one who has been involved in her care) in line with PD2014_028 Open Disclosure Policy.

It is known that Aboriginal people experience higher levels of psychological distress than non-Aboriginal people16. Particular consideration and attention should be given to the communication that takes place following a PPH to ensure it is sensitive and takes into account any cultural considerations. Aboriginal staff including midwives, health workers and liaison officers may be able to provide further advice.

The content of discussions should be documented in the woman’s clinical record.

6.3 Reporting and review requirements

PPH ≥1500mls is considered a significant adverse event and should be:

- Notified in the Incident Information Management System (IIMS) as per PD2014_004 Incident Management Policy
- Subject to multidisciplinary clinical review PD2009_003 Maternity - Clinical Risk Management Program.

7 SECONDARY PPH

Secondary PPH is usually associated with endometritis (with or without retained products of conception). Conventional treatment includes antibiotic therapy and uterotonics in some cases. In situations of excessive or continued bleeding surgical intervention, particularly the evacuation of retained products should be considered, irrespective of ultrasound findings4.

As subacute PPH is easily underestimated, prevention and management of secondary postpartum haemorrhage should be included in routine discharge advice and factored into early discharge decisions and programs.

8 EDUCATION

Clinicians who may be required to care for women before during and after birth (e.g. maternity units, NSW Ambulance Service, theatre/recovery room or emergency departments) may need to respond to a woman with a PPH. These clinicians should
receive appropriate education and training in the form of mandatory training or as locally
determined dependent on the professional group, the workplace and / or role of the staff
member. This may include (but is not limited to):

- Regular PPH emergency drills and education sessions at the local level which are
  consistent with the content of the Fetal welfare Obstetric emergency Neonatal
  resuscitation Training (FONT®) program
- Completion of the online component of FONT® program (mandatory 3 yearly
  education for maternity clinicians)
- Completion of the Blood-Safe: Postpartum Haemorrhage (PPH) available on line at
  My Health Learning (the eHealth learning platform)
- Access to The NSW Health Primary PPH Quick Reference Guide (see Appendix 1)
  wherever women may present with a PPH (e.g. maternity units, Ambulance,
  theatre/recovery room or emergency departments).
9 REFERENCES


10 APPENDICES

Appendix 1: NSW Health Primary PPH Quick Reference Guide

The NSW Health Primary PPH Quick Reference Guide should be accessible in all areas of NSW Public Health Organisations (PHOs) where women may present with a primary PPH (e.g. maternity units, Ambulance, theatre / recovery room or emergency departments).
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GUIDELINE

ISSUE DATE: September-2017

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**PRIMARY PPH QUICK REFERENCE GUIDE - DETECT & RESPOND**

**ARE YOU CONCERNED THAT THE WOMAN IS AT RISK OF PRIMARY PPH?**

Does the woman have any of the following risk factors, signs or symptoms present?

- **Antenatal**
  - History of previous PPH
  - Uterine distention (e.g. multiple pregnancy, polyhydramnios)
  - Anaemia, clotting disorders
  - Abnormal placentation (e.g. accreta, praevia)
  - Uterine/amniotic infection
  - Intrauterine fetal demise (IUFD)

- **Intrapartum/Postpartum**
  - Prolonged first, second, and/or third stage
  - Arrest of descent
  - Cervical, uterine or perineal lacerations
  - Instrumental birth (forceps or vacuum)
  - Syntocinon infusion for augmentation or IOL
  - Retained or incomplete placenta or membranes

**NOTE:** Two thirds of cases of Primary PPH cannot be predicted.

The most important single warning of diminishing blood volume and mild shock is tachycardia. This often precedes a fall in blood pressure.

**Record observations on the Standard Maternity Observation Chart - SMOC**

**Does the woman have any RED ZONE observations OR blood loss ≥1500ml OR additional criteria OR serious clinician concern?**

**Does the woman have any YELLOW ZONE observations OR blood loss ≥1000ml OR additional criteria OR clinician concern?**

**Does the woman have cumulative blood loss ≥500mls following a VAGINAL BIRTH AND NO additional criteria or clinician concern?**

---

**RESPOND & ESCALATE**

**Severe Primary PPH and symptoms of SHOCK are present**

- This is a life threatening maternal emergency
- This woman is at risk of rapid deterioration
  - Call immediately for a Rapid Response (as per local CERS)
  - Measure / weigh blood loss
  - Commence management as per Primary PPH Quick Reference Guide - Management
  - Monitor for signs and additional causes of deterioration

**Severe Primary PPH is present**

- This woman is at risk of further deterioration
  - Immediate escalation to a medical officer (as per local CERS protocol)
  - Measure / weigh blood loss
  - Commence management as per Primary PPH Quick Reference Guide - Management
  - Monitor for signs and additional causes of deterioration

**Primary PPH is present**

- Act promptly to prevent deterioration
  - Call for assistance
  - Do not leave the woman
  - Increase maternal observations/assessments
  - Commence basic measures as per Primary PPH Quick Reference Guide – Management

- Escalate and commence full resuscitation measures if bleeding continues despite the above OR YELLOW or RED ZONE observations/criteria occur
Maternity – Prevention, Detection, Escalation and Management of Primary Postpartum Haemorrhage (PPH)

GUIDELINE

PRIMARY PPH QUICK REFERENCE GUIDE - MANAGEMENT

If bleeding continues or signs of shock despite basic measures – commence full resuscitation & treat the cause

- Escalate as per local CERS
- O2 via mask (10-15L/min)
- Insert IDC – monitor output (i.e. >30ml/hr)
- Give maximum of 3L warmed fluids
- Consider blood transfusion early. Give O-RRD neg blood (or group specific if available) if bleeding ongoing after 3L of fluids infused

- Re-test Coags, FBC, Ca2+ and ABG’s every 30-60 mins while active bleeding continues

Basic measures – for all women when a PPH is detected

- Call for assistance
- Lie the woman flat
- Repeat or give oxytocic (Syntocinon
- Keep the woman warm
- Ensure the woman’s bladder is empty
- Repair genital trauma if indicated

- If the placenta is delivered: evaluate uterine tone, expel clots, fundal massage
- Inspect placenta & membranes for completeness
- Monitor BP, P, RR, and SpO2 every 5 mins & Temp every 15 mins

Gain IV access & send urgent:
• Group and hold
• FBC
• Coagulation screen
Consider:
• Cross match (4 units)
• LPT, uEChs
• Ca2+, lactate

IDENTIFY THE CAUSE

(TISSUE)
Placenta out & complete?

- Do not massage uterus
- Ensure 3rd stage oxytocic given
- Apply CCT & attempt delivery of placenta
- Stop if undue traction required
- Remove placenta if retained in vagina
- Post delivery: check for completeness, massage fundus – assess tone
- Transfer to OT for:
  • Manual removal/EAU
  • Retained placenta or products

(TONE)
Fundus firm?

- Uterine massage
- Expel uterine clots
- Give 1st line drugs:
  • 40 units Syntocinon intravein of NSalone or Hartmanns.
  • Infuse at 250ml/hr (warmed)
  • Ergometrine 250mcg IM

If bleeding continues:

- Consider bimanual compression

Give 2nd line drugs:
• Dinoprostone (Prostin F2 alpha)
  OR
• Carbetoprost (15 methyl prostaglandin F2 alpha)

(MASSIVE PPH (i.e. blood loss >2000mls or signs of severe shock)

• Review criteria for activating Massive Transfusion Protocol (MTP) early. Give:
  • RBC, FFP, Plates
  • Cryoprecipitate if fibrinogen <2.5g/l
  • Ca Gluconate if Ca2+ <1.1mmol/L
  • Avoid hypothermia & acidosis

(TRAUMA)
Genital tract & uterus intact?

- Inspect cervix, vagina, perineum and repair trauma
- Assess for uterine inversion and replace if found
- Transfer to OT if:
  • Uterine rupture suspected
  • Haematoma
  • Unable to see/ access trauma site

(THROMBIN)
Blood clotting?

- Review blood test results
- Activate Massive Transfusion Protcol (MTP) early. Give:
  • RBC, FFP, Platelets
  • Cryoprecipitate if fibrinogen <2.5g/l
  • Ca Gluconate if Ca2+ <1.1mmol/L
  • Avoid hypothermia & acidosis

REASSURE, TREAT THE CAUSE & REASSESS

RESUSCITATE, TREAT ONGOING BLEEDING

Transfer :
To OT for manual removal or EAU if not already undertaken

Consider:
• Intrauterine balloon tamponade
• Angiographic embolisation
  (if available)
• Laparotomy:
  • Interim aortic compression
  • ILynch compression
  • Bilateral uterine artery ligations
  • Hystereotomy

Consider:
• Anaesthetic to optimise genital tract/cervix exposure for repair
• Assess for uterine rupture/trauma
• Laparotomy/hysterectomy
• Hysterectomy (consider early)

AFTER

After the emergency
• Consider transfer to a higher level of care as per local CERS
• Develop a clear plan for ongoing care and follow-up
• Documentation: actions, response and outcomes
• Consider reporting requirements, debriefing with staff and disclosure with the woman.

Severe PPH increases the risk of VTE. Review criteria for VTE prophylaxis
**Appendix 2: Risk factors for primary PPH**

<table>
<thead>
<tr>
<th>Antepartum</th>
<th>Intrapartum</th>
<th>Postpartum</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Maternal age ≥35 years</td>
<td>• Precipitate labour</td>
<td>• Drug induced hypotonia (e.g. MgSO4, anaesthetic agent)</td>
<td>Tone 70%</td>
</tr>
<tr>
<td>• BMI ≥35kg/m²</td>
<td>• Prolonged labour (first, second, or third stage)</td>
<td>• Bladder distension</td>
<td></td>
</tr>
<tr>
<td>• Grand multiparity</td>
<td>• Arrest of descent</td>
<td></td>
<td></td>
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<tr>
<td>• Uterine anomalies (e.g. fibroids)</td>
<td>• Uterine infection (e.g. pyrexia &gt;38° in labour)</td>
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<td></td>
</tr>
<tr>
<td>• History of previous primary or secondary PPH</td>
<td>• Oxytocic use for augmentation or induction of labour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• History of APH in the current pregnancy</td>
<td>• Instrumental birth (forceps or vacuum)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Over distension of the uterus:</td>
<td>• Intrapartum haemorrhage</td>
<td></td>
<td></td>
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<tr>
<td>o Multiple pregnancy</td>
<td></td>
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<td></td>
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<tr>
<td>o Polyhydramnios</td>
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<td></td>
<td></td>
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<tr>
<td>o Macrosomia (≥4kg)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• History of retained placenta</td>
<td>• Precipitate labour</td>
<td>Tissue 20%</td>
<td></td>
</tr>
<tr>
<td>• Abnormal placentation (i.e. Placenta praevia, accreta, percreta, or increta).</td>
<td>• Instrumental birth (forceps or vacuum)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Retained placenta manual removal or products (e.g. cotyledon, membranes, blood clots)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Manual Removal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Uterine inversion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Intrauterine fetal death</td>
<td>• Precipitate labour</td>
<td>Trauma 10%</td>
<td></td>
</tr>
<tr>
<td>• Therapeutic anticoagulation</td>
<td>• Instrumental birth (forceps or vacuum)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Maternal bleeding disorders:</td>
<td>• Cervical, uterine or perineal lacerations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Von Willebrand Disease</td>
<td>• Caesarean section</td>
<td></td>
<td></td>
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<tr>
<td>o Idiopathic Thrombocytopenia purpura</td>
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<td></td>
<td></td>
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<tr>
<td>o Thrombocytopenia (from hypertensive disorders of pregnancy)</td>
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<td></td>
</tr>
<tr>
<td>o Disseminating Intravascular Coagulation (DIC)</td>
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</tbody>
</table>

NOTE: Most cases of PPH occur in women with no identifiable risk factors.
## Appendix 3: First line pharmacological agents for the prevention and/or treatment of primary PPH

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose and Route</th>
<th>Side effects</th>
<th>Contraindications</th>
</tr>
</thead>
</table>
| Syntocinon® (synthetic oxytocin) | Prior to the delivery of the placenta: 5 Units *slow* IV injection (over 1-2 minutes) OR 5-10 units IM  
(May repeat IV dose after 5 minutes, up to a total of 10 units)  
**ALERT:** Rapid IV administration of oxytocin (i.e. <30 seconds) or a single dose >5 units IV may be associated with transient adverse maternal haemodynamic changes (e.g. hypotension, ischaemic electrocardiograph changes) particularly after caesarean section operation  
If Syntocinon has been given and the placenta is out, start two IV infusions (14-16G cannulae)  
A) 40 units Syntocinon in 1 litre of *warmed* Hartmann's solution. Infuse at 250 mls/hr.  
B) *warmed* IV Hartmann's solution 1 litre  
**NB. Do not administer Syntocinon IV in a dextrose solution.** | • painful contractions  
• nausea, vomiting (water intoxication)  
• transient vasodilatation & hypotension if undiluted IV doses  
• high doses or prolonged administration in electrolyte-free fluids can cause water intoxication | Hypersensitivity to drug |
| Syntometrine® (ergometrine maleate 0.5mg oxytocin 5IU per mL) | IM Syntometrine 1 mL following expulsion of placenta, or when bleeding occurs  
Repeat dose of 1 mL after no less than two hours if necessary  
The total dose given in 24 hours should not exceed 3 mL | • nausea, vomiting  
• uterine hypertonicity & abdominal pain  
• headache, dizziness  
• skin rashes  
• hypertension  
• bradycardia  
• cardiac arrhythmia  
• chest pain  
• anaphylactoid reactions | • any suspicion of retained placenta  
• exclude twin pregnancy  
• hypersensitivity to ergometrine, other ergot alkaloids or any ingredients in the preparation  
• history of hypertension, eclampsia, pre-eclampsia or current diastolic equal to or greater than 90mmHg  
• severe or persistent sepsis  
• heart disease  
• peripheral vascular disease  
• impaired hepatic or renal function |
| Ergometrine maleate | Ergometrine 250 micrograms IM OR Ergometrine 250 micrograms IV. (This should be injected slowly over one minute or diluted to a volume of 5 mL with sodium chloride 0.9% before administration to prevent serious side effects.) Do not add ergometrine to IV flasks containing other drugs. | • nausea, vomiting  
• abdominal pain  
• headache  
• dizziness  
• rash  
• peripheral vasocstriction  
• hypertension  
• cardiac arrhythmias  
• chest pain  
• anaphylactoid reactions | • any suspicion of retained placenta  
• exclude twin pregnancy  
• hypersensitivity to ergometrine, other ergot alkaloids or any ingredients in the preparation  
• history of hypertension, eclampsia, pre-eclampsia or current diastolic equal to or greater than 90mmHg  
• severe or persistent sepsis  
• heart disease  
• peripheral vascular disease  
• impaired hepatic or renal function |
| Duratocin® (Carbetocin) | 1 ml (100 micrograms) by slow injection over 1 minute. For use following an elective caesarean section. This should only be administered in theatre by an anaesthetist and not used in any other context | • nausea, vomiting  
• abdominal pain  
• headache  
• dizziness  
• rash  
• peripheral vasocstriction  
• hypertension  
• cardiac arrhythmias  
• chest pain  
• anaphylactoid reactions | • any suspicion of retained placenta  
• exclude twin pregnancy  
• hypersensitivity to carbetocin, other ergot alkaloids or any ingredients in the preparation  
• history of hypertension, eclampsia, pre-eclampsia or current diastolic equal to or greater than 90mmHg  
• severe or persistent sepsis  
• heart disease  
• peripheral vascular disease  
• impaired hepatic or renal function |
## Appendix 4: Second line pharmacological agents for the treatment of primary PPH

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose and Route</th>
<th>Side effects</th>
<th>Contraindications</th>
</tr>
</thead>
</table>
| Prostin F₂ alpha (Dinoprost trometamol) | Intra myometrial injection preferred as PGF₂α has limited efficacy if given peripherally IM.  
• Mix 5mg PGF₂α (1mL of a 5mg/mL solution) with 9mL normal saline to make a total of 10mL (i.e. 0.5mgs/mL).  
• Discard 4mL, leaving 3mgs in 6mL.  
• The Medical Officer injects 1 mL (0.5 mg) trans abdominally into the myometrium on each side of the fundus (i.e. 1mg (2mL) of prepared solution).  
• This may be repeated if atonia persists, to a maximum dose of 3mg (6mL of prepared solution).  
• Alternatively, a trans cervical injection at 9 and 3 o’clock can be given to help contract the uterine arteries.  
**NOTE:** Ensure an IV line, cardiac monitoring, and oxygen therapy are in place before administration of Prostaglandin F₂ alpha®. Resuscitation equipment should be available and an anaesthetist on standby.  
**ALERT:** May cause critical hypertension – check BP every 5 minutes after administration. | • nausea, vomiting, diarrhoea, headache, flushing, pyrexia, cardiac arrest  
• relative risks include pelvic infections and uterine rupture.  | • women with asthma, hypertension, active cardiac, renal, pulmonary or hepatic disease  
• hypersensitivity.                                                                                                                          |
| 15-methyl prostaglandin F₂ (Carboprost) | 250mcg intra myometrial or IM with a tuberculin syringe. Repeat as required every 15-90 minutes to a maximum of 2mg (8 doses). | • Extreme hypertension  
• Fever with chills  
• Headache  
• Paraesthesia  
• Diarrhoea, nausea, vomiting  
• Breast tenderness  
• Dystonia  
• Pulmonary oedema  | • acute pelvic inflammatory disease, cardiac, pulmonary, renal or hepatic disease  
• hypersensitivity to prostaglandin  
**Relative contraindications:**  
• asthma  
• anaemia  
• diabetes  
• epilepsy  
• hyper/hypotension  
• jaundice  
• uterine surgery.                                                                 |