Postpartum Haemorrhage (PPH)

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

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Audience All Clinicians in Maternity Services, Operating Theatre and Recovery, Emergency Departments

POSTPARTUM HAEMORRHAGE (PPH)

GUIDELINE SUMMARY

This Guideline outlines the roles and responsibilities of NSW Health organisations and health practitioners in the prevention, early detection, escalation and management of postpartum haemorrhage (PPH). NSW Health places a high priority on health practitioners working collaboratively with woman and their families, as well as each other, throughout all phases of maternity care.

KEY PRINCIPLES

The key principles that support prevention, early detection, escalation and management of PPH include, identification of women with risk factors and the development of strategies to prevent and/or manage PPH. These strategies include prompt, appropriate clinical and pharmacological management of women experiencing a PPH, and development of a Maternity Massive Transfusion Protocol (MTP) for managing obstetric critical bleeding in local Maternity Services.

USE OF THE GUIDELINE

This Guideline is designed for use by NSW Health staff who are part of the maternity care team. This Guideline should form the basis for:

- 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 this Guideline
- Provision of culturally safe and responsive maternity care services
- Access to education and training in relation to PPH for clinicians who may be required to care for women before, during and after birth. This may be mandatory or targeted education and training at the discretion of the health entity, based on its assessment of local needs.

REVISION HISTORY

Version	Approved by	Amendment notes
October-2021 (GL2021_017)	Chief Executive, Clinical Excellence Commission	Updated appendix 2 and 3 in alignment with the guideline content.
June 2021 (GL2021_009)	Deputy Secretary Health System Strategy and Planning	Revised guideline includes updated pharmacological management of PPH and additional antenatal testing of ferritin levels for Aboriginal women and teenagers.
September 2017 (GL2017_018)	Deputy Secretary, Strategy and Resources	Revised guideline replacing PD2010_064 Updated advice on the use of Carboprost pharmaceutical treatment, fluid resuscitation and local Massive Transfusion Protocols applicable to maternity care Guidance about PPH education requirements.
October 2010	Deputy Director-General	Revised policy replacing PD2005_264

(PD2010_064)	Strategic Development	
November 2002 (PD2005_264)	Director-General	New policy

ATTACHMENTS

1. Postpartum Haemorrhage (PPH): Guideline

CONTENTS

1 BACKGROUND

Postpartum haemorrhage (PPH) occurs after approximately 5% of all births.[1] It remains a leading cause of preventable maternal morbidity and mortality.[1] The majority of cases of PPH, occur in women without risk factors, are minor and cause little or no morbidity. However, rapid blood loss and/ or maternal death can occur if prevention and/ or immediate management strategies are not implemented appropriately.[2]

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.[3]

1.1 About this document

This document is revised to include updated recommendations regarding 1st and 2nd line and maintenance pharmacological treatment.

1.2 Key definitions

Clinical Emergency Response System (CERS)

A process outlined in the NSW Health Policy Directive *Recognition and Management of Patients who are Deteriorating* (PD2020_018) to access and obtain expert assistance from appropriate clinicians in an appropriate timeframe.

PPH

Blood loss ≥ 500 mL.[4]

Minor PPH

Blood loss of ≥ 500 - 1,000 mL during or after childbirth with no clinical signs of shock.[5]

Severe PPH

Blood loss of ≥ 1,000 mL[4] OR any amount of blood loss that causes signs of haemodynamic compromise (shock).[5]

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 ≥ 2,000 mLs) OR is life threatening OR is likely to result in the need for massive blood transfusion.[6]

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[3] specifically for use in women with massive postpartum haemorrhage (or obstetric critical bleeding).

Primary PPH

Occurs within the first 24 hours following birth.[4]

Secondary PPH

Occurs after 24 hours and before 6 weeks postpartum.[4]

1.3 Related NSW Health documents

This Guideline should be read in conjunction with the following documents.

NSW Health Policy document	
(PD2014_028)	Open Disclosure Policy
(GL2016_018)	NSW Maternity and Neonatal Service Capability Framework
(PD2019_057)	Prevention of Venous Thrombosis
(PD2020_008)	Maternity - National Midwifery Guidelines for Consultation and Referral
(IB2020_010)	Consent to Medical and Healthcare Treatment Manual
(PD2020_014)	Tiered Networking Arrangements for Perinatal Care in NSW
(PD2020_018)	Recognition and management of patients who are deteriorating
(PD2020_047)	Incident Management
(GL2021_007)	NSW Emergency Surgery Guidelines and Principles for Improvement

2 PREVENTION OF PRIMARY POSTPARTUM HAEMORRHAGE

Risk factors for primary PPH may be identified in the antepartum period, or can arise during or after birth (see Appendix 1)

2.1 Risk assessment and care planning

All women should be assessed throughout the antepartum, intrapartum and postpartum periods for risk factors associated with primary PPH.

- A clear plan should be developed in consultation with the woman, that includes the identified risk factors, and the strategies (e.g. management of the third stage), to be used to mitigate or control the 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 NSW Health Guideline *NSW Maternity and Neonatal Service Capability Framework* (GL2016_018) and the NSW Health *Guide to the Role Delineation of Clinical Services*.[5]
- Particular consideration should be given to care planning for Aboriginal and adolescent women who are at higher risk of anaemia and iron deficiency.[7]

2.2 Women who decline or are unsuitable for blood or blood component transfusion

The *Consent to Medical and Healthcare Treatment Manual* (Section 6) provides guidance on the woman's right to refuse recommended treatments.

The *Patient Blood Management Guidelines Module 5* (Section 3.5) discusses management strategies for women in these circumstances.

2.3 Antepartum anaemia

Women at higher risk for anaemia should have serum ferritin levels measured at the same time as full blood counts i.e. in early pregnancy[3] and again at 28 weeks gestation.[7] Advise low dose iron supplementation for women with iron deficiency anaemia.[7]

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.[5] The following should be considered the minimum levels of haemoglobin:

- 0 - 20 weeks 110 g/L
- ≥ 20 weeks 105 g/L.[7]

Further investigation is required for women with low haemoglobin concentration for gestational age and repeat testing at 36 weeks may be required for women who have symptoms of anaemia or risk factors for anaemia.[7]

2.4 Labour and birth

2.4.1 Intravenous access

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

2.4.2 Prophylactic oxytocic

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.[5,8,9] Oxytocin (Syntocinon®) is the drug of choice.

2.4.3 Caesarean section

- 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.[10] Clinicians should ensure the following:
  - All women who have had a previous caesarean section should have their placental site confirmed via ultrasound scan[5]
  - Women with an abnormally adherent placenta require a clear multidisciplinary management plan documented in their clinical record prior to labour and birth.

3 DETECTION OF PRIMARY POSTPARTUM HAEMORRHAGE

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.[11] The clinical signs and symptoms of shock vary amongst women but will 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.[12]

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.

- *First hour following birth*: regular assessment of vital signs and uterine tone conducted at least every 15 minutes. Assessments including accurate and ongoing estimation of cumulative blood loss, fundal height and tone, blood pressure (BP) and pulse in line with the Standard Maternity Observation Chart.
- *First four hours following birth*: after the first hour, close monitoring should 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 soaked 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 line with the Between the Flags criteria and local (CERS) NSW Health Guideline *Recognition and Management of Patients who are Deteriorating* (GL2020_018). Assessment of blood loss and other observations are to be continued after transfer from the birth environment as clinically indicated.

4 MANAGEMENT OF PRIMARY POSTPARTUM HAEMORRHAGE

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 2) 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 control the bleeding and prevent deterioration are required when primary PPH is identified.

Most cases of PPH are treated effectively with basic measures.[1]

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

- Call for assistance
- Lie the woman flat
- Evaluate uterine tone, expel clots, and perform fundal massage (if the placenta is delivered)
- Gain IV access
- Administer appropriate pharmacological treatment (see Appendix 3)
- Inspect the lower genital tract for trauma and repair where indicated
- Inspect the placenta and membranes for completeness
- Empty the woman's bladder
- Keep the woman warm
- Monitor pulse, blood pressure, respirations and oxygen saturation every 5 minutes and temperature every 15 minutes and record using the appropriate NSW Health standard observation chart.

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 2).

Full resuscitation measures are required if bleeding continues despite basic measures OR for blood loss ≥ 1,000 mL 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

Insert two large bore intravenous cannulas, size 14F or 16F gauge (If not already in-situ) and collect blood for urgent pathology:

- Full blood count (FBC)
- Coagulation screen, group and hold
- Consider: LFTs; UECs; Ca2+; lactate and cross match (4 units).[5]

Urine output

Insert an indwelling catheter (If not already in-situ). Monitor urine output as an indication of circulating volume adequacy. Urine output should be maintained at 0.5 mL/kg/hour.

Calculate the required urine output per hour i.e. a woman weighing 60 kg (x 0.5) should have a urine output > 30 mL/hour.

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[13]
- Blood transfusion is recommended if further fluid replacement is required.

NOTE: Clear fluid volume of greater than 4,000 mL has been independently associated with adverse maternal outcome in women with persistent PPH.

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:

- bleeding is rapid or ongoing, and/or signs of shock are present

  OR

- bleeding is ongoing after 3.5 litres of warmed clear fluid has been rapidly infused (initially 2 litres of warmed isotonic crystalloid with further fluid resuscitation with additional isotonic crystalloid or colloid).[14]

4.3.3 Prevent hypothermia

It is crucial that hypothermia is avoided.[15] To minimise thermal loss clinicians should:

- When possible, warm all resuscitation fluids using a temperature-controlled fluid warming device (e.g. blood warmer)
- Use a forced air warming blanket if available (warmed air is forced through low-pressure blankets to diffuse air evenly over the patient to prevent hypothermia)

- Minimise body exposure during clinical procedures such as uterine massage
- Remove wet linen, drapes and other items 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
- Every 5 minutes asses;
  - fundal height and uterine tone
  - BP, pulse, respiratory rate and oxygen saturations (SaO_2)
- Every 15 minutes assess temperature to detect hypothermia
- Collect serum blood samples e.g. 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 POSTPARTUM HAEMORRHAGE

The majority of PPH episodes are treated before the threshold for activation of a massive transfusion protocol is reached. Where massive PPH occurs, clinicians should consider the additional measures described below.

5.1 Massive transfusion protocol (MTP) applicable to maternity

All services should have a MTP applicable to maternity. This is to trigger a multidisciplinary response specific to the needs of the local service.

Guidance to develop an MTP 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, Novo Seven®) 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 Surgical management

If pharmacological and initial mechanical measures do not control the bleeding, the highest possible category of clinical urgency should be initiated in line with the NSW Health Guideline *NSW Emergency Surgery Guidelines and Principles for Improvement* (GL2021_007). Intrauterine balloon tamponade is an appropriate first line 'surgical' intervention for most women where uterine atony is the only or main cause of haemorrhage.[5]

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:

- Early recourse to hysterectomy is recommended, particularly where bleeding is associated with placenta accreta or uterine rupture[5]
- The decision to proceed to hysterectomy should be made by an experienced consultant obstetrician, ideally in consultation with a second experienced colleague[5]
- Consent for emergency procedures should be in line with NSW Health *Consent for Medical and Healthcare Treatment Manual*.

For further information regarding surgical management see Appendix 2.

6 MANAGEMENT FOLLOWING PRIMARY POSTPARTUM HAEMORRHAGE

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 clearly documented plan and arrangements made for follow-up.

6.1 Venous thromboembolism (VTE) prophylaxis

Severe PPH increases the risk of VTE.[3] All women who have had a severe or massive PPH require VTE prophylaxis in line with NSW Health Policy Directive *Prevention of Venous Thromboembolism* (PD2019_057).

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 will aid 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 should occur at the earliest opportunity by a clinician (preferably one who has been involved in her care) in line with NSW Health Policy Directive *Open Disclosure Policy* (PD2014_028).

It is known that Aboriginal people experience higher levels of psychological distress than non-Aboriginal people.[16] 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

Significant PPH is considered an adverse event with potential maternal harm. This event should be:

- Notified in the incident management system (IMS+) in line with NSW Health Policy Directive *Incident Management* (PD2020_047)
- Subject to an appropriate level of multidisciplinary clinical review.

7 SECONDARY POSTPARTUM HAEMORRHAGE

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 findings.[4]

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 Maternal Safety Education Pathway
- Completion of the Blood-Safe: Postpartum Haemorrhage (PPH) available from the My Health Learning (the eHealth learning platform).

Access to The NSW Health Primary PPH Quick Reference Guide (see Appendix 2) wherever women may present with a PPH (e.g. maternity units, ambulance, theatre/recovery room or emergency departments).

9 REFERENCES

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10 APPENDIX LIST

1. Risk Factors for Primary PPH
2. NSW Health Primary PPH Quick Reference Guide
   a. Detect and Respond
   b. Management
3. Medication Management

Appendix 1: Risk Factors for Primary PPH

Antepartum	Intrapartum	Postpartum	Cause

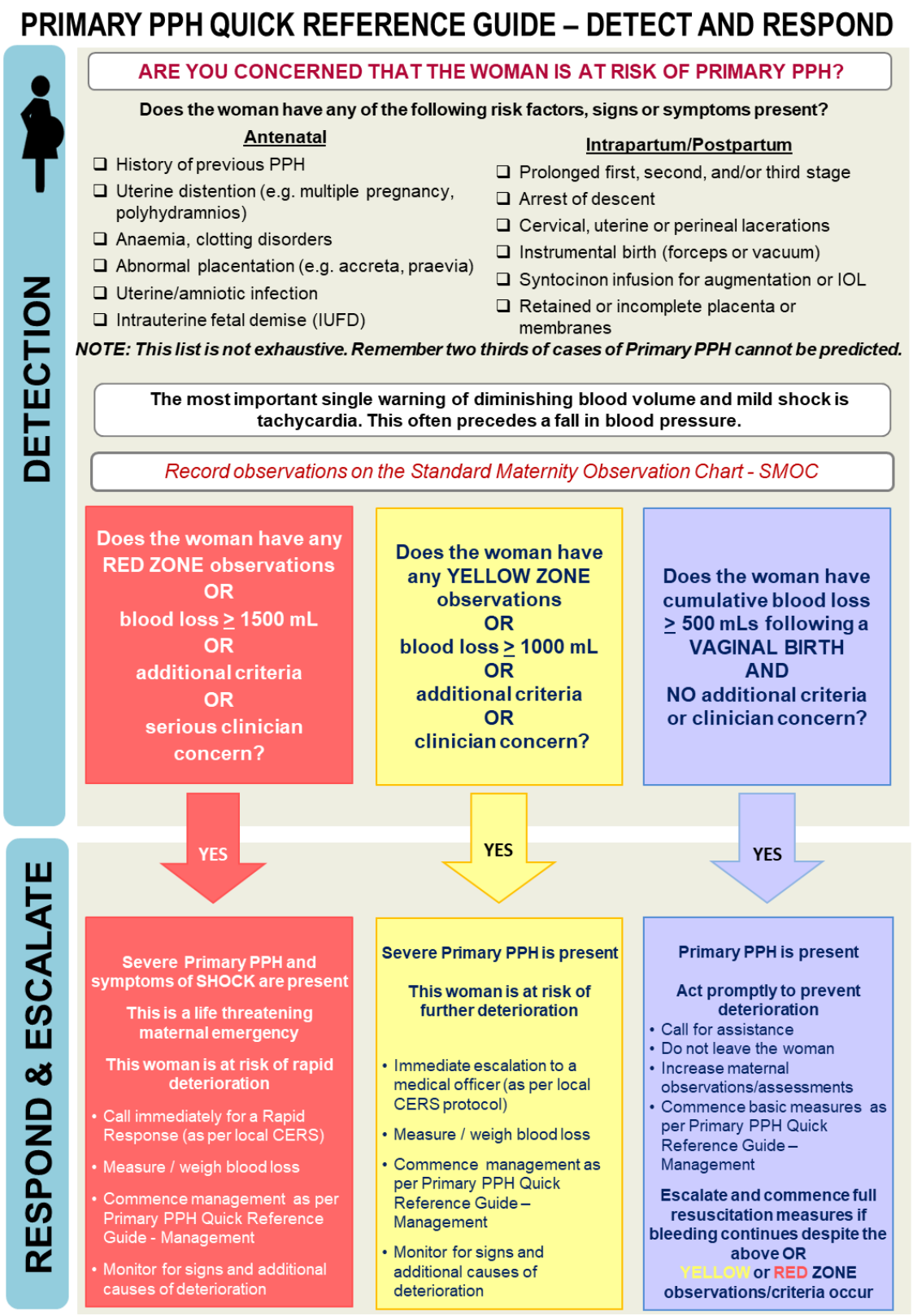
• Maternal age ≥ 35 years
• BMI ≥ 35 kg/m^2
• Grand multiparity
• Uterine anomalies (e.g. fibroids)
• History of previous primary or secondary PPH
• History of APH in the current pregnancy
• Over distension of the uterus:
  ○ Multiple pregnancy
  ○ Polyhydramnios
  ○ Fetal macrosomia (> 4 kg)
	• Precipitate labour
	• Prolonged labour (first, second, or third stage)
	• Arrest of descent
	• Uterine infection (e.g. pyrexia > 38 °C in labour)
	• Oxytocic use for augmentation or induction of labour
	• Instrumental birth (forceps or vacuum)
	• Intrapartum haemorrhage
		• Drug induced hypotonia (e.g. magnesium sulphate, anaesthetic agent)
		• Bladder distension
			Tone
			70%

	• Precipitate labour • Instrumental birth (forceps or vacuum)	• Cervical, uterine or perineal lacerations • Caesarean section	**Trauma** **20%**
• History of retained placenta • Abnormal placentation (i.e. Placenta praevia, accreta, percreta, or increta).		• Retained placenta manual removal or products (e.g. cotyledon, membranes, blood clots) • Manual Removal • Uterine inversion	**Tissue** **10%**

• Intrauterine fetal death
• Therapeutic anticoagulation
• Maternal bleeding disorders:
  ○ Von Willebrand Disease
  ○ Idiopathic Thrombocytopenia Purpura
  ○ Thrombocytopenia (from hypertensive disorders of pregnancy)
  ○ Disseminating Intravascular Coagulation (DIC)
	• Amniotic Fluid Embolism (AFE)
	• Disseminated Intravascular Coagulation (DIC)
		• AFE
		• DIC
			Thrombin
			1%

NOTE: Most cases of PPH occur in women with no identifiable risk factors.			

Appendix 2: Primary PPH Quick Reference Guide



PRIMARY PPH QUICK REFERENCE GUIDE - MANAGEMENT

RESUSCITATE, TREAT THE CAUSE & REASSESS

Initial assessment & resuscitation

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)
- ❑ LFT, UECs
- ❑ Ca2+, lactate

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

- Escalate as per local CERS
- O2 via mask (10-15 L/min)
- Insert IDC – monitor output (i.e. > 30 mL/hr)
- Give maximum of 3.5 L warmed fluids
- Consider blood transfusion early. Give O-RhD neg blood (or group specific if available) if bleeding ongoing after 3.5 L of fluids infused
- Re-test Coags, FBC, Ca2+ and ABG's every 30-60mins while active bleeding continues

Identify the cause

(TISSUE) Placenta out & complete? — YES → **(TONE)** Fundus firm? — YES → **(Trauma)** Genital tract/ uterus intact? — YES → **(THROMBIN)** Blood clotting?

Treat the cause Immediate management

NO – (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/EUA of retained placenta or products

NO – (TONE): Fundus firm?

- Uterine massage
- Expel uterine clots

Give 1st line drugs:

- Syntocinon®
- Syntometrine®
- Ergometrine

Give 2nd line drugs early

- Tranexamic acid
- Carboprost tromethamine®

Consider bi-manual compression

Subsequent Maintenance

- Syntocinon® infusion
- Misoprostol

NO – (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

NO – (THROMBIN): Blood clotting?

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

MASSIVE PPH (i.e. blood loss ≥ 2,000 mLs or signs of *severe* shock)

- Review criteria for activating Massive Transfusion Protocol (MTP)
- Transfer to OT
- Maintain facial oxygen
- Bimanual compression
- Senior multidisciplinary team

Reassess. Treat ongoing bleeding

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

Consider

- intrauterine balloon tamponade
- Angiographic embolisation (if available)
- Laparotomy:
  - Interim aortic compression
  - B-Lynch compression suture
  - Bilateral uterine artery ligation
  - Hysterectomy

Consider

- Anaesthetic to optimise genital tract/cervix exposure for repair
- Assess for uterine rupture/trauma
- Laparotomy/hysterectomy

Consider:

- Angiographic embolisation
- Bilateral uterine artery ligation
- Hysterectomy (consider early)

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 3: Medication Management of PPH

Management	Medication	Dosage	Administration	Notes
Immediate	Oxytocin (Syntocinon®) 5 units/mL or 10 units/mL	10 units	IM or slow IV	Short acting oxytocic Repeat dose may be given if already administered as third stage prophylaxis.
	PLUS CONSIDER			
	Ergometrine 500 microgram/mL **(see notes)**	250 micrograms **OR** 250-500 micrograms	Slow IV IM	Must only be given if oxytocin has been administered either as third stage prophylaxis or PPH treatment. Ergometrine can be repeated up to a maximum total of 1 mg, in the absence of contraindications.
	OR as an alternative to an oxytocin bolus and/or ergometrine bolus.			
	Oxytocin 5 units with ergometrine (Syntometrine®) 500 micrograms/mL	Give as 1 mL Syntometrine®	IM	Oxytocic combined with ergot derivative - longer acting combination therapy. A single repeat dose may be given if already administered as third stage prophylaxis
Early *(use both medications when bleeding not controlled)*	Tranexamic acid^ 100 mg/mL	1 gram	Slow IV	If bleeding persists after 30 minutes, a second dose may be administered
	AND			
	Carboprost[#] tromethamine 250 microgram/mL	250 micrograms	IM	Can be repeated at not less than 15 minutely intervals - (maximum of 8 doses)
Maintenance When bleeding is controlled *(use either medication to maintain tone)*	Oxytocin (Syntocinon®) infusion	40 units in 1 litre crystalloid	IV (given over 4 hours)	If commenced prophylactically, then this medication can be continued during the PPH and afterwards to maintain uterine tone
	OR			
	Misoprostol^ 200 micrograms	400 - 800 micrograms	Buccal / sublingual or rectal	Regardless of route of administration, misoprostol takes 1 to 2.5 hours to increase uterine tone

^Use of misoprostol and tranexamic acid for post-partum haemorrhage is considered off-label use. Ensure correct procedures are followed including the indication has been approved by the local Drug and Therapeutics Committee and informed patient (or delegate) consent is obtained (as per *Approval Process of Medicines for Use in NSW Public Hospitals*).

[#]Carboprost is only available for use in Australia under the Special Access Scheme (SAS). Hospitals will need to make arrangements through their individual pharmacy departments to ensure for availability and access to this product for emergency use. The prescriber will be required to complete a Category A form and obtain informed patient (or delegate) consent for use.