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MINISTRY OF HEALTH-ETHIOPIA

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HEALTHIER CITIZENS FOR PROSPEROUS NATION!

**National Guideline on Prevention and  
Management of Postpartum  
Hemorrhage**

**May 2022  
Ministry of Health, Ethiopia**

# National Guideline on Prevention and Management of Postpartum Hemorrhage

First Edition  
May 2022



International  
Confederation  
of Midwives



## Foreword

Ending preventable maternal death remain at the top of the global agenda; similarly, the Ethiopian government in its health sector transformation plan committed to prioritize maternal and neonatal health as one of the key health system transformation strategic agendas and proceeding with all the concerted efforts towards achieving the targets.

Ethiopia has made significant reduction in maternal mortality over the years. Despite the significant reduction, the current rate of maternal mortality is still unacceptably high and has remained of great concern to the country, particularly the health sector.

Obstetric hemorrhage is the leading cause of maternal death in Ethiopia and most hemorrhages occur during the postpartum period and are generally related to uterine atony, retained placenta, thrombin and/or genital trauma. We believe that investing in the prevention and management of the leading causes of maternal morbidity and mortality will help to avert significant number of deaths which could make compelling health, political and economic impact.

This guideline provides the basis for training and implementation of prevention and management of PPH in Ethiopia. All health care providers involved in the care of women during labor and childbirth must therefore apply these guidelines at all levels of facilities as part of the national efforts to improve the quality and equity maternal health services for reducing maternal mortality and morbidity in the country.



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The Ministry of Health would also like to pass its deepest gratitude to the members of the Ethiopian technical working group on PPH who made tremendous contributions during the development of the guideline.



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## Acronyms and abbreviations

|        |  |
|--------|--|
| BEmONC | <b>Basic Emergency Obstetrics and newborn Care</b>         |
| CBC    | <b>Complete Blood Count</b>                                |
| CEmONC | <b>Comprehensive Emergency Obstetric and Newborn Care</b>  |
| CPD    | <b>Continuing professional Development</b>                 |
| CS     | <b>Cesarean Section</b>                                    |
| EDHS   | <b>Ethiopian Demographic and Health Survey</b>             |
| EML    | <b>Essential Medicine List</b>                             |
| EMwA   | <b>Ethiopian Midwives Association</b>                      |
| ESOG   | <b>Ethiopian Society of Obstetrician and Gynecologists</b> |
| GTN    | <b>Glyceryl trinitrate</b>                                 |
| Hb     | <b>Hemoglobin</b>  |
| Hct    | <b>Hematocrit</b>  |
| HSC    | <b>Heat Stable Carbetocin</b>                              |
| HSTP   | <b>Health Sector Transformation Plan</b>                   |
| IESO   | <b>Integrated Emergency Surgical Officer</b>               |
| LUSCS  | <b>Lower Uterine Segment Cesarean Section</b>              |
| MOH    | <b>Ministry of Health</b>                                  |
| MOEWS  | <b>Modified Obstetric Early Warning System</b>             |
| NASG   | <b>Non pneumatic anti-shock garment</b>                    |
| PPH    | <b>Postpartum Hemorrhage</b>                               |
| SBAR   | <b>Situation Background Assessment Recommendation</b>      |
| TXA    | <b>Tranexamic acid</b>                                     |
| UBT    | <b>Uterine Balloon Tamponade</b>                           |
| WHO    | <b>World Health Organization</b>                           |



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## 1. Background

As a global health priority, important progress has been made in the last two decades in reducing maternal mortality, but still the mortality during and following pregnancy and childbirth remains unacceptably high. Postpartum hemorrhage (PPH) remains the leading direct cause of maternal deaths.

Effective prevention and treatment of PPH can be achieved by an evidence-based, coordinated approach by the main care providers of women during childbirth. Competent care providers can decrease PPH mortality by assessing for risk in the antenatal period, monitoring the progress of labor, and active management of third stage of labor (AMTS). It is also vital to have a well-resourced and enabling environment and access to essential medicines.

In recent years, the World Health Organization (WHO) revised and published guidance to prevent and manage PPH. These include:

- WHO. (2012). Recommendations for the prevention and treatment of PPH.
- WHO. (2017). Recommendation on Tranexamic Acid for the treatment of PPH.
- WHO. (2018). Recommendations on the use of uterotronics for the prevention of PPH.
- WHO. (2019). Essential Medicines List (EML).

As part of a system-wide approach for the above recommendations to have a positive impact on PPH prevention and treatment, concerted actions of International Federation of Gynecology and Obstetrics (FIGO) and the International Confederation of Midwives (ICM), extended this effort through the Improve access to essential medicines to reduce PPH morbidity and mortality (IAP) two years project from January 2021-August 2022 to update countries national guidelines/protocols in line with the WHO recommendations 2017/2018. So this guideline is developed by MOH/ ESOG in partnership with FIGO and ICM to develop appropriate tools for front line health professionals to assist them provide standardized and evidence-based service according to the WHO recommendations in health facilities.

### 1.1. Introduction

Globally, it has been estimated that 295,000 women died during and following pregnancy and childbirth in 2017. Almost two third of these deaths (66%) occurred in sub-Saharan Africa (SSA) and most could have been prevented. Seventy three percent of all maternal deaths globally are due to direct causes, and 27.1% of these is due to hemorrhage. Similarly, hemorrhage is the primary underlying cause of 24.5% maternal deaths in SSA.

Over the last two decades, there has been a significant decline in maternal mortality in Ethiopia, specifically; 69% reduction from its 1990 level. However, the country still has a high burden of maternal deaths. In 2017 the MMR for Ethiopia was estimated to be 401 per 100,000 live births. The Ethiopia national Maternal death surveillance and response report (2010 EFY) showed that majority of maternal deaths (82%) were preventable. Obstetric Hemorrhage is the most common direct cause of maternal death accounting for 41.3% of the total maternal death in Ethiopia. Seventy six percent of deaths from obstetric hemorrhage in Ethiopia occurred during the postpartum period.

The Ethiopian government prioritizes the maternal and newborn health in its health sector transformation plan (HSTP II), aimed to achieve a maternal mortality ratio of 279/100 000 live births by 2025 as part of achieving the ambitious maternal health targets of the Sustainable Development Goals, specifically SDG 3.1 which aims to reduce the global maternal mortality ratio to less than 70/100 000 live births by 2030.

As PPH is the leading cause of maternal mortality in the country, practical steps are needed to scale up the implementation of evidence-based interventions for the prevention and management of PPH.

This guideline is designed for obstetric care providers to familiarize them with the most recent global recommendations for the prevention and management of PPH. This clinical guideline for the prevention and management of post-partum hemorrhage has been developed in line with the World Health Organization PPH guidelines, to improve awareness and implementation of evidence based PPH prevention and management approaches including using the newly recommended uterotonic agents. The guideline is complementary to the Ethiopian ministry of health's obstetrics management protocol for hospitals and health centers.

## 1.2. Purpose of the Guideline

The purpose of this guideline is to facilitate and support skilled health personnel in providing safe and effective obstetric care based on the best available evidence-based practice to identify, prevent and manage PPH. Specifically, this clinical guideline will enhance the competency of health care providers to:

- Identify high-risk groups and institute measures to prevent/minimize post-partum hemorrhage
- Timely detect and diagnose postpartum hemorrhage
- Prompt resuscitation and supportive measures including replacement of blood loss.
- Clear and timely communication between obstetric, surgical, anesthetic, and hematology/blood transfusion services.
- Investigate the cause and arrest the hemorrhage and institute appropriate monitoring.

## 1.3. Scope of the guideline

The guideline will be used as a reference for PPH prevention and management clinical services at all levels of health facilities. The guideline should be incorporated into continuous professional development (CPD) programs for health professionals providing maternity services and can also be used to update job aids to facilitate implementation. The guideline can be used in pre-service training and educational institutions in delivering training consistent with the overall national guideline.

The primary users of this guideline are skilled health personnel directly providing labor and childbirth care in all settings. These include Midwives, Nurses, Health officers, Integrated Emergency Surgical Officers (IESOs), General medical practitioners, and Obstetricians. The guideline will also be of interest to trainers, clinical mentors, and maternal and child health program managers.

This guideline should be implemented along with current WHO guidelines, National obstetric management protocols that highlight women-centered care to optimize the experience of labor and childbirth for women and their babies through a holistic, human rights, and evidence-based approach.

## 2. Definition of postpartum hemorrhage

Postpartum hemorrhage (PPH) is defined as estimated blood loss of more than 500 ml after vaginal birth or 1,000 ml after cesarean delivery, or any blood loss sufficient to compromise hemodynamic stability (a change in pulse, or/and blood pressure) (Table 1). Postpartum bleeding is also defined as bleeding that results in a drop in hematocrit more than 10% from the baseline (Table 2). In women with lower body weight (less than 60kg), anemia, and pre-eclampsia, a lower level of blood loss may be clinically significant.

### 2.1. Classification

**Primary PPH:** PPH occurring within 24 hrs.

**Secondary PPH:** PPH occurring from 24 hrs. following delivery until 6 wks. after delivery

Table 1. Classification of Hemorrhage and Physiologic response

| Hemorrhage class | Acute blood loss | Percentage lost | Physiologic response   |
|------------------|------------------|-----------------|--|
| 1                | 500-1000ml       | 10-15           | Dizziness, palpitations, no or mild increase in heart rate                                       |
| 2                | 1000-1500ml      | 15-25           | Tachycardia, tachypnea, sweating, weakness, narrowed pulse pressure                              |
| 3                | 1500-2000ml      | 25-35           | Significant tachycardia and tachypnea, overt hypotension, restlessness, pallor, cool extremities |
| 4                | ≥2000-2500ml     | 35-45           | Cardiogenic shock, air hunger, oliguria, anuria  |

Postpartum hemorrhage can be minor (500-1000ml) or major (more than 1000ml). Massive PPH involves the loss of 2000ml or more of blood from the genital tract within 24 hours of the delivery or when the woman is hemodynamically compromised or showing signs of shock as a result of obstetric hemorrhage of any amount over 500mls. A blood loss can also be considered a Massive Obstetric Hemorrhage in cases where four units of blood have been transfused and further units are required, regardless of blood loss.

Table 2. Normal reference hemoglobin values in pregnancy

| Gestational age  | Anemia                |
|------------------|-----------------------|
| 0-12 weeks       | <11.0g/dl (Hct 33.0%) |
| 13-28 weeks      | <10.5g/dl (Hct 32%)   |
| 29 weeks to term | <11.0g/dl (Hct 33.0%) |

### 2.2. Blood loss estimation

Visual estimates of blood loss are very inaccurate; there is also a tendency to underestimate blood loss associated with a surgical procedure. Following PPH, a fall in blood pressure is usually a late sign. In women with normal hemoglobin levels, blood loss of 500-1000ml may not be associated with any change in pulse rate and blood pressure. There is usually an increase in pulse and respiratory rate with blood loss of up to 1500ml (25% loss in blood volume). With blood loss of more than 1500-2000ml (up to 40% loss in blood volume) or more, in addition to raised pulse

and respiratory rate, the blood pressure falls (hypotension). Additionally, signs associated with reduced perfusion of the brain and skin such as cold clammy skin, confusion/agitation/drowsiness, and reduced urine output become evident.

These clinical signs associated with specific blood loss volumes above are more reliable than visual estimation. A 100% saturated 10 cm by 10 cm piece of gauze will absorb 12mls of blood, 30cm by 30 cm will absorb 100ml and 45cm by 45 cm will absorb 160mls of blood.

Accurate quantification of blood loss is vital but should not be the only focus for the management of postpartum hemorrhage. Other factors such as the rate of blood loss, clinical signs, patient symptoms, the shock index, and the physiological response to hemorrhage are crucial to early recognition of a high-risk situation which may help promote optimal management.

### 3. Postpartum Hemorrhage Prevention

Minimizing the risk of PPH starts during the antenatal period, by the identification and treatment of anemia, identify any women with increased risk of PPH (Table 3) and plan for their delivery. It is possible to have women with no risk factors to develop PPH. Risk factors for developing PPH may present antenatally or intrapartum, so care plans should be modified as these risks emerge. Women with known risk factors should deliver in health facilities with capacity for blood transfusion and surgery.

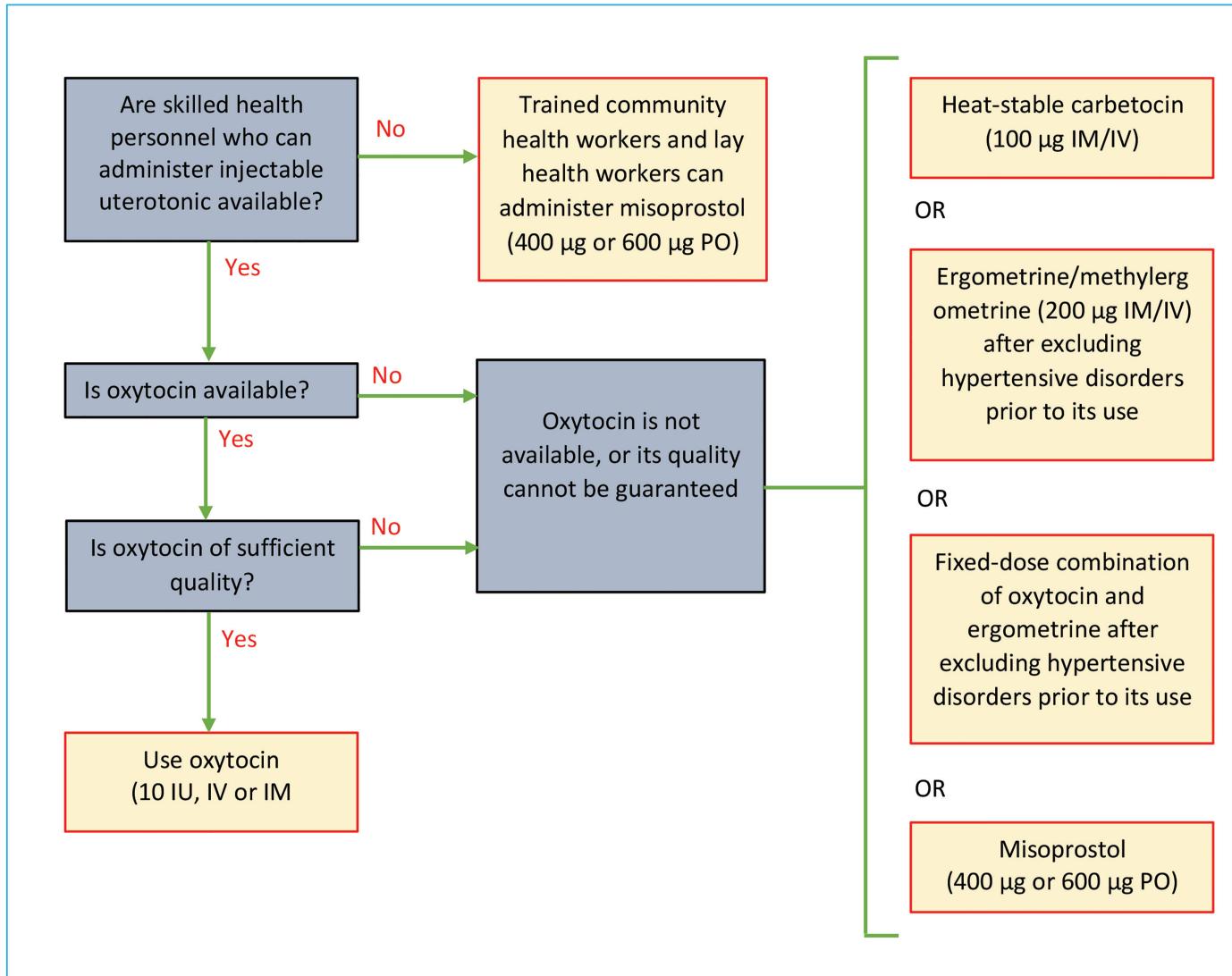
During 3rd stage of labor, one of the following uterotronics: oxytocin, heat stable carbetocin (HSC), or misoprostol, should be administered (**Figure 1** and **Figure 2**). The characteristics of these uterotronics are provided in **Annex 1**.

**Oxytocin** (10 IU, IM/IV) is the recommended uterotonic of choice (vaginal and caesarean birth). If IV oxytocin is used, it should be administered through an IV drip. If oxytocin is unavailable or the quality cannot be guaranteed, the other uterotronics above can be used. Providers should ensure that proper storage is maintained at all times in health facilities. The use of HSC (100 micrograms, IM/IV) is recommended as a second-line drug for the prevention of PPH. It is expected that HSC will be available in many low and lower-middle income countries, this is likely to address the issues of effectiveness, quality and affordability.

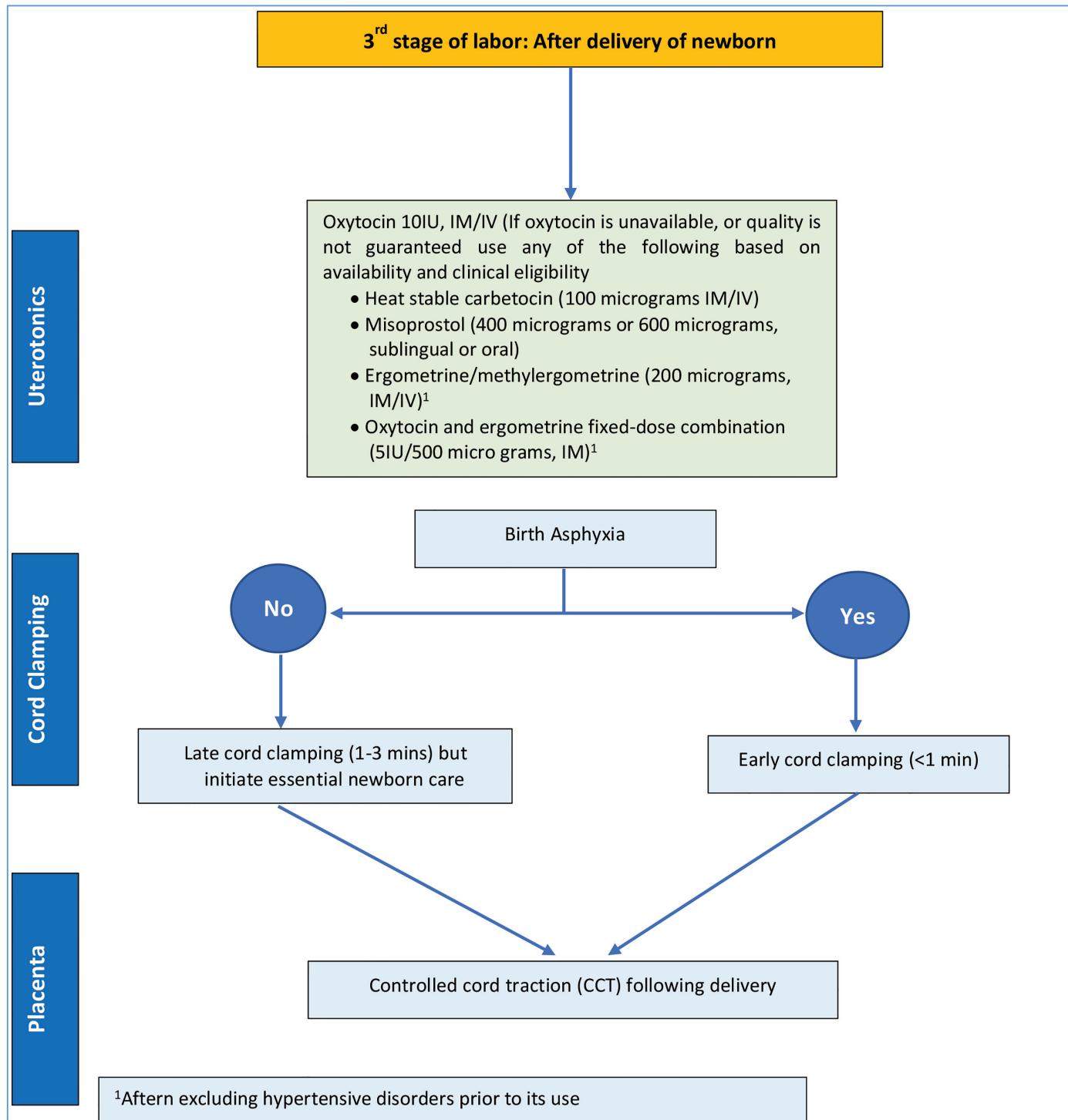
Any uterotonic that contains **ergometrine**, could be used in the absence of oxytocin in a context where hypertensive disorders can safely be excluded.

Injectable prostaglandins such as Carboprost or Sulprostone are not recommended for PPH prevention.

Postpartum abdominal uterine tone assessment for the early identification of uterine atony should be performed for all women.



**Figure 1. Deciding which uterotonic to use**



**Figure 2. PPH prevention flow chart**

## 4. Treatment of PPH

### 4.1. MINOR PPH: blood loss 500-1000 ml without clinical shock

This management plan is for PPH with blood loss 500-1000mls without clinical shock. Additionally, a smaller blood loss associated with clinical signs of shock, hypotension (systolic BP drop of 30mmHg), tachycardia (pulse rate rise of more than 30bpm), tachypnoea (respiratory rate more than 30 cycles/min) or oliguria (Less than 30 ml of urine/hour) can also be managed following these steps.

Alert labour ward in-charge/coordinator, first line obstetric staff(midwife/nurse/healthofficer/medicalintern/General practitioner) and anaesthetic staff (if in a comprehensive EmoNC facility)

The most senior skilled health personnel available should lead the management. The team leader will be responsible for key procedures, clear communications, and allocation of tasks (interventions, equipment and documentation, monitoring and communication with the family) Clear information should be provided to the woman and her partner about what is happening from the onset.

#### Conduct a rapid initial assessment

- Assess Airway, Breathing and Circulation
- Fluid replacement
- Establish intravenous access with 14-18G cannula and commence crystalloid infusion such as ringer lactate and normal saline
- Take blood sample for lab investigation (CBC, BGP &Rh, Coagulation screening including fibrinogen and save blood for cross matching,)
- Monitor vital signs: Pulse rate, respiratory rate, blood pressure every 15 minutes. A modified early obstetric warning score (MEOWS) will aid in monitoring and prompt action when abnormal scores are observed. Look Annex VIII for Modified Early Obstetric Warning Score chart
- Consider blood transfusion if clinically indicated.

#### Conduct a Secondary survey

Look out for the 4 Ts (Tone, Tissue, Trauma and Thrombin) and associated risk factors (Table 3). The most common cause of PPH is uterine atony with placental site bleeding, genital tract trauma or both. The initial evaluation helps in distinguishing uterine atony from genital tract lacerations. Note that some women without risk factors can also have PPH.

Table 3. Risk factors and causes of obstetric hemorrhage

| The Four Ts  | Risk factors/notes   |
|--|--|
| Tone: causes of uterine atony  |  |
| Overdistension of uterus   | Polyhydramnios, multiple gestation, macrosomia   |
| Intra-amniotic infection   | Prolonged rupture of membranes   |
| Functional/ anatomical distortion of uterus  | Rapid labor, prolonged labor, fibroids, placenta previa, uterine anomalies                     |
| Uterine relaxants  | Magnesium sulfate , Nifedipine, Terbutaline, halogenated anesthesia, Glyceryl trinitrate (GTN) |
| Bladder distension   | May prevent uterine contractions   |
| Tissue: retained products of conception  |  |
| Retained cotyledon or succenturiate lobe   | Previous uterine surgery, previous uterine curettage   |
| Retained placenta, adherent placenta   | Previous uterine surgery, previous uterine curettage   |
| Retained blood clots   | Uterine atony  |
| Trauma: genital tract injury   |  |
| Lacerations of the cervix, vagina or perineum  | Precipitate labor, instrumental delivery, fetal macrosomia                                     |
| Vulvar, and vaginal hematoma   | Precipitated labor, instrumental delivery  |
| Extensions, lacerations at CS  | Malposition, deep engagement   |
| Uterine rupture  | Previous uterine surgery   |
| Uterine inversion  | High parity, excessive cord traction   |
| Thrombin: abnormalities of coagulation   |  |
| Pre-existing states e.g., Von Willebrand,  | History of hereditary coagulopathies or liver disease  |
| Hemophilia   | Elevated blood pressure  |
| Acquired in pregnancy:   | Coagulopathy   |
| Gestational thrombocytopenia, pre- eclampsia with HELLP  |  |
| DIC: Intrauterine fetal death, severe infection, abruption, amniotic fluid embolism, Severe PIH/ PET | Deep venous thrombosis/Pulmonary embolism treatment  |
| Therapeutic anticoagulation  |  |

### Clinical considerations:

- Empty bladder – leave catheter in place and commence fluid balance chart
- Assess uterine tone and perform uterine massage as necessary, and bimanual compression if required
- Use uterotonic medications (see Figure 2). Note that dose of misoprostol for treatment is 800 micrograms sublingual.

## Use of Tranexamic acid in postpartum hemorrhage management

Tranexamic acid, an anti-fibrinolytic agent, is identified as a promising drug that should be included in the PPH treatment package

- Tranexamic acid (TXA) should be used in all cases of PPH within 3 hours of birth, regardless of the cause
- TXA should be administered at a fixed dose of 1 g in 10 mL (100 mg/mL) IV at 1mL per minute (i.e., administered over 10 minutes), with a second dose of 1 g IV if bleeding continues after 30 minutes or if bleeding restarts within 24 hours of completing the first dose.
- The reference point for the start of the 3-hour window for starting TXA administration is time of birth. If time of birth is unknown, the best estimate of time of birth should be used as the reference point.
- The use of TXA should be avoided in women with a clear contraindication to antifibrinolytic therapy. For example, in a woman with active intravascular clotting and known hypersensitivity to TXA.

- ✓ TXA should be part of the standard comprehensive PPH treatment package, including medical (uterotonics), nonsurgical, and surgical interventions in accordance with WHO guidelines or adapted local PPH treatment protocols.
- ✓ Early use of IV TXA (as early as possible after clinical diagnosis of PPH, and only within 3 hours of birth) in addition to standard care is recommended for women with clinically diagnosed PPH following vaginal birth or caesarean section.
- ✓ The point estimates of effect of TXA use beyond 3 hours on death following PPH were both in the direction of harm, albeit not statistically significant for women with PPH. In view of this evidence, WHO recommends against the use of TXA more than 3 hours after birth.
- ✓ Treatment delay in use of TXA appears to reduce benefit. The benefit appears to decrease by 10% for every 15-minute delay, with no benefit seen after 3 hours.

## Tranexamic acid Health system considerations

Tranexamic acid should be always readily available in the delivery and postpartum areas of facilities providing emergency obstetric care.

Tranexamic acid is relatively cheap in most contexts, easy to administer, and often available in health care settings. It has a shelf life of 3 years and can be stored at room temperature (15-30 °C) in many places.

There are reports of serious complications including death following inadvertent intrathecal administration of TXA during obstetric spinal anesthesia. Thus, care provider should take extra caution with the storage and administration of TXA.

## Situation-Background-Assessment-Recommendation

The SBAR (Situation-Background-Assessment-Recommendation) technique provides a framework for communication between members of the health care team about a patient's condition.

It allows for an easy and focused way to set expectations for what will be communicated and how between members of the team, which is essential for developing teamwork and fostering a culture of patient safety.

Patient safety is improved through SBAR implementation, especially when used to structure communication over the phone. A tool for SBAR implementation is provided in Annex VII: SBAR communication and referral tool\*.

The clinical care will depend on the type of facility where the diagnosis of PPH is made: health center Figure 3 or hospital Figure 4.

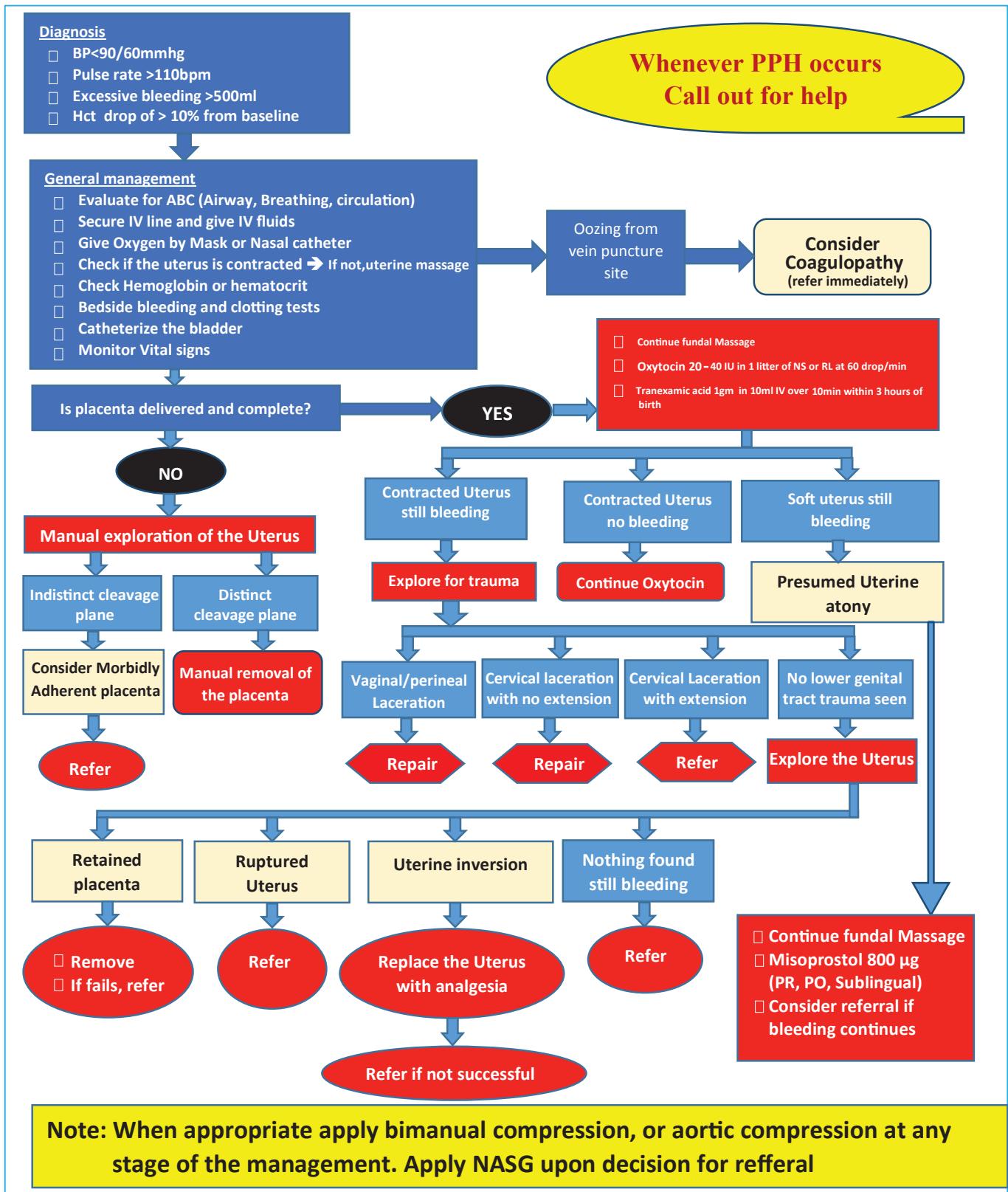


Figure 3. Flow chart for PPH treatment at Health centers

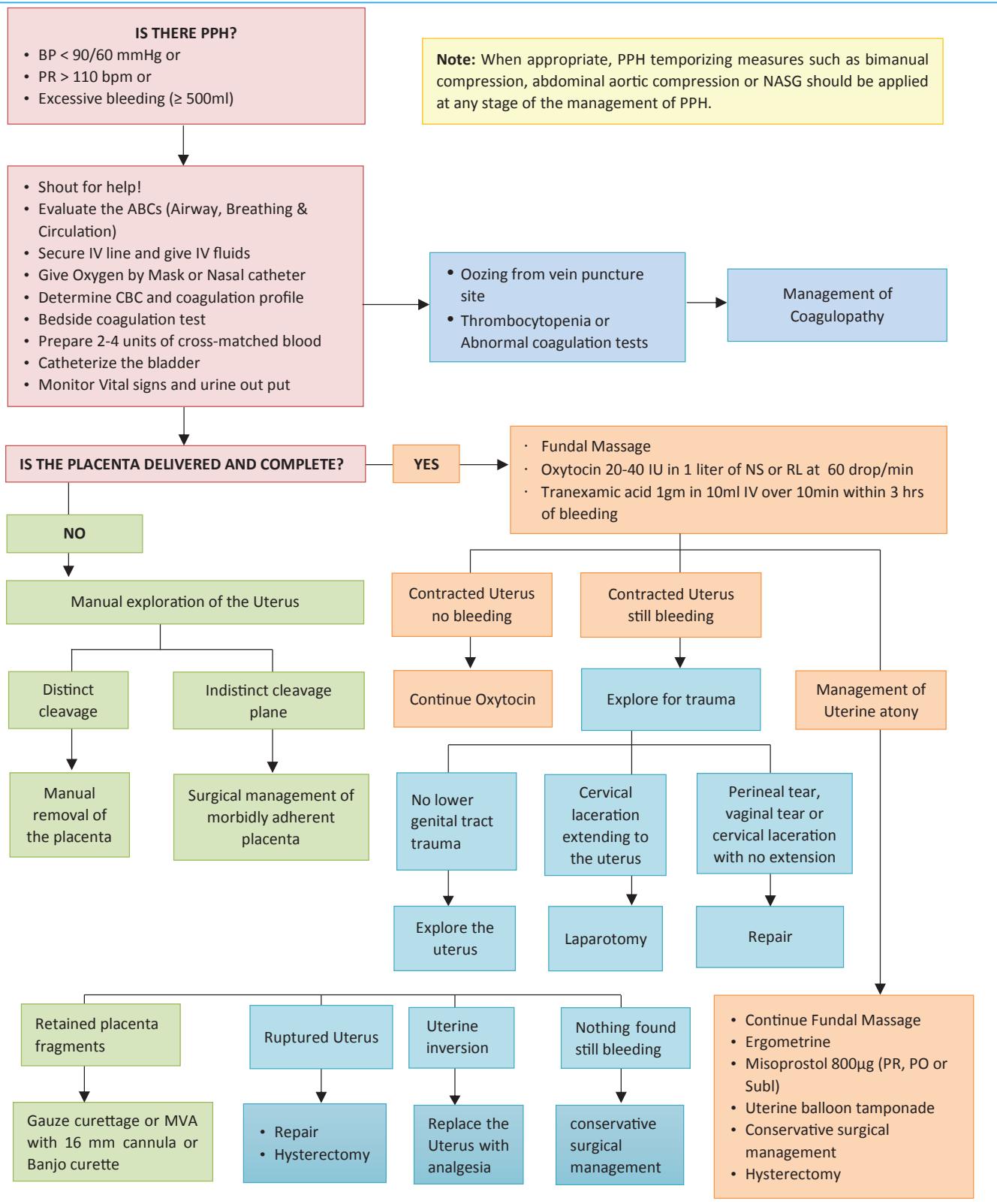


Figure 4. Flow chart for PPH treatment at Hospitals

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Figure 4. Flow chart for PPH treatment at Hospitals

## 4.2. MAJOR PPH: Blood loss more than 1000ml and ongoing bleeding or clinical shock

The most senior skilled health personnel available should lead the management. The team leader will be responsible for key procedures, clear communications, and allocation of tasks (interventions, equipment, and documentation, monitoring and communication with the family).

### Conduct rapid initial assessment

- ABC: assess airway and breathing; Oxygen 15L/min via facemask
- Evaluate circulation
- Position the patient flat
- Give immediate clinical treatment:
  - Uterine massage “rub up a contraction”, bimanual compression if required
  - Empty bladder – leave catheter in place and commence fluid balance chart
  - Uterotonic medications – see Figure 2
  - Establish two 14-18 G cannula, take bloods for complete blood count, coagulation screen, renal and liver baseline and cross match packed red cells (4units).
  - Volume replacement: involves restoration of both blood volume and oxygen carrying capacity.
  - As rapidly as possible give 2L of ringer lactate or normal saline, followed by transfusion of blood and blood products.
  - Blood transfusion should be done as indicated following blood transfusion clinical protocol. Note that immediate estimation of hematocrit can be misleading due to hemoconcentration.
  - Controlled cord traction if placenta has not yet been delivered – remove any clots or remaining tissue.
  - Continuously assess blood loss- make clinical estimation of blood loss based on count of soaked packs and gauzes and other relevant observations.
  - Monitor vital signs: Pulse, respiratory rate, blood pressure every 15 minutes. A modified early obstetric warning score (MEOWS), this will aid monitoring, prompt action when abnormal scores are observed.

### Conduct a Secondary survey (Table 3)

#### Care pathway (pharmacological, non-surgical and surgical)

- If pharmacological measures fail to control the hemorrhage, surgical interventions should be initiated as early as possible.
- Intrauterine balloon tamponade is an appropriate first line ‘non-surgical’ intervention for most women where uterine atony is the only or main cause of hemorrhage.
- Conservative surgical interventions may be attempted as second line, depending on clinical circumstances and available expertise.
- It is recommended that a laminated diagram of the brace suture technique be kept in the operating theatre. (Annex IXa and IXb)
- Resort to hysterectomy as clinically indicated.

- Ideally and when feasible, it is recommended to have a second opinion from an experienced clinician regarding the decision for hysterectomy.

## Conservative surgical techniques

A description of the B-Lynch suture technique is provided here. See Annex IXa and IXb: B-Lynch and modified B-Lynch surgical technique for the control of massive postpartum hemorrhage

The B-Lynch suture allows for even tension, free drainage of the uterine cavity and facilitates involution. With this technique it is easy to confirm hemostasis, that the uterine cavity is empty, confirm no decidua tear/trauma.

### Steps of B-Lynch brace suture placement

- Lloyd Davis or frog-legged position essential
- The uterus must be exteriorized
- Bi-manual compression to test for potential success
- Transverse lower segment incision should be made
- Uterine cavity checked, explored, and evacuated
- A large (70-mm) half circle guarded needle with chromic catgut No. 1 or No. 2 is used
- Apply suture correctly with even tension (no shouldering)
- The suture is used to enter and exit the uterine cavity laterally in the lower uterine segment. It is then looped over the fundus and re-enters the lower uterine cavity through the posterior wall.
- The suture then crosses to the other side of the lower uterine segment, exits through the posterior wall, and is looped back over the fundus to enter the anterior lateral lower uterine segment opposite and parallel to the initial bites.
- The free ends are pulled tightly and tied down securely to compress the uterus, assisted by bimanual compression.
- Allow free drainage of blood, debris, and inflammatory material.
- Check bleeding control vaginally, using swabs and instruments

### Steps of modified B-Lynch (Hayman) brace suture placement

- Lloyd Davis or frog-legged position essential
- The uterus must be exteriorized
- Bi-manual compression to test for potential success
- A large (70-mm) half circle guarded needle with chromic catgut No. 1 or No. 2 is used
- Apply suture correctly with even tension (no shouldering)
- Place two vertical compression sutures from the anterior to posterior uterine wall directly without hysterotomy
- Allow free drainage of blood, debris, and inflammatory material.
- Check bleeding control vaginally, using swabs and instruments

N.B. Before application, the uterus should be exteriorized, and the surgeon demonstrates to his assistant bimanual compression and anteversion. The second assistant checks the vagina to ensure that bleeding is controlled, and the surgical technique will work.

### Secondary PPH

Common causes of secondary PPH include retained product of conception, endometritis/endomyometritis and abnormal involution of placental site.

A pelvic ultrasound may help to exclude the presence of retained products of conception, although the diagnosis of retained products is unreliable. Surgical evacuation of retained placental tissue should be undertaken or supervised by an experienced clinician.

In women presenting with secondary PPH, an assessment of vaginal microbiology should be performed (high vaginal and endocervical swabs) and appropriate use of antimicrobial therapy should be initiated when endometritis is suspected.

## 5. Monitoring and evaluating PPH clinical guideline implementation

The implementation of the country adapted PPH clinical Guidelines should be monitored at all levels of care where maternity services are provided. Clinical audits or criterion-based audits can be used based on clearly defined review criteria and indicators, locally agreed. Good starting points are the relevant standards and indicators described in the Ethiopian Ministry of Health Framework for Monitoring and Evaluation National Call to Actions to accelerate reduction of Postpartum Hemorrhage related maternal deaths.

The use of formal protocols by health facilities for the prevention and treatment of PPH is recommended. Monitoring the use of uterotonic after birth for the prevention of PPH is suggested as a process indicator for programmatic evaluation. Facilities should use formal protocols for referral of women to a higher level of care. The use of simulations of PPH treatment is recommended for pre-service and in-service training programs.

## 6. Annexes

### Annex I. Characteristics of potential uterotonic

| Oxytocin | Brief description (14,15)  | Heat Stable Carbetocin  | Misoprostol  | Injectable prostaglandins  | Oxytocin plus ergometrine  | Misoprostol plus oxytocin  |
|----------|--|---|--|--|--|--|
|          | Synthetic cyclic peptide form of the naturally occurring posterior pituitary hormone | Long-acting synthetic analogue of oxytocin with agonist properties      | Synthetic analogue of natural prostaglandin E1. Has oxytocic properties, inhibits gastric acid and pepsin secretion, and enhances gastric mucosal resistance to injury | Inhibits uterine smooth muscle, resulting in rhythmic contractions, increased frequency of existing contractions, and increased uterine tone | Ergometrine and methyl ergometrine are ergot alkaloids that increase uterine muscle tone by causing sustained uterine contractions | See misoprostol and oxytocin Combination agents not in synthetic (fixed-dose) or naturally occurring forms |
|          | Pharmacokinetics (14,15)   | (IV): almost immediate action with peak concentrations after 30 minutes | (IM): onset of action within 2 minutes, lasting for about 6 minutes and followed by rhythmic contractions for 60 minutes   | Absorbed 9–15 minutes after sublingual, oral, vaginal or rectal use  | IM: onset of action within 2–3 minutes, lasting for about 3 hours  | See oxytocin and ergometrine   |

|   |   |  |   |  |
|---|---|--|---|--|
|   |   |  |   |  |
| lasting clinical effect of up to 1 hour | IM: sustained uterine contractions lasting for about 11 minutes and rhythmic contractions for 120 minutes | Oral and sublingual routes have the advantage of rapid onset of action, while the vaginal and rectal routes result in prolonged activity and greater bioavailability | IM: latent period for the uterine response is about 2.5 minutes; uterotonic effects last for around |  |
|   |   |  |   |  |
|   |   |  |   |  |
|   |   |  |   |  |

## Annex II. Manual removal of placenta

### Steps to follow during Manual removal of placenta

| A. GETTING READY              |   |
|-------------------------------|---|
| 1.                            | Prepare the necessary equipment.  |
| 2.                            | Tell the woman what is going to be done, listen to her, and respond attentively to her questions and concerns.  |
| 3.                            | Provide continual emotional support and reassurance, as feasible.   |
| 4.                            | Ask the woman to empty her bladder or insert a catheter, if necessary.  |
| 5.                            | Give anaesthesia or analgesia such as pethidine and diazepam IV slowly or ketamine  |
| 6.                            | Give a single dose of prophylactic antibiotics: <ul style="list-style-type: none"> <li>• Ampicillin 2 g IV PLUS metronidazole 500 mg IV OR</li> <li>• Cefazoline 1 g IV PLUS metronidazole 500 mg IV</li> </ul>   |
| 7.                            | Put on personal protective barriers.  |
| B. MANUAL REMOVAL OF PLACENTA |   |
| 1.                            | Wash hands and forearms thoroughly with soap and water and dry with a clean, dry cloth or air dry.  |
| 2.                            | Put high-level disinfected or sterile surgical gloves on both hands. (Note: elbow-length gloves should be used, if available.)  |
| 3.                            | Clean the vulva and perineum with antiseptic solution   |
| 4.                            | Place a drape under the woman's buttocks and over her abdomen   |
| 5.                            | Hold the umbilical cord with a clamp.   |
| 6.                            | Pull the cord gently until it is parallel to the floor.   |
| 7.                            | Insert the other hand into the vagina and up into the uterus.   |
| 8.                            | When the placenta has been located, let go of the cord and move that hand onto the abdomen to support the fundus abdominally and to provide counter-traction to prevent uterine inversion.  |
| 9.                            | Move the fingers of the hand in the uterus laterally until the edge of the placenta is located.   |
| 10.                           | Detach the placenta from the implantation site by keeping the fingers tightly together and using the edge of the hand to gradually make a space between the placenta and the uterine wall.  |
| 11.                           | Proceed slowly all around the placental bed until the whole placenta is detached from the uterine wall: <ul style="list-style-type: none"> <li>• If the placenta does not separate from the uterine surface by gentle lateral movement of the fingertips, suspect Adherent placenta and arrange for surgical intervention.</li> </ul>                         |
| 12.                           | When the placenta is completely separated: <ul style="list-style-type: none"> <li>• Hold the placenta and slowly withdraw the hand from the uterus, bringing the placenta with it;</li> <li>• With the other hand, continue to provide counter-traction to the fundus by pushing it in the opposite direction of the hand that is being withdrawn.</li> </ul> |
| 13.                           | Examine the uterine surface of the placenta to ensure that it is complete: If any placental lobe or tissue is missing, explore the uterine cavity to remove it.   |

|     |   |
|-----|---|
| 14. | Palpate the inside of the uterine cavity to ensure that all placental tissue has been removed.  |
| 15. | Give oxytocin 20 units in 1 L IV fluid (normal saline or Ringer's lactate) at 60 drops/minute.  |
| 16. | Have an assistant massage the fundus to encourage a tonic uterine contraction.                  |
| 17. | If there is continued heavy bleeding, give ergometrine 0.2 mg IM, or give prostaglandins.       |
| 18. | Examine the woman carefully and repair any tears to the cervix or vagina, or repair episiotomy. |

#### C.POST-PROCEDURE TASKS

|    |   |
|----|---|
| 1. | Immerse both gloved hands briefly in a container filled with 0.5% chlorine solution; then remove gloves by turning them inside out and place in a plastic bag or leakproof, covered waste container |
| 2. | Wash hands thoroughly with soap and water and dry with a clean, dry cloth or air dry.   |
| 3. | Monitor vaginal bleeding and take the woman's vital signs: <ul style="list-style-type: none"> <li>• Every 15 minutes for one hour, then every 30 minutes for two hours.</li> </ul>                  |
| 4. | Palpate the uterine fundus to ensure the uterus remains contracted.   |
| 5. | Complete documentation  |

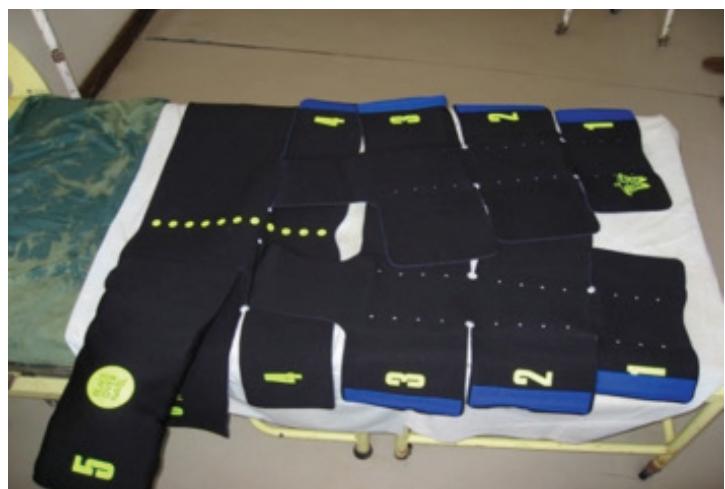
### Annex III. Non-pneumatic Anti-shock Garment (NASG) for the management of PPH

#### Steps in NASG application

| STEP/TASK to apply NASG |  |
|-------------------------|--|
| 1.                      | Place the NASG under the woman; the top of the NASG should be at the level of her lowest rib.  |
| 2.                      | Starting at the ankles, close segment #1 tightly around each ankle. Make sure it is tight enough so that you can snap it and hear a sharp sound  |
| 3.                      | Close segment #2 on each leg as tightly as possible. Try to leave the woman's knee free in the space between segments so that she can bend her leg. She may be in the NASG for a long time.  |
| 4.                      | Apply segments #3, the thigh segments, in the same way as segments #1 and #2. Remember: close segments tightly enough so that you can snap it and hear a sharp sound!  |
| 5.                      | Apply segment #4, the pelvic segment, goes all the way around the woman at the level of the pubic bone.  |
| 6.                      | Place segment #5 with the pressure ball directly over her umbilicus.   |
| 7.                      | Then close the NASG using segment #6. If there are two people present they can rapidly apply the three leg segments together, each working on one leg, starting at the ankle. However, only one person using as much strength as possible should close the pelvic and abdominal segments. If two people close the pelvic and abdominal segments they can apply too much pressure and compromise the patient's breathing. Do not close the segment so tightly that it restricts the woman's breathing. One person can sufficiently manage the whole application if necessary. |
| 8.                      | Make sure the patient can breathe normally with the NASG segment #6 in place.  |
| 9.                      | If the source of bleeding appears to be uterine atony, administer uterotonic drugs and massage the uterus. The NASG stretches, allowing room for your hand to fit between the woman's abdomen and the NASG   |

You can find NASG garment instructional video [here](#).

Women should remain in the delivery suite for 24 hours after major PPH has been resolved or after transfer from ICU.



## Annex IV. Bimanual uterine compression

### Bimanual compression of the uterus for the management of PPH

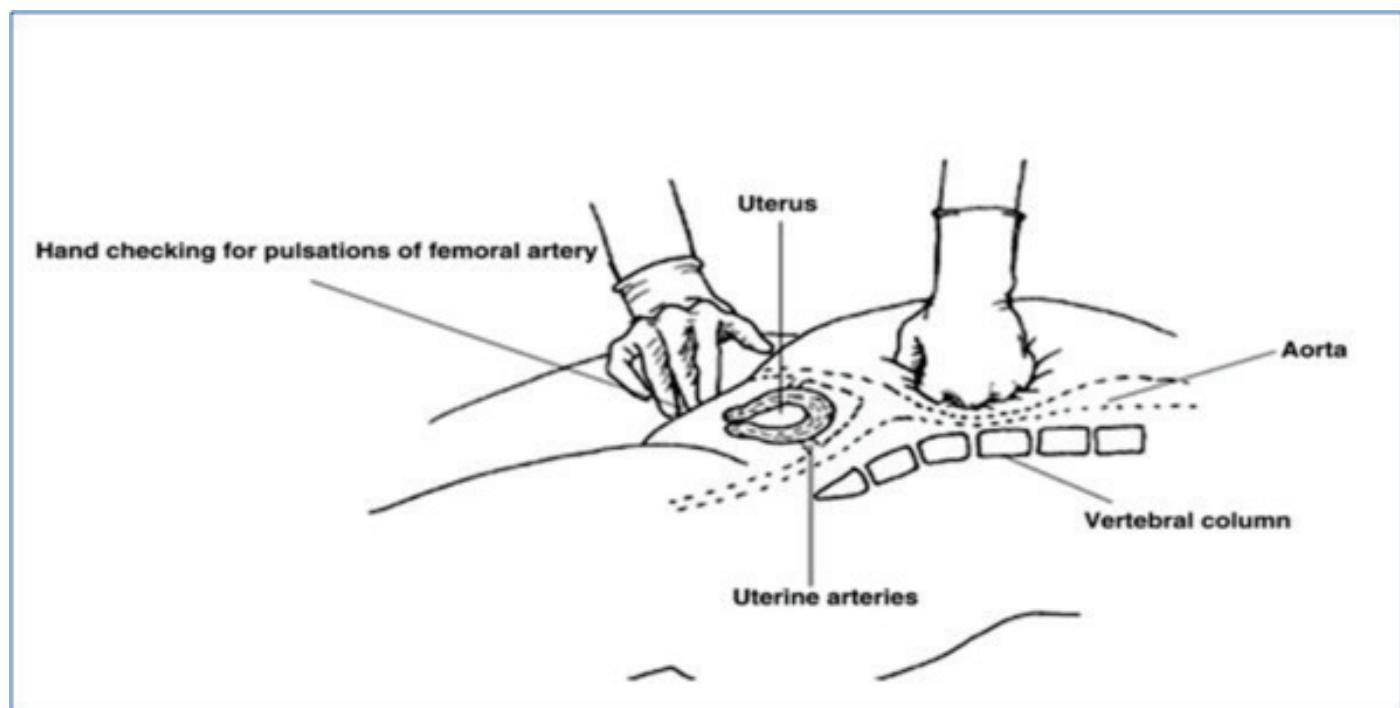
| LEARNING GUIDE FOR BIMANUAL COMPRESSION OF THE UTERUS  |  |
|--|--|
| STEP/TASK  |  |
| CASES  |  |
| GETTING READY  |  |
| <ol style="list-style-type: none"><li>1. Tell the woman what is going to be done, listen to her, and respond attentively to her questions and concerns.</li><li>2. Provide continual emotional support and reassurance, as feasible.</li><li>3. Put on personal protective barriers.</li></ol>   |  |
| <b>Note:</b> Steps 1 and 2 should be implemented at the same time as the following steps.  |  |
| BIMANUAL COMPRESSION   |  |
| <ol style="list-style-type: none"><li>1. Wash hands and forearms thoroughly with soap and water and dry with a clean, dry cloth or air dry.</li><li>2. Clean the vulva and perineum with antiseptic solution.</li><li>3. Put high-level disinfected or sterile surgical gloves on both hands.</li><li>4. Insert one hand into the vagina and form a fist.</li><li>5. Place the fist into the anterior vaginal fornix and apply pressure against the anterior wall of the uterus.</li><li>6. Place the other hand on the abdomen behind the uterus.</li><li>7. Press the abdominal hand deeply into the abdomen and apply pressure against the posterior wall of the uterus.</li><li>8. Maintain compression until bleeding is controlled and the uterus contracts.</li></ol> |  |



## Annex V. Aortic Compression

**Compress the aorta as a temporizing measure until appropriate care is available**

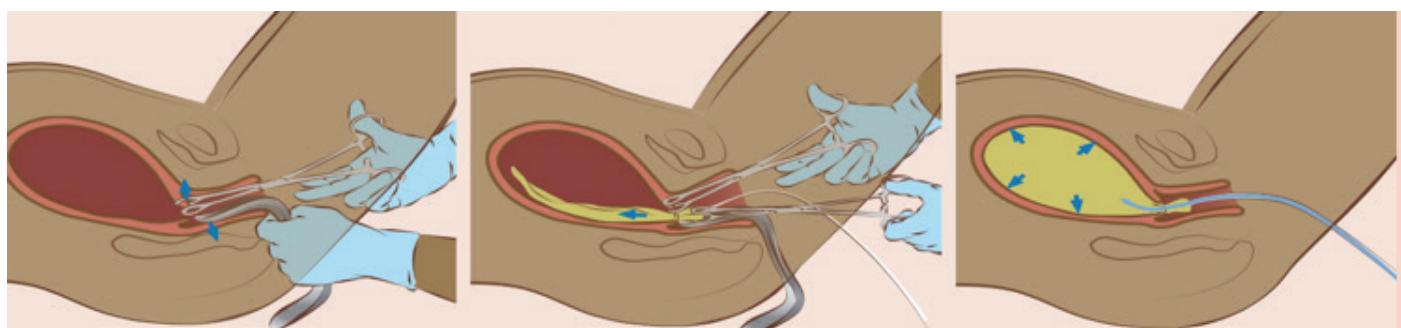
| Steps to follow during Aortic Compression |   |
|---|---|
| 1.  | Tell the woman what is going to be done, listen to her, and respond attentively to her questions and concerns.  |
| 2.  | Provide continual emotional support and reassurance, as feasible.   |
| 3.  | Apply downward pressure with a closed fist over the abdominal aorta directly through the abdominal wall. The point of compression is just above the umbilicus and slightly to the left.   |
| 4.  | With the other hand, palpate the femoral pulse to check the adequacy of compression: <ul style="list-style-type: none"><li>• If the pulse is palpable during compression, the pressure exerted by the fist is inadequate.</li><li>• If the femoral pulse is not palpable, the pressure exerted is adequate.</li></ul> |
| 5.  | Maintain compression until bleeding is controlled or alternative measures can be taken.   |



## Annex VI. Uterine Balloon Tamponade (UBT)

### Steps to follow during UBT insertion (Condom loaded foley Catheter)

| A. Steps to follow during UBT insertion |   |
|---|---|
| 1.                                      | Explain the procedure to the mother and get consent.  |
| 2.                                      | Collect the already assembled UBT kit, a basin and clean water. (A complete kit consists of 2 condoms, 2 O-rings/cotton strings, 1 Foley catheter fitted with a one-way valve and a 60 ml syringe).   |
| 3.                                      | Unroll the condom. Place the Foley catheter half-way into the condom leaving the condom hanging loosely at the end of the Foley catheter.   |
| 4.                                      | Tie the condom onto the Foley catheter using the two O-rings/cotton strings.  |
| 5.                                      | Locate the cervix using your two fingers and insert the uterine balloon into the uterus to the fundus. Be sure that it is not just in the vagina. If the balloon is inflated in the vagina, it may not address bleeding from within the uterus. |
| 6.                                      | Inflate the catheter with 15 ml of NS / water.  |
| 7.                                      | Inflate the balloon using NS/clean water at room temperature. Fill the balloon with 300- 500 ml of NS/water or more as maybe required until bleeding stops /meet resistance.  |
| 8.                                      | Continue to check to see that the UBT has not slipped into the vagina as it is filled. If the bleeding does not stop, re-examine for other causes of PPH and then proceed to next steps of management.  |
| 9.                                      | Secure the catheter on the thigh of the woman so it does not pull out with her movement. Place the woman in a recovery position.  |
| B. Steps to follow during UBT removal   |   |
| 10.                                     | After 6-24hrs, while the woman is being observed, the balloon should then be deflated.  |
| 11.                                     | Explain the procedure to the mother.  |
| 12.                                     | Wash your hands and put on gloves.  |
| 13.                                     | Remove 100 ml of water from the balloon and observe closely for one hour to see if bleeding resumes.  |
| 14.                                     | If significant bleeding resumes refill the balloon and re-examine the patient. Other causes of bleeding (retained products, cervical tears, coagulopathy) can be the cause and should be treated.   |
| 15.                                     | If there is no bleeding after one hour, withdraw all the NS / water from the balloon using the syringe.   |
| 16.                                     | Withdraw the 15mls of NS/water from the smaller Foley balloon.  |
| 17.                                     | Gently remove the UBT device and discard  |



## Annex VII. SBAR communication and referral tool\*

|   |   |  |
|---|---|--|
| S | <b>Situation:</b> a concise statement of the problem  |  |
|   | State clearly: <ul style="list-style-type: none"><li>• What is your profession</li><li>• Where you are calling from</li><li>• Which patient you are calling about: name and age</li><li>• Why are you calling?</li></ul>  |  |
| B | <b>Background</b> (pertinent and brief information related to the situation) <ul style="list-style-type: none"><li>• State the admission diagnosis and date of admission</li><li>• State any important history</li><li>• Give a brief summary of the treatment to date</li></ul>  |  |
| A | <b>Assessment</b> (analysis and considerations of options — what you found/think) <ul style="list-style-type: none"><li>• State the findings of the initial assessment</li><li>• State the most recent vital signs: respiratory rate, heart/pulse rate, B/P, temperature, oxygen saturations, AVPU (Alert, Voice/or new confusion, Pain or Unresponsive), Blood sugar</li><li>• What is the state of the uterus?</li><li>• What is the state of the placenta?</li><li>• What is your assessment of lacerations?</li></ul> |  |
| R | <b>Recommendation</b> (action requested/recommended — what you want) <ul style="list-style-type: none"><li>• State clearly what your recommendation is or what do you want?</li></ul>   |  |

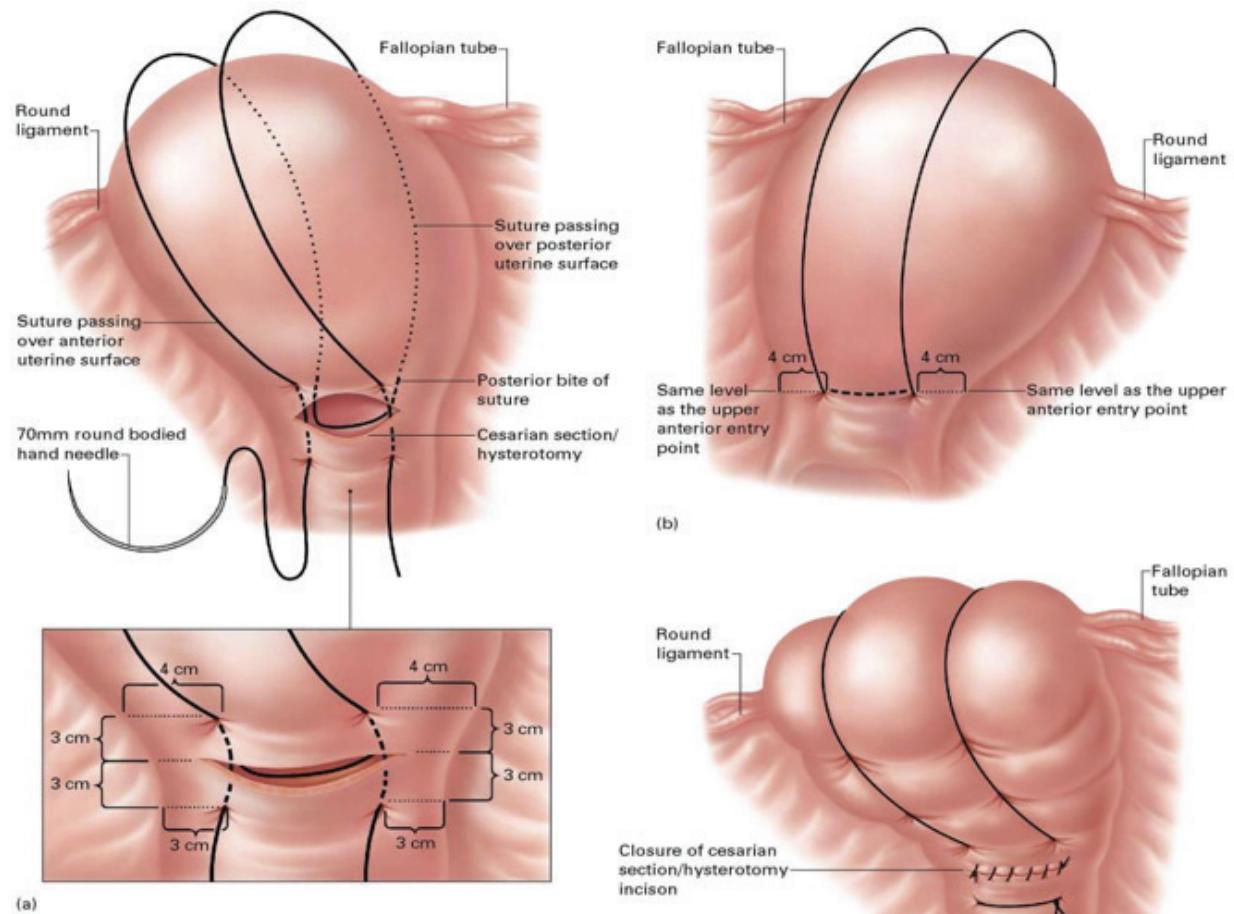
\*If referral communication is via telephone, ask the receiver to repeat key information to ensure understanding.

## **Annex VIII. Modified Early Obstetric Warning Score chart**

| Name: _____     | Hosp number: _____      |  |      |       |    |        |       |            |          |     |             |           |
|-----------------|-------------------------|--|------|-------|----|--------|-------|------------|----------|-----|-------------|-----------|
| Ward: _____     | Consultant: _____       |  |      |       |    |        |       |            |          |     |             |           |
| Diagnosis _____ | Gravidity/Parity: _____ |  |      |       |    |        |       |            |          |     |             |           |
|                 |                         | For score of 0 or 1, repeat observations 12 hourly or as usual for post op patients<br>For score of 2, repeat after 30 minutes, if it remains 2 or rises, inform Doctors<br>For score of 3 or more, or if concerned regardless of the score, please call doctors<br>Doctors review time should be completed for triggered patients |      |       |    |        |       |            |          |     |             |           |
| Date            | Time                    | Observation  | Temp | Pulse | RR | Sys BP | Urine | Cons level | Del mode | EWS | Review time | Signature |
|                 |                         | Score  |      |       |    |        |       |            |          |     |             |           |
|                 |                         | Observation  |      |       |    |        |       |            |          |     |             |           |
|                 |                         | Score  |      |       |    |        |       |            |          |     |             |           |
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## Annex IX. B-Lynch surgical technique

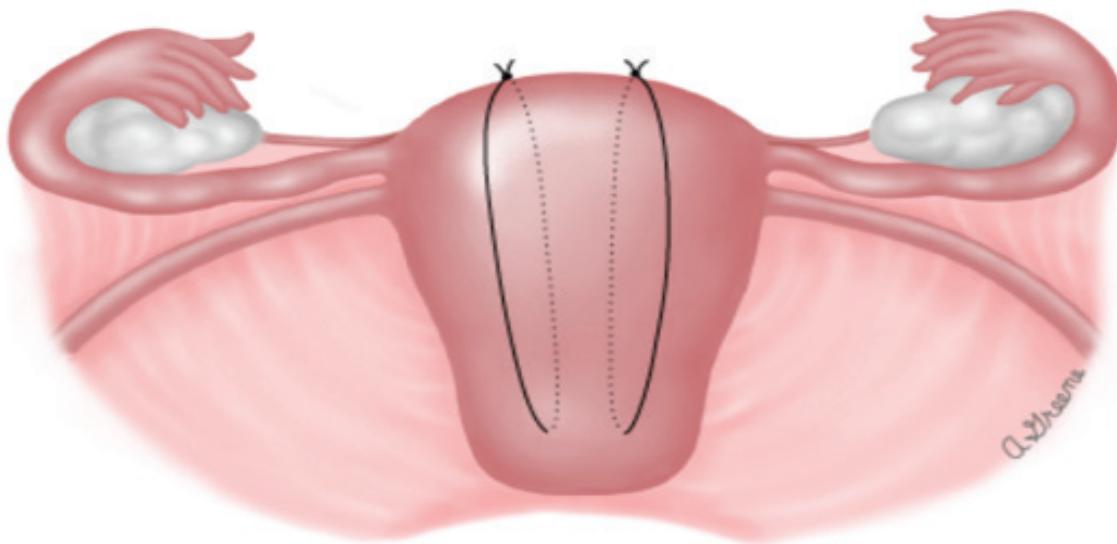
B-Lynch surgical technique for the control of massive postpartum hemorrhage during



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## cesarean section delivery

## B. Modified B-Lynch surgical technique for the control of massive postpartum hemorrhage without hysterotomy



### Annex X. Postpartum hemorrhage Kit

All health facilities should have a dedicated PPH Kit containing the basic tools that can be used to manage postpartum hemorrhage.

Basic PPH kit contains

- Oxytocin
- Misoprostol
- Ergometrine
- Fole catheter, urinary bag
- Crystalloids (Normal saline, ringer lactate)
- IV Cannula (14-18), IV Set
- Syringes of different volume, Citrated bottle
- Surgical and disposable glove
- Uterine Balloon Tamponade

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