MAIN CONTENTS

Chapter 9:
Maternal health

contents

contents (continued)

1. Introduction

Maternal health refers to the health of an individual during pregnancy, delivery, and the post-partum period (also known as the puerperium, lasting approximately 6 weeks or 42 days after birth). While the events of this span of time are often positive and fulfilling experiences, for too many this period is associated with suffering, ill health, and even death.

A positive pregnancy experience requires maternity care to be responsive to an individual's values, beliefs, and needs. A systematic review by the World Health Organization (WHO) found that what matters to women in relation to childbirth is underpinned by three phenomena: the physical and psychosocial nature of birth as an embodied experience; local familial and sociocultural norms that legitimate or reframe expectations about labour and birth; and how maternity care provision enables or restricts what matters to them [1]. There is evidence from a wide range of sources to suggest that it is imperative that maternity care recognizes the benefits of providing what matters to all pregnant individuals (and the risks of not doing so). These factors should become a central component of care provision to ensure the optimum uptake of effective and respectful maternity care and, as a consequence, the health of women of reproductive age and their infants and families, in both the short and longer term [1,2].

This chapter addresses some of the key interventions for maternal and newborn health that are essential to saving the lives of women and their infants and improving their health and well-being, including early detection of risk factors and timely provision of relevant preventive interventions and treatment during pregnancy, labour, and delivery, and the immediate and extended post-partum/post-natal period. This chapter aims to provide guidance for lower-level clinics and facilities who have referral networks that would include more specialized obstetric care for individuals at high risk or with complications.

Acronyms

ANC	antenatal care
ASB	asymptomatic bacteriuria
BEmONC	basic emergency obstetric and newborn care
BMI	body mass index
CEmONC	comprehensive emergency obstetric and newborn care
EmONC	emergency obstetric and newborn care
FGM	female genital mutilation
GDM	gestational diabetes mellitus
PPH	post-partum haemorrhage
PPROM	preterm prelabour rupture of membranes
PROM	prelabour rupture of membranes
SGBV	sexual and gender-based violence
WHO	World Health Organization
ZVD	Zika virus disease

2. Antenatal care

2.1 Purpose of antenatal care

Antenatal care (ANC) can be defined as the care provided by skilled healthcare professionals to pregnant individuals to ensure the best health conditions for both the individual and the fetus during pregnancy. The components of ANC include risk identification, prevention and management of pregnancy-related or concurrent diseases, and health education and promotion [3].

Adequate and appropriate ANC, also known as prenatal care, saves lives. When provided along with other essential healthcare, ANC has the potential to have far-reaching benefits for individuals, families, and communities. For the care of pregnant individuals who do not wish to continue a pregnancy, see *Chapter 5: Abortion care*.

2.2 Number and components of antenatal contacts

The WHO recommends a minimum of eight ANC contacts. This approach replaces the 'focused' or 'basic' four-visit ANC model, with the aim of reducing perinatal mortality and improving experiences of care during pregnancy [3].

Each contact focuses on assessments and interventions that support positive pregnancy outcomes. Each ANC contact must involve the following tasks (see *Appendix 1* for WHO's recommended schedule of interventions for ANC visits):

1. Confirm the diagnosis of pregnancy (see *Appendix 2*) and establish accurate gestational age.
2. Develop or review the birth plan, giving consideration to any clinical changes or mobility difficulties, the appearance of warning signs, or changes in the client's wishes (see *Appendix 3*).
3. Assess (screen) for risk factors (see *Section 2.3*), including reassessment of any risks identified at previous contacts.
4. Give nutritional advice and promote healthy behaviours, where appropriate (see *Section 2.4*).
5. Update the client's notes, including history, examination, investigation results and discussions, and schedule the next ANC contact.

2.3 Routine investigations and screening for risk factors

Antenatal care contacts provide the opportunity to assess signs and symptoms and to identify and treat any complications of pregnancy in a timely and appropriate manner. A thorough antenatal history including medical issues (and use of medicines) at the first contact gives the healthcare provider the opportunity to assess the pregnant individual for any risk factors, to manage and reassess them during the pregnancy, and to make referrals for specialist care, when indicated.

2.3.1 Routine investigations

The following investigations are **recommended** during pregnancy [3]:

- Regular measurement of blood pressure, weight, and presence of proteinuria.
- Full blood count (preferred) or haemoglobin level (via haemoglobinometer preferred over haemoglobin colour scale method) at visits 1, 3, and 6 (12, 26, and 36 weeks of pregnancy).
- Midstream urine culture (preferred) or urine Gram staining (preferred over urine dipstick) at visits 1, 3, and 5 (12, 26, and 34 weeks). Provider-initiated testing and counselling for HIV and syphilis testing (rapid plasma reagin test or VDRL test) at visit 1 (12 weeks). An on-site rapid syphilis test is recommended in settings of low coverage of syphilis screening, limited laboratory capacity, or high prevalence of syphilis (≥5 per cent) [4].
- Screening for gestational diabetes (between 24 and 28 weeks of pregnancy), or if hyperglycaemia is first detected at any time during pregnancy.
- Screening for tobacco, alcohol, and other drug use at each antenatal visit.
- One ultrasound scan before 24 weeks to determine gestational age, improve detection of fetal anomalies and multiple pregnancies, reduce induction of labour for post-term pregnancy, and improve an individual's pregnancy experience.

The following investigations and interventions are recommended in specific contexts and repeated when clinically indicated:

- Routine vaginal examinations, breast examination, weighing, and ultrasound scans.
- Tuberculosis screening is recommended at the first visit (12 weeks) in high-prevalence settings.
- Clinical enquiry about the possibility of sexual and gender-based violence (SGBV) should be strongly considered at ANC visits when assessing conditions that may be caused or complicated by SGBV to improve clinical diagnosis and subsequent care, where there is the capacity to provide a supportive

response (including referral where appropriate, see *Chapter 10: Sexual and gender-based violence*).

- Listening to the fetal heart rate may be reassuring for the client and can be offered; however, it is not a predictor of fetal well-being and is not recommended as a routine investigation.
- Although daily fetal movement counting may cause anxiety, asking the client to monitor fetal movements is an option in settings where no other facilities for fetal assessment are available.

2.3.2 Screening for risk factors

2.3.2.1 Factors that may increase the risk of caesarean delivery or preterm birth

Previous caesarean delivery: Pregnant individuals with no risk factors other than previous caesarean delivery can plan for delivery in a comprehensive emergency obstetric and newborn care (CEmONC) facility, where a trial of vaginal birth can be attempted and caesarean performed, if needed. This should be noted on the birth plan.

High-risk factors: Pregnant individuals with high-risk factors identified in the antenatal period that could make a normal delivery difficult or unlikely should be referred to a specialist facility (CEmONC facility). Delivery should take place in a facility that can perform a caesarean, if necessary. These risk factors include:

- malpresentation within 1 month of expected delivery
- multiple pregnancy
- previous third- or fourth-degree tear
- age younger than 14 years

Other risk factors: Pregnant individuals with other risk factors can be advised that delivery should occur with a skilled attendant in a facility. These risk factors include previous stillbirth or early neonatal death; history of pregnancy complications, such as haemorrhage or pre-eclampsia; age younger than 16 years; diabetes mellitus; cardiac disease; contracted pelvis; haemoglobinopathies; and first-time pregnancy or grand multiparity. During labour and delivery, some individuals with disabilities may require specialized care that needs to be organized in advance to ensure that the relevant support is available when needed. Identify providers who are knowledgeable or willing to learn about how to provide the best support to these clients during antenatal, labour and delivery, and post-natal care.

2.3.2.2 Mental health

Assessment: The antenatal period is an opportunity to assess the pregnant individual's mental health and their risk of developing mental illness during pregnancy and the post-partum period. Key screening questions are summarized in *Box 1*.

BOX 1: Recognizing mental health disorders in the antenatal care (ANC) setting

Recognize that people who have a mental health disorder may be:

- unwilling to disclose or discuss their illness because of fear of stigma or due to a negative perception by their family or the community
- reluctant to engage in treatment because of their mental health disorder or dependence on drugs and/or alcohol

Screening questions to ask at the first ANC contact:

1. During the past month, have you been feeling down, depressed, or hopeless?
2. Recently, have you had little interest or pleasure in doing things?

If the answer is "Yes" to either of the above two questions, continue by asking the following:

3. During the past 2 weeks, have you been bothered by not being able to control worrying or being anxious?
4. Have you had severe mental illness in the past?
5. Has your mother/sister/daughter experienced mental illness in pregnancy?

Discuss with the individual whether they can positively involve friends or family members for support, if possible, and refer if necessary.

2.3.2.3 Sexual and gender-based violence

Sexual and gender-based violence (SGBV) can have a negative impact on maternal and fetal health. The healthcare provider should be aware of whether a partner or husband present at consultations is behaving intrusively, and should never ask the client about violence if the partner is present. For detailed guidance on screening and managing SGBV, see *Chapter 10: Sexual and gender-based violence*.

2.3.2.4 Female genital mutilation

Clients with the most severe forms of female genital mutilation (FGM) – type III, also referred to as infibulation – are at greater risk for a range of obstetric complications during delivery, including caesarean delivery, post-partum haemorrhage (PPH), episiotomy, and prolonged or difficult labour. Similarly, their infants have an increased risk of stillbirth, early neonatal death, asphyxia at birth, and resuscitation at birth [5,6].

WHO recommends deinfibulation for preventing and treating obstetric complications and to facilitate delivery in clients living with type III FGM. The decision about the timing of the procedure (antepartum or intrapartum) should be based on client preference, access to healthcare facilities, place of delivery, and skill levels of the healthcare provider [7]. Counselling on physiological changes after deinfibulation must be offered to all clients undergoing the procedure [5]. For further information see *Chapter 10: Sexual and gender-based violence*.

2.3.2.5 Hypertensive disorders

Hypertensive disorders of pregnancy including pre-eclampsia, eclampsia, gestational hypertension, and chronic hypertension are among the main causes of maternal and neonatal mortality and morbidity and stillbirth.

2.3.2.6 Anaemia

The most common anaemia in pregnancy is iron deficiency anaemia, which can be due to poor diet or an infection such as a parasitic or chronic infection. Full blood count testing is recommended at the first ANC visit. In settings where full blood count testing is not available, on-site haemoglobin testing with a haemoglobinometer is recommended. Healthcare providers should recheck haemoglobin levels at a subsequent visit if anaemia is suspected, but not delay giving iron supplements.

2.3.2.7 Gestational diabetes mellitus

Gestational diabetes mellitus (GDM) occurs when a pregnant individual develops hyperglycaemia with no history of diabetes mellitus. Individuals with GDM are at greater risk of pre-eclampsia and other hypertensive disorders, fetal macrosomia, and shoulder dystocia. GDM can also persist as diabetes mellitus after delivery.

Follow local protocols for screening all pregnant individuals for diabetes. Those found to have hyperglycaemia may need nutritional counselling (see *Section 2.4.2*), exercise, and medication. GDM can be diagnosed at any time in pregnancy if one or more of the following criteria are met:

- fasting plasma glucose 5.1–6.9 mmol/l (92–125 mg/dl)
- 1-hour plasma glucose ≥10.0 mmol/l (180 mg/dl) following a 75 g oral glucose load
- 2-hour plasma glucose 8.5–11.0 mmol/l (153–199 mg/dl) following a 75 g oral glucose load

Individuals with values above the range would be diagnosed with diabetes mellitus.

2.3.2.8 Asymptomatic bacteriuria

Asymptomatic bacteriuria (ASB) is a common condition of the urinary tract that is associated with an increased risk of infection in pregnant individuals. Midstream urine culture is the recommended method for diagnosing ASB in pregnancy. In settings where urine culture is not available, on-site midstream urine Gram staining is recommended over the use of dipstick tests as the method for diagnosing ASB in pregnancy. If ASB is diagnosed in a pregnant individual, a 7-day antibiotic regimen is recommended to prevent persistent bacteriuria and preterm birth.

2.3.2.9 Group B streptococcus

Group B streptococcus is associated with preterm labour. However, routine screening at any gestation is not recommended, except in areas where there is a high

local prevalence of Group B streptococcus and preterm labour, or if national guidelines recommend it.

2.3.2.10 Syphilis

The specific risk of syphilis (see *Chapter 6: Sexually transmitted infections)* in pregnancy is perinatal transmission (congenital syphilis), which can cause fetal death, stillbirth, and premature birth.

- Provide screening for syphilis with the rapid plasma reagin test at first ANC contact (or the on-site rapid syphilis test where there is low prevalence of syphilis or limited laboratory capacity). If positive, check whether the client and their partner have had treatment. A positive rapid plasma reagin test result means that they require a confirmatory test for syphilis and, if positive, should be treated, and that the infant should be screened after delivery.

Management and treatment:

- Give the client 2.4 million units of benzathine benzylpenicillin by intramuscular injection: 5 ml split in half and given as two injections in different sites.
- If allergic to penicillin, give 500 mg of erythromycin orally, four times daily for 14 days.
- Ensure anaphylactic shock treatment is available during treatment, although it is extremely rare.
- Provide counselling for the client on why it is also important to bring their sexual partner for testing and treatment and advise using barrier methods of contraception to prevent reinfection.
- After delivery, the newborn should be screened, and treated if:
  - congenital syphilis is confirmed; or
  - the newborn is clinically normal but the mother was untreated or inadequately treated for syphilis, or was treated with non-penicillin regimens [8].

2.3.2.11 HIV

Testing for HIV during pregnancy at the first ANC visit offers the opportunity for individuals who test positive to initiate antiretroviral treatment, which improves individual health outcomes, prevents vertical transmission of HIV to the fetus, and horizontal transmission to an uninfected sexual partner [3] (see *Chapter 7: HIV*). In addition, healthcare providers should counsel on the benefits of involving and testing the client's partner and using barrier methods of contraception. Explain that vaginal delivery may be possible, but local protocols will need to be followed. Provide counselling on breastfeeding and infant feeding options later in pregnancy, considering the risk of HIV transmission via breastfeeding (see *Chapter 7: HIV, Section 6*).

2.3.2.12 Tuberculosis

Tuberculosis increases the risk of preterm birth, perinatal death, and other adverse pregnancy outcomes and complications. Local protocols should be used to screen for active tuberculosis at the first ANC contact, where appropriate.

2.4 Preventive health interventions

Antenatal care contacts offer the opportunity to provide some preventive health interventions, including tetanus toxoid vaccination, nutritional counselling and supplementation, HIV screening, context-specific interventions (Zika virus disease, malaria, helminth infections, and seasonal influenza), and assistance for common physiological symptoms of pregnancy.

2.4.1 Tetanus toxoid vaccination

Tetanus toxoid vaccination can prevent neonatal tetanus, which is almost always fatal, as well as maternal tetanus (i.e. tetanus during pregnancy or the post-partum period). Tetanus-toxoid-containing vaccines are safe to give in pregnancy. It is an essential antenatal intervention, especially in settings where tetanus is common and where people are unlikely to have already received a full course (three primary plus three booster doses) of tetanus vaccine by the age of 15 years through routine immunization [9].

2.4.2 Nutritional counselling and supplementation

A healthy diet is essential to meet maternal and fetal needs. Maternal undernutrition and maternal obesity are both associated with poor perinatal outcomes [3].

Healthcare providers should give tailored nutritional advice and supplementation to ensure that interventions are appropriate for the individual and explain the benefits. See *Appendix 1* for recommended dietary interventions and nutritional supplements mapped to ANC visits.

Weight gain generally begins after 20 weeks of pregnancy, and the definition of 'normal' weight gain varies but should take pre-pregnant body mass index (BMI) into consideration. *Table 1* provides an approximate guide.

2.4.3 Context-specific preventive measures

Healthcare providers should be aware of local protocols for preventing a range of infections that may be harmful to pregnant individuals and which are endemic in the local areas they work in.

2.4.3.1 Zika virus disease

Zika virus disease (ZVD) is primarily transmitted by the bite of an infected female *Aedes* mosquito *(Ae. aegypti* and *Ae. albopictus)*. ZVD can also be transmitted through sexual contact, to the fetus during pregnancy, and through blood transfusion and organ transplantation [10].

Infection with ZVD in pregnancy can result in congenital brain abnormalities such as microcephaly and other birth defects. It is also associated with miscarriage, stillbirths, and preterm birth. Currently, there is no vaccine against ZVD, nor any treatment for the infection [10].

TABLE 1: Recommended ranges for weight gain during pregnancy

Body mass index (BMI, kg/m^2) at the start of pregnancy	Recommended weight gain during pregnancy
Underweight: BMI <18.5	12.5–18 kg
Normal weight: BMI 18.5–24.9	11.5–16 kg
Overweight: BMI 25–29.9	7–11.5 kg
Obese: BMI >30	5–9 kg

Source: WHO [3].

For clients in affected areas, healthcare providers should counsel on the risks of ZVD during pregnancy and infection prevention measures, including minimizing the risk of mosquito bites [10,11]. Providers should also conduct the following assessments:

- At each visit, pregnant individuals should be asked about the occurrence of any of the symptoms or signs of Zika virus infection since their last ANC visit. They should be counselled to present early for diagnostic work-up and treatment if they develop any of these symptoms between scheduled ANC visits.
- Perform fetal anomaly ultrasound scan between 18 and 20 weeks. Careful attention should be paid to the fetal central nervous system. A repeat ultrasound for fetal morphology should be performed between 28 and 30 weeks.
- If the fetal head circumference decreases, the prognosis worsens [12].

Provide counselling on the options in accordance with local laws, ensuring accessible, easy-to-understand communication:

- All pregnant individuals, regardless of their individual choices concerning their pregnancies, must be treated with respect and dignity.
    - Those who decide not to continue the pregnancy should receive accurate information and support (see *Chapter 5: Abortion care*).
    - Those who carry their pregnancy to term should receive appropriate care and support to manage anxiety, stress, and the birth environment. Plans for neonatal care and management should be discussed during the pregnancy and in consultation with a paediatrician or paediatric neurologist, where available. Consider referral to any local social support services.

2.4.3.2 Malaria

For all pregnant individuals in malaria-endemic areas, WHO recommends intermittent preventive treatment with sulphadoxine-pyrimethamine (IPTp-SP), starting in the second trimester (13 weeks), with doses given at least 1 month apart, with the objective of ensuring that at least three doses are received. Pregnant individuals

should also be advised to use insecticide-treated nets [13].

In all settings, clinical suspicion of malaria, based on fever or a history of fever, should be confirmed with a parasitological diagnosis.

2.4.3.3 COVID 19

COVID-19 vaccination in pregnant individuals is currently indicated in most countries, where vaccines are available.

- While overall the benefits of vaccination against COVID-19 in pregnant individuals are thought to outweigh the potential risks, given the lack of extensive clinical data in pregnancy, clients should make a joint decision with their healthcare provider based on their individual circumstances, having understood the benefits and risks.
- There is no need to stop breastfeeding before or after being vaccinated against COVID-19.
- Reported side effects of COVID-19 vaccinations in pregnant individuals do not differ from those reported by non-pregnant individuals [14].

2.4.3.4 Helminth infections

Preventive anthelminthic treatment is recommended for pregnant individuals in endemic areas after the first trimester [3].

2.4.3.5 Seasonal influenza

Vaccination against seasonal influenza with inactive virus is recommended for pregnant individuals where available.

2.4.4 Interventions for common physiological symptoms of pregnancy

Many individuals suffer from one or more symptoms of pregnancy that are not harmful but can affect physical and mental well-being, including nausea and vomiting, constipation, heart burn, low back and pelvic pain, varicose veins and oedema, and vaginal discharge. It is critical to support each individual client and to provide care and treatment options as well as reassurance that symptoms are self-limiting and generally resolve later in the pregnancy or after delivery (see WHO [3] for interventions during pregnancy that are safe and evidence based).

3. Management of labour, delivery, and the immediate post-partum period

3.1 General principles and emergency preparedness

Care of individuals during labour and delivery should be provided in a supportive and encouraging atmosphere that is respectful of the client's wishes.

Use the triage assessment for clients attending ANC visits, in labour, or post-partum to exclude any dangerous conditions (*Appendix 4*).

Depending on their capacity and the signal function they can perform, facilities will provide different levels of care for emergency obstetric and newborn care (EmONC): basic emergency obstetric and newborn care (BEmONC) or comprehensive emergency obstetric and newborn care (CEmONC) (see *Table 2* – next page).

Facilities that provide only BEmONC should have a referral protocol in place including a memorandum of understanding with a referral (CEmONC) facility, telephone numbers of ambulances, other transport arrangements, and emergency supplies and equipment for the transfer.

3.2 Management of labour and prelabour ruptured membranes

Take a careful history and conduct a thorough clinical examination and record review to establish the clinical state of the pregnant individual presenting with possible labour or with prelabour rupture of membranes (PROM) and assess any risks of obstetric complications. Use *Appendix 5* as a guide.

TABLE 2: Signal functions of basic and comprehensive emergency obstetric and newborn care (BEmONC and CEmONC)

	Emergency obstetric and newborn care (EmONC)	
Basic EmONC	1. Administer parenteral antibiotics	Comprehensive EmONC
	2. Administer uterotonics (i.e. parenteral oxytocin)	
	3. Administer parenteral anticonvulsants for pre-eclampsia and eclampsia (i.e. magnesium sulphate)	
	4. Manually remove the placenta	
	5. Remove retained products (e.g. manual vacuum aspiration, dilatation and curettage)	
	6. Perform assisted vaginal delivery (e.g. vacuum extraction, forceps delivery)	
	7. Perform basic neonatal resuscitation (e.g. with bag and mask)	
	8. Perform surgery (e.g. caesarean delivery)	
	9. Perform blood transfusion	
BEmONC facility = all functions 1–7 are performed		
CEmONC facility = all functions 1–9 are performed		

Source: WHO [15].

3.2.1 Prelabour rupture of membranes at term

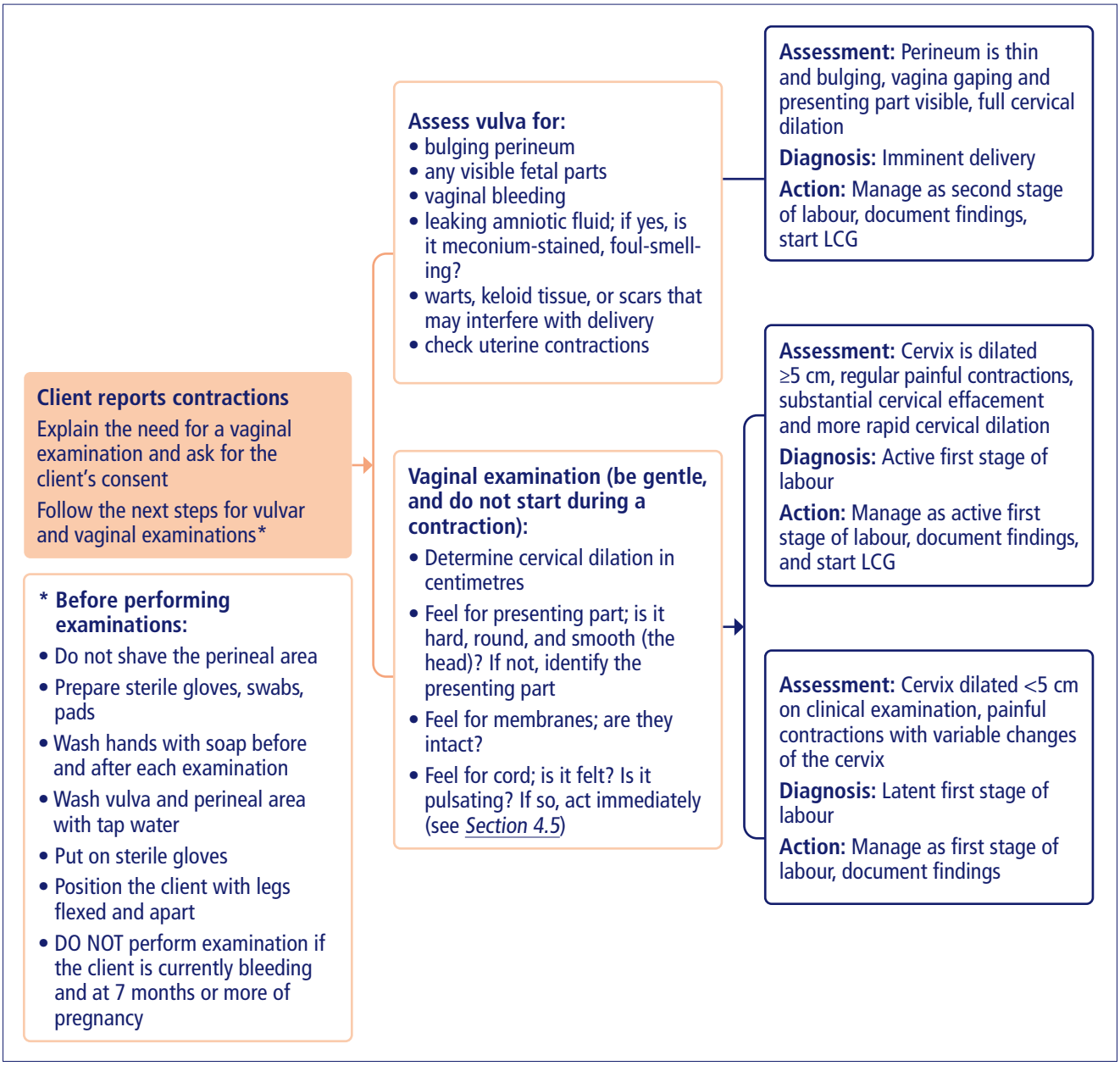
If pregnancy is term (37 weeks of gestation or more), PROM refers to the rupture of membranes before the onset of labour. If the pregnancy is preterm (less than 37 weeks), rupture of membranes before labour is referred to as preterm PROM (or PPROM, see *Section 4.4*).

- Check history of rupture of members and perform essential examination (Note! Do NOT perform a digital vaginal examination if there is no sign of labour).
- Provide reassurance that PROM can be normal and that in the absence of infection it is fine to wait for labour to start and progress naturally. Counsel the client about induction of labour if needed. The most significant maternal consequence of term PROM is intrauterine infection, the risk of which increases with the duration of membrane rupture.
- Routine antibiotic administration is NOT recommended.

3.2.2 Establish stage of labour

Individuals reporting regular contractions at term are likely to be in labour. Establish the stage of labour (see *Figure 1*).

FIGURE 1: Establishing the stage of labour



Abbreviation: LCG, labour care guide.

Source: WHO [16].

3.3 Management of normal labour

Routine management of normal labour for pregnancies at term (37 weeks or more) is summarized in *Table 3*.

TABLE 3: Management of normal labour

Stage of labour	Key points for routine care	Additional interventions
First stage – Period from start of labour to a fully dilated (10 cm) cervix	Do not leave the client alone, provide supportive care, ideally with their companion of choice How is the client coping? Assess every hour in latent and every 30 minutes in active labour Check blood pressure, pulse, temperature at least every 4 hours during latent phase; then blood pressure every 4 hours, temperature every 2 hours, and pulse every 30 minutes during active labour Consider the positioning/mobility of the client, hydration, and pain management Assess uterine contractions (strength, frequency) over a 10-minute period: hourly during latent phase and every 30 minutes during active phase Be flexible in letting the client choose positions that make them feel most at ease. Clients with disabilities/difficulties moving may need help exploring alternative positions Fetal assessment: Assess fetal lie, position, descent, and development of caput. Listen immediately after contraction for one full minute, at least every 15 minutes. Record accelerations or decelerations Start Labour Care Guide (LCG) tool when cervical dilation ≥5 cm Document all findings and times of any counselling, physical change, or warning signs	Do not shave the perineal or pubic area Do not give routine enemas Do not perform vaginal examination if not necessary If rising baseline fetal heart rate or decelerations, perform intermittent auscultation more frequently Consider arranging transfer to a facility that can perform caesarean delivery, if required

continued

TABLE 3: Management of normal labour ***continued***

Stage of labour	Key points for routine care	Additional interventions
Second stage		
Early (non-expulsive) second stage: Full dilation of the cervix without expulsive contractions or urge to push	Client and baby should be monitored every 5 minutes with documentation on the LCG Never leave the client alone during the second stage	Perform vaginal examination to confirm full dilation after 30 minutes of expulsive contractions if perineum is not stretched
Late (expulsive) second stage: Fetal head is visible with expulsive contractions with full dilation of the cervix. May last up to 2 hours (multiparas) or 3 hours (nulliparas)	Bladder is empty; if the client cannot pass urine, empty their bladder Ensure all equipment and supplies including newborn resuscitation equipment are available and that the room is warm During expulsive phase, encourage the client to push when they feel the urge, and to adopt their preferred position Do not perform routine episiotomy	If not fully dilated, lie the client on their left side and ask them not to push No descent of the head after 2 hours, consider operative delivery or caesarean delivery
	Actions for client after delivery Give 10 IU oxytocin intramuscularly to client in the upper thigh if there is no second baby within 1 minute of birth Change gloves, clamp and cut the cord after 1–3 minutes Encourage breastfeeding within the first hour **Actions for baby after delivery** Dry baby immediately, change towel if wet Assess baby's breathing while drying: is the baby breathing well with rising of the chest? Wipe eyes Keep baby warm, preferably on the client's chest in skin-to-skin contact	**After delivery:** **Baby not breathing or gasping?** Stimulate by rubbing back 2–3 times; cut cord quickly, transfer to a firm warm surface and start resuscitation Call for help Do not perform routine suction or aspiration; this should only be performed in the presence of dense substances blocking the nose and mouth Do not apply any substance to the stump Do not remove bandage or bind the stump Do not remove vernix Do not bathe or wash the baby until at least 6 hours of age (and delay to 24 hours if possible)

continued

TABLE 3: Management of normal labour ***continued***

Stage of labour	Key points for routine care	Additional interventions
Third stage: Period between the birth of the baby and the delivery of the placenta	Never leave the client alone Estimate and record blood loss Examine the perineum, lower vagina, and vulva for tears Verify uterine tone Await a strong contraction, usually 2–3 minutes after delivery of the baby, observe signs of placental separation and deliver the placenta by controlled cord traction **Do not** attempt controlled cord traction unless trained	**Client:** If there is a third- or fourth-degree tear and the provider cannot repair the laceration appropriately, refer/transfer for care If after 30 minutes of giving intramuscular oxytocin the placenta has not delivered and the client is not bleeding, empty the client's bladder, encourage breastfeeding, repeat controlled cord traction, if trained If the placenta has not delivered within 1 hour after delivery, remove the placenta manually and refer the client to a hospital. Insert an intravenous line and give intramuscular/intravenous antibiotics and 20 IU oxytocin at 30 drops per minute Do not squeeze or push the uterus to deliver the placenta **Baby:** Listen for grunting and look for indrawing of chest and fast breathing
Immediate post-partum care of the client: 1–2 hours after delivery	Clean the client and the area beneath them, help them to change clothes, and supply a sanitary pad Estimate and record blood loss. If total blood loss is approximately 250 ml but bleeding has stopped, plan to keep the client in the facility for 24 hours Monitor vital signs, vaginal bleeding, and uterine contraction Keep the client in the delivery room with their baby for a minimum of 1 hour after delivery of the placenta	If bleeding is excessive, manage post-partum haemorrhage with uterine massage, uterotonics, and verification of no genital tract tears
First 24 hours after delivery	All post-partum clients should have regular assessment routinely during the first 24 hours starting from the first hour after birth Discuss post-partum contraception	

Source: Adapted from WHO [17].

3.3.1 Use of the Labour Care Guide

The WHO Labour Care Guide (LCG) tool is designed for the care of pregnant individuals and their babies during labour and delivery [16]. It includes assessments and observations that are essential for the care of all pregnant individuals. The LCG is designed for health personnel to monitor the well-being of clients and their babies during labour through regular assessments to identify any deviation from normal circumstances. The tool aims to stimulate shared decision-making by healthcare providers and clients, and to promote client-centred care. However, the LCG is primarily designed for the care of apparently healthy pregnant individuals and their babies (i.e. those with low-risk pregnancies). Clients at high risk of developing labour complications may require additional specialized monitoring and care.

Documentation on the LCG of the well-being of the client and baby, as well as progression of labour, should be initiated when the client enters the active phase of the first stage of labour (5 cm or more cervical dilation), regardless of their parity and membranes status. The aims of the LCG are:

- To guide monitoring and documentation of the well-being of clients and babies, and progress through labour.
- To guide skilled personnel to offer supportive care throughout labour.
- To assist skilled personnel to promptly identify and address emerging labour complications by providing thresholds for observations and action for abnormal observations.
- To prevent unnecessary use of interventions.
- To support audit and quality improvement of labour management.

Per the LCG, the use of the partograph is now no longer recommended routinely by WHO. Healthcare professionals should continue to plot cervical dilation versus time on the cervicograph as well as other partograph parameters (including fetal heart rate, caput succedaneum, moulding, status of amniotic fluid, fetal descent, maternal temperature, blood pressure, and urinary output) to monitor the well-being of the client and their baby and identify risks for adverse birth outcomes. In healthcare facilities where interventions such as augmentation and caesarean delivery cannot be performed and where referral-level facilities are difficult to reach, the alert line could still be used for triaging clients who may require additional care. In this instance, plotting should commence from a cervical dilation of 5 cm, which signifies the onset of the active first stage of labour for most pregnant individuals.

4. Complications during pregnancy

Clients presenting with complications during labour, delivery, or the immediate post-partum period should receive care at a facility that provides CEmONC or be referred to one as soon as possible.

It is important to initiate resuscitation and stabilize the client's condition before transfer. This includes insertion of a large bore intravenous cannula with intravenous fluids, antibiotics if there is a sign of intrauterine infection or sepsis, and treatment for pre-eclampsia or eclampsia if present.

4.1 Hyperemesis gravidarum

Nausea and vomiting in pregnancy affect up to 80 per cent of pregnant individuals in early pregnancy. Hyperemesis gravidarum is diagnosed when nausea and vomiting are protracted and there is more than 5 per cent weight loss, as well as dehydration and electrolyte imbalance [18]. Vomiting arising late in pregnancy, however, should trigger investigation for other pathologies (pre-eclampsia, eclampsia, HELLP syndrome, and/or diabetic ketoacidosis in diabetic clients).

Assess all antenatal clients reporting excessive nausea and vomiting for hyperemesis gravidarum via history-taking and examination/clinical assessment. A healthcare provider can use a urine dipstick test to identify presence or absence of ketones to confirm the diagnosis if needed. Blood urea and electrolytes can be measured (if available) to assess severity.

Hospital admission is not always needed if clients can rehydrate themselves and take anti-emetic medications. Treatment should be given based on what is available and in accordance with local protocols.

- Clients who have prolonged symptoms requiring intravenous fluids should have their electrolyte levels measured regularly to ensure that sodium and potassium deficiencies are detected and corrected.
- If there is no response to treatment with intravenous fluids and anti-emetics, then steroids and referral may be required.
- Consider a non-urgent ultrasound scan, if available, to establish a viable pregnancy and to exclude multiple pregnancy and trophoblastic disease.

4.2 Hypertensive disorders in pregnancy

Hypertensive disorders are an important cause of maternal and neonatal morbidity and mortality, stillbirth, and long-term disability – outcomes that can be avoided with treatment of the disorder [19].

The types of hypertensive disorder during pregnancy are:

- **Pre-eclampsia (and eclampsia, its main complication):** Pre-eclampsia is diagnosed as a new episode of hypertension during pregnancy (with persistent diastolic blood pressure >90 mm Hg) accompanied by the occurrence of substantial proteinuria (>0.3 g/24 hours). Eclampsia is "characterized by the occurrence of generalized seizures in women with pre-eclampsia, provided that the tonic–clonic seizures are not attributable to other causes (e.g. epilepsy)" [19].
- **Gestational hypertension**: New high blood pressure with onset after 20 weeks of pregnancy with no heavy proteinuria.
- **Chronic hypertension**: High blood pressure before pregnancy, which continues during pregnancy.

See *Section 4.4* for guidance on managing hypertension in pregnancy when there is an imminent risk of preterm birth.

4.2.1 Eclampsia and pre-eclampsia

Individuals at risk of pre-eclampsia should be identified as early as possible in the antenatal period based on risk factors and history. Risk factors for pre-eclampsia include current gestational hypertension, chronic hypertension, history of hypertensive disease during a previous pregnancy, renal disease, autoimmune disease, diabetes, and multiple pregnancies [19]. Other risks for pre-eclampsia include first pregnancy at age 40 or older, pregnancy interval of more than 10 years, body mass index of 35 kg/m^2 or greater at first ANC visit, and family history of pre-eclampsia.

4.2.1.1 Prevention of pre-eclampsia

Once the risk of pre-eclampsia has been identified, evidence-based interventions, such as low-dose aspirin (75 mg), and antihypertensive drugs can be initiated to mitigate its development. The client's birth plan should be developed and adjusted, as needed, with a consulting specialist team and the client. In areas where dietary calcium intake is low, calcium supplementation during pregnancy (1.5–2.0 g elemental calcium/day) is recommended for the prevention of pre-eclampsia in all clients, in addition to those at high risk of developing pre-eclampsia [20].

4.2.1.2 Management of pre-eclampsia

The only definitive treatment for pre-eclampsia is delivery of the fetus and placenta; although in some cases, the disease can worsen temporarily after delivery.

If the client presents at less than 34 weeks of pregnancy with pre-eclampsia, counsel and refer to higher-level care for stabilization and consider early delivery after administration of corticosteroids for fetal lung maturation (see *Section 4.4*).

Clients should deliver in higher-level health facilities. After delivery, they remain at high risk of eclampsia and will continue to require intensive monitoring with regular blood pressure checks and treatment with magnesium sulphate to prevent eclampsia in the immediate post-partum period [19].

All clients who have had pre-eclampsia should have an individualized care plan at time of discharge.

4.2.1.3 Severe pre-eclampsia and eclampsia

Eclampsia is a complication of pre-eclampsia, characterized by the occurrence of generalized seizures/convulsions.

Once a diagnosis of severe pre-eclampsia or eclampsia is made, the client should not be left alone; the healthcare team must act promptly to avoid serious complications and death. *Appendix 6* provides further details on the treatment of severe pre-eclampsia and eclampsia.

- Magnesium sulphate is recommended for the prevention of eclampsia in clients with severe pre-eclampsia and for treatment of eclampsia, in preference over any other anticonvulsants. The healthcare provider should call for help if required, seek expert assistance (if available), and consider transferring the client to a higher-level facility.
- If the client is transferred, always accompany them to the referral facility. Keep the client positioned on their left side and if a convulsion occurs during the journey, give magnesium sulphate and protect the client from fall and injury.

4.3 Bleeding in pregnancy

When a client presents with vaginal bleeding, the healthcare provider should provide a rapid evaluation of the client's general condition, vital signs, level of consciousness, presence of anxiety and/or confusion, blood loss, and colour/temperature of skin. If shock is suspected or develops, treatment should begin immediately, starting with initiation of intravenous fluids. If the client is stable, ask about menstruation history, pregnancy history, and bleeding patterns. After history-taking, the healthcare provider should assess uterine size and tenderness, including a bimanual examination if needed, and perform a speculum examination if needed.

4.3.1 Vaginal bleeding in early pregnancy (less than 22 weeks)

Table 4 (next page) provides details of presenting signs and symptoms associated with vaginal bleeding at less than 22 weeks of pregnancy and likely diagnoses.

4.3.1.1 Management

For information on management of inevitable and incomplete abortion, see *Chapter 5: Abortion care*.

If complications from an unsafe abortion are suspected, examine for signs of infection or uterine, vaginal, or bowel injury and thoroughly irrigate the vagina to remove any herbs, local medications, or caustic substances

4.3.1.2 Ectopic pregnancy

Ectopic pregnancies occur when the embryo implants outside the uterus. This is typically in a fallopian tube, but can also occur on the ovary, cervix, caesarean delivery scar, or even within the abdominal cavity. Risk factors for ectopic pregnancy include previous ectopic pregnancy, history of tubal surgery, or tubal damage from pelvic infections or endometriosis [21].

Healthcare providers need to be competent to diagnose ectopic pregnancy based on history, clinical examination, laboratory testing, and ultrasound (if available). Signs and symptoms are extremely variable depending on whether the ectopic pregnancy has ruptured (see *Table 5*).

Where the healthcare facility is not adequately equipped to perform ultrasound or laparotomy, the provider should refer the client to a higher-level facility. The urgency of the referral depends on the clinical situation (whether the client is haemodynamically stable, for example). Ensure that the client is accompanied on transfer, wherever possible.

- Insert an intravenous line, administer fluids, and prepare the client for surgery/referral if needed. Prepare blood transfusion, if needed.
- For ruptured ectopic pregnancies with unstable vital signs, surgery is needed immediately.
- Surgical options for tubal ectopic pregnancy are salpingectomy (removal of the whole fallopian tube) or salpingotomy (incision of the fallopian tube and removal of the ectopic pregnancy).

TABLE 4: Diagnosis of vaginal bleeding in early pregnancy

Presenting symptom and other symptoms and signs typically present	Symptoms and signs sometimes present	Probable diagnosis
• Light bleeding • Closed cervix • Uterus corresponds to dates	• Cramping/lower abdominal pain • Uterus softer than normal	Threatened abortion (pregnancy may continue)
• Light bleeding • Abdominal pain • Closed cervix • Uterus smaller than normal • Uterus softer than normal	• Fainting • Tender adnexal mass • Amenorrhoea • Cervical motion tenderness	Ectopic pregnancy
• Light bleeding • Closed cervix • Uterus smaller than dates • Uterus softer than normal	• Light cramping/lower abdominal pain • History of expulsion of products of conception	Complete abortion (products of conception completely expelled)
• Heavy bleeding • Dilated cervix • Uterus corresponds to dates	• Cramping/lower abdominal pain • Tender uterus • No expulsion of products of conception	Inevitable abortion (pregnancy will not continue and will proceed to incomplete/complete abortion)
• Heavy bleeding • Dilated cervix • Uterus smaller than dates	• Cramping/lower abdominal pain • Partial expulsion of products of conception	Incomplete abortion (products of conception partially expelled)
• Heavy bleeding • Dilated cervix • Uterus larger than dates • Uterus softer than normal • Partial expulsion of products of conception which resemble grapes	• Nausea/vomiting • Spontaneous abortion • Cramping/lower abdominal pain • Ovarian cysts (easily ruptured) • Early onset pre-eclampsia • No evidence of a fetus	Molar pregnancy

Source: Adapted from WHO [17].

TABLE 5: Symptoms and signs of unruptured and ruptured ectopic pregnancy

Unruptured ectopic pregnancy	Ruptured ectopic pregnancy
• Symptoms of early pregnancy (irregular spotting or bleeding, nausea, swelling of breasts) • Abdominal and pelvic pain • Exam: Bluish discoloration of vagina and cervix, slight uterine enlargement, +/- tender adnexal mass	• Collapse and weakness • Fast weak pulse (110 bpm or more) • Hypotension • Hypovolaemia • Acute abdominal and/or pelvic pain • Abdominal distension • Rebound tenderness

Source: Adapted from WHO [17].

4.3.1.3 Molar pregnancy

If diagnosis of molar pregnancy is certain, cross-match blood if possible and arrange for evacuation of the uterus. See *Chapter 5: Abortion care* for additional information on recommended methods for uterine evacuation. The type of procedure for molar pregnancy depends on uterine size (>13 weeks versus <13 weeks). Oxytocin may be infused (20 units in 1 litre of intravenous fluids at 60 drops/minute) to prevent haemorrhage (particularly with uterine size >13 weeks) once evacuation is underway [17].

4.3.2 Placental abruption or placenta praevia

The most serious causes of antepartum or intrapartum haemorrhage are placental abruption and placenta praevia. The healthcare provider should not perform a routine speculum examination if an individual presents with antepartum or intrapartum vaginal bleeding after 22 weeks of pregnancy, until placenta praevia has been excluded. Perform a rapid evaluation of the client's general condition, as noted for bleeding in early pregnancy (see *Section 4.3.1*). It is essential to keep vital signs stable, initiate intravenous fluid infusion, and organize transfer to a higher-level facility for further investigation and management, such as caesarean delivery.

4.3.3 Post-partum haemorrhage

Post-partum haemorrhage (PPH) is defined as blood loss of 500 ml or greater and is considered to be severe when loss is 1000 ml or greater.

Primary PPH is the most common form of major obstetric haemorrhage that occurs from the genital tract *within 24 hours of delivery*. The main causes are uterine atony, genital tract trauma, uterine rupture, retained placenta (complete or partial), and maternal coagulation disorders [22]. Secondary PPH is defined as abnormal or excessive vaginal bleeding *between 24 hours and 12 weeks after delivery*. In addition to the causes given above, secondary PPH can be caused by vascular abnormalities and unrecognized surgical injury or complications.

4.3.3.1 Prevention of primary PPH

The use of an effective uterotonic for the prevention of PPH during the third stage of labour is recommended for all births. To effectively prevent PPH, only one of the flowing uterotonics should be used: oxytocin, carbetocin, misoprostol, ergometrine/methylergometrine, or oxytocin and ergometrine fixed dose (last two options only where hypertensive disorders can be safely excluded before use). Injectable prostaglandins are not recommended for the prevention of PPH.

In settings where multiple uterotonic options are available, oxytocin (10 IU, intramuscular/intravenous) is the recommended uterotonic agent for the prevention of PPH for all births.

In settings where oxytocin is unavailable (or its quality cannot be guaranteed), the use of other injectable uterotonics (carbetocin, or if appropriate ergometrine/methylergometrine, or oxytocin and ergometrine fixed-dose combination) or oral misoprostol is recommended for the prevention of PPH.

In settings where skilled health personnel are not present to administer injectable uterotonics, the administration of misoprostol (either 400 µg or 600 µg, orally) by community health workers and lay health workers is recommended for the prevention of PPH.

If the placenta is retained and with significant bleeding, manual placental removal should be expedited, accompanied by a single dose of prophylactic antibiotics [22,23,24].

4.3.3.2 Management of PPH

Immediate action:

- Insert two intravenous lines and administer fluids (normal saline or Ringer's lactate). Take vital signs regularly.
- Initial fluid resuscitation is performed together with intravenous administration of uterotonics and 1 g tranexamic acid (100 mg/ml) intravenously at 1 ml per minute over 10 minutes. If intravenous uterotonics are not available, fluid resuscitation and tranexamic acid should be started in parallel with sublingual misoprostol or other parenteral uterotonics. If PPH is in the context of placental retention, the placenta should be extracted and a single dose of antibiotics should be administered.
- Perform bimanual uterine massage as soon as PPH is diagnosed and exclude vaginal or cervical laceration.
- Measure or estimate the blood loss.
- Check haemoglobin level and blood group and cross-match if facilities are available. Consider transfer to another facility.
- Catheterize the bladder.
- Check to see if the placenta has been expelled and examine the placenta to ensure it is complete.
- Examine the cervix, vagina, and perineum for tears.
- Determine the cause of PPH (*Table 6*) and manage accordingly.

TABLE 6: Differential diagnosis of post-partum haemorrhage

Presenting symptoms and other symptoms and signs typically present	Symptoms and signs sometimes present	Probable cause
• Primary PPH • Uterus soft and not contracted	• Shock	Uterine atony
• Primary PPH	• Complete placenta, uterus contracted	Tears of cervix, vagina, or perineum
• Placenta is not delivered within 30 minutes of birth • Portion of maternal surface of placenta missing or torn membranes containing vessels	• Primary PPH • Uterus contracted	Retained placenta/ fragments
• Uterine fundus not felt on abdominal examination • Slight or intense pain	• Inverted uterus apparent at vulva • Primary PPH	Inverted uterus
• Primary PPH (bleeding may also be intra-abdominal) • Severe abdominal pain (may decrease after rupture)	• Shock • Tender abdomen • Rapid maternal pulse	Ruptured uterus
• Bleeding occures more than 24 hours after delivery • Uterus softer and larger than expected for elapsed time since delivery	• Bleeding is variable and foul-smelling • Anaemia	Secondary PPH

Source: Adapted from WHO [17].

Uterine atony:

- Palpate for the fundus and massage to stimulate contractions (uterine massage).
- Use uterotonic drugs:
  - Intravenous oxytocin (preferred)
    - 20 units/1 litre at fastest flow rate possible for first litre; continuing dose at 40 drops per minute for each additional litre up to 3 litres total.
    - Do not give as intravenous bolus.
    - Intramuscular oxytocin (10 units) can be given (if the intravenous route is not available).
  - If oxytocin is not available or the bleeding does not respond to oxytocin:
    - Ergometrine/methylergometrine, intravenous (slowly, preferred) or intramuscular 0.2 mg. Repeat 0.2 mg intramuscularly after 15 minutes.
      - If required can give 0.2 mg intramuscularly or intravenously (slowly) every 4 hours up to 5 doses total.
      - Do not use in setting of high blood pressure, pre-eclampsia, heart disease, or retained placenta.
    - 15-methyl prostaglandin F2 alpha: 0.25 mg intramuscularly every 15 minutes up to 8 doses (2 mg) total.
      - Do not give to clients with asthma.
      - Do not give intravenously.
    - Misoprostol: sublingual 800 µg. Can repeat 200–800 µg up to 1600 µg.
  - Early use of intravenous tranexamic acid within 3 hours of birth in addition to standard care is recommended for clients with clinically diagnosed PPH following vaginal birth or caesarean delivery.
    - Tranexamic acid 1 g intravenously (slowly), repeat after 30 minutes if bleeding continues up to no more than 10 mg/kg of body weight, 3–4 times daily.
    - Do not use in history of coagulopathy or active clotting or convulsions [17].

Retained placenta:

- Ensure that the bladder is empty and catheterize if necessary.
- Avoid forceful cord traction with fundal pressure as this may cause uterine inversion or cord avulsion.
- Give an additional 10 units oxytocin intramuscularly/intravenously in combination with controlled cord traction.
- If the placenta has been expelled but is incomplete (or not available for inspection):
  - Perform uterine massage to expel clots/retained fragments.
- If the placenta is not expelled (or incomplete) and bleeding is ongoing, manually remove the placenta/fragments or use manual vacuum aspiration.
  - A single dose of antibiotics (ampicillin or first-generation cephalosporin) is recommended if manual removal of the placenta is attempted.
  - Very adherent tissue may be placenta accreta. If the placenta does not separate easily, stabilize and refer the client urgently to hospital for treatment [17].

Genital tract bleeding:

Check for perineal and lower vaginal tears. Apply pressure with sterile gauze and put the client's legs together for 5 minutes. If bleeding continues, suture the tear.

If heavy bleeding continues:

Stabilize the client and refer them to a higher-level facility with two intravenous lines and fluids.

4.4 Preterm labour

Preterm labour is defined as the onset of labour before 37 completed weeks of pregnancy, and preterm or premature births refer to babies born at this time. History-taking should include the due date, gestational age, and if the membranes have ruptured. Physical assessment should include the client's vital signs, abdominal tenderness, rupture of membranes, and fetal assessment (heart tones, position). Routine antibiotic administration is not recommended for clients in preterm labour with intact amniotic membranes and no clinical signs of infection. Antenatal corticosteroid therapy (intramuscular dexamethasone or intramuscular betamethasone 24 mg in divided doses) is recommended for clients at risk of preterm birth from 24–34 weeks of pregnancy when the following conditions are met: gestational age assessment can be accurately undertaken, preterm birth is considered imminent, there is no sign of maternal infection, adequate delivery care is available (including for preterm birth), and the preterm newborn can receive adequate care if needed.

Additionally, the use of magnesium sulphate is recommended for clients at risk of imminent preterm birth before 32 weeks of pregnancy for prevention of cerebral palsy in the infant/child. Magnesium sulphate for neuroprotection should only be given if preterm birth is likely to occur within 24 hours.

If these interventions are not available locally, consider transfer [25].

4.5 Prolapsed cord

Prolapsed cord is a complication of pregnancy that occurs when the umbilical cord lies below the presenting fetal part. It may happen following artificial rupture or an early rupture of membranes if the fetus is not up against the internal os of the cervix [17].

4.5.1 Immediate actions to manage prolapsed cord

- Administer oxygen.
- If the cord is pulsing and the client is in the first stage of labour:
  - Insert a gloved (sterile) hand into the vagina and push the presenting part of the fetus up to decrease the pressure on the cord. The other hand can be placed on the abdomen to keep the fetus elevated. Keep the fetus elevated from the pelvis until a caesarean delivery can be performed.
  - Give tocolytics to reduce contractions while preparing for the surgery.
  - Perform immediate caesarean delivery.
- If the cord is pulsating and the client is in the second stage of labour:
  - Expedite delivery with obstetric vacuum or forceps.
  - Prepare for newborn resuscitation.
- If the cord is not pulsing when the prolapsed cord is diagnosed, the fetus is already dead and an expedited delivery is no longer necessary [17].

4.6 Obstructed labour

Obstructed labour occurs when the presenting part of the fetus cannot progress through the birth canal, despite strong uterine contractions. The most common cause of obstructed labour is cephalopelvic disproportion. Other causes of obstructed labour include malpresentation or malposition and, rarely, locked twins or pelvic tumours [17,26].

4.6.1 Immediate actions to manage obstructed labour (when the fetus is alive)

Either:

- Prepare as soon as possible for a caesarean or instrumental delivery (forceps, vacuum extraction, or symphysiotomy), depending on fetal position/descent

or:

- Refer urgently to a higher-level facility, if the facility does not provide CEmONC.

Prolonged labour due to obstructed labour can result in life-threatening complications and disability including sepsis, injuries to the bladder and/or rectum, and ruptured uterus, which can result in severe haemorrhage, shock, and death. Prolonged obstructed labour can also cause obstetric fistula, stillbirth, brain damage in the infant, and neonatal death.

4.7 Maternal sepsis

Maternal sepsis is a life-threatening condition defined as organ dysfunction resulting from infection during pregnancy or delivery or during the post-abortion or post-partum period [27].

4.7.1 Prevention of maternal infection

Each client should be assessed for **risk** of infection before, during, and after delivery by reviewing their history and clinical records. If one or more risk factors are identified, **prevent** infection by administering antibiotic prophylaxis. See *Table 7* for recommended regimens for preventing maternal infection in a range of situations.

4.7.2 Diagnosis and management of sepsis

If the client's temperature is over 38°C and they have any one of the following (high respiratory rate, lethargy, stiff neck, unable to stand), the healthcare provider should suspect the possibility of sepsis. Sepsis may also eventually drop the body temperature to one of hypothermia.

Make regular observations of vital signs (pulse rate, blood pressure, temperature, respiratory rate); if the client is in shock (systolic blood pressure <90 mm Hg, pulse >110/minute):

- Insert an intravenous line and give fluids.
- Monitor blood pressure and pulse every 15 minutes.
- Monitor urine output.
- Record fluid replacement, urine output, and vital signs.

At the same time, the healthcare provider should perform diagnostic tests based on clinical suspicion, if available (e.g. blood cultures, high vaginal swabs, throat swabs, midstream urine). These must not delay antibiotic treatment.

TABLE 7: Prophylactic antibiotic regimens

Situation	Antibiotic treatment (refer to local protocols)
Preterm prelabour rupture of membranes (PPROM) (see *Section 4.4*)	Oral erythromycin 500 mg orally, every 6 hours for 10 days (or until birth **OR** Ampicillin 2 g intravenously every 6 hours
Undergoing removal of the placenta	Ampicillin 2 g intravenous/intramuscular, single dose **OR** First generation cephalosporin, e.g. cefazolin 1 g intravenous/intramuscular, single dose
Third- or fourth-degree perineal tear	Broad-spectrum antibiotics, e.g: Cephazolin 2 g intravenous single dose preoperative followed by amoxycillin + clavulanate (875 mg + 125 mg orally), every 12 hours for 7 days **OR** Cephalexin 500 mg orally, every 6 hours for 7 days **PLUS** metronidazole 400 mg orally, every 12 hours for 7 days
Post-partum endometritis or chorioamnionitis	Clindamycin 600 mg intravenously every 8 hours **PLUS** gentamicin 5 mg/kg or 60–80 mg intravenously/intramuscularly, every 24 hours

If the client's temperature remains above 38°C and any of the following signs such as chills, foul-smelling vaginal discharge, fetal tachycardia, and rupture of membranes of more than 18 hours are present, the following management is recommended:

- Insert an intravenous line and give fluids rapidly.
- Give intramuscular or intravenous antibiotics.
- If the baby and placenta have been delivered, give oxytocin 10 mg intramuscularly and assess the newborn for signs of infection and treat if required.
- Refer the client urgently to a higher-level facility if required.

4.8 Fetal complications

4.8.1 Fetal distress

Fetal distress is defined as fetal heart rate below 120 or above 160 beats/minute. If fetal heart rate remains below 120 or above 160 beats/minute after 30 minutes of observation, the healthcare provider should take the following steps for early or late active labour:

- Early active labour (dilation of at least 4 cm):
  - Keep the client lying on their left side.
  - Consider initiating intravenous fluids and stop oxytocin (if started).
  - Prepare for caesarean delivery or refer the client urgently to a higher-level facility for caesarean delivery.
- Late active labour (dilation between 7 cm and 10 cm):
  - Call for help during delivery as needed. Refer if needed.
  - Monitor fetal heart rate after every contraction.
  - Prepare for newborn resuscitation (see *Appendix 7*).

4.8.2 Managing stillbirth

A stillbirth is a baby born with no signs of life after 28 weeks of gestation. In about half of all stillbirths, fetal death occurs during labour [28].

Risk factors for stillbirth include maternal age over 35 years, maternal infections, presence of maternal disability, non-communicable diseases, and nutrition and lifestyle factors [17,29].

The loss of a baby is devastating for any parent. When stillbirth has occurred, the parent(s) should be informed as soon as possible. They should be offered a chance to hold the baby for as long as they need, with privacy if requested. Bereavement care and support services for parent(s) should be offered. Advise clients on physical care for themselves as for any other birth, with the offer of contraceptive counselling (see *Section 5.2: Postnatal care*).

The healthcare provider should be aware of local protocols for recording of stillbirths and completing any perinatal death notification.

5. Post-natal care

The post-natal period (client and baby) or post-partum period (client only) is the period immediately after the birth of the baby and up to 6 weeks (42 days) after birth. This is a critical period for both the client and the baby as most maternal and infant deaths occur during this period [30,31].

Following an uncomplicated vaginal birth in a healthcare facility, the client and baby should receive post-natal care for 24 hours after birth and should be observed for any warning signs (see *Sections 5.2 and 5.1.1*, respectively). All post-partum clients should have regular assessment of vaginal bleeding, uterine contraction, fundal height, temperature, and heart rate (pulse) routinely during the first 24 hours starting from the first hour after birth. Blood pressure should be measured shortly after birth. If normal, the second blood pressure measurement should be taken within 6 hours. The client should have voided their bladder within 6 hours. If the birth was at home, the first post-natal contact should be as soon as possible within 24 hours after birth. Three additional post-natal care contacts are recommended on day 3, between days 7 and 14 after birth, and 6 weeks after birth.

5.1 Post-natal care for the newborn

The neonatal or newborn period refers to the first 28 days after birth. The first days, the first week, and the first month are the most crucial. Almost half of all deaths of children under the age of 5 years occur in the first month [32].

5.1.1 Assessment of the newborn

Assess the newborn at every post-natal contact for warning signs (*Box 2*) and consider referring the newborn for further assessment and management if any of the signs are present. All newborns should be given 1 mg vitamin K intramuscularly after birth (i.e. after the first hour by which time skin-to-skin contact and breastfeeding should be initiated).

Communicate these warning signs to the client and family so that they can be vigilant and seek care if any of them occur.

Box 2: Warning signs in newborn babies

- Fast/difficult breathing (breathing rate ≥60 per minute)
- Slow breathing or gasping
- Severe chest in-drawing
- No spontaneous movement
- Fever (temperature ≥37.5°C) or unusually cold (temperature <35.5°C)
- Abdominal overdistension
- Not feeding well or stops feeding well
- Fits or convulsions
- Jaundice in the first 24 hours of life, yellow palms and soles at any age
- Umbilicus is red or draining pus or blood
- Pallor
- Swollen eyes, draining pus

5.1.2 Cord care

Advise the client to keep the cord clean and dry at all times. In settings with high neonatal mortality, daily application of chlorhexidine (7.1 per cent chlorhexidine digluconate aqueous solution or gel, delivering 4 per cent chlorhexidine) to the umbilical cord stump is recommended during the first week of life.

5.1.3 Breastfeeding

Babies should be exclusively breastfed from birth until 6 months of age, if possible. The healthcare provider has a significant part to play by encouraging and supporting breastfeeding at each post-natal contact. Clients with disabilities may need support in carrying or positioning the baby for breastfeeding.

If the client is living with HIV (see *Chapter 7: HIV, Section 6.1*):

- Refer to national guidance on feeding babies born to individuals living with HIV.
- If the client is taking antiretroviral medication, they should be supported to fully breastfeed as the chance of transmission of HIV to the baby through breast milk is minimal.
- In settings where there is a high burden of infant mortality from undernutrition and infectious diseases and the client is not taking antiretroviral medication, breastfeeding may be the most appropriate option for feeding the baby and should therefore be encouraged.

5.1.4 Other post-natal care for the newborn

- Advise the parent(s) on the need to use a bed net (long-lasting insecticide-treated nets) for the baby when sleeping in high-risk areas; position the baby to sleep on its back; ensure that the baby is kept a safe and comfortable temperature.
- Bathing should be delayed for at least 6 hours, and optimally 24 hours after birth.
- Immunizations should be promoted according to local guidelines.

- For all newborns, the WHO guidelines for treatment of STIs recommend topical ocular prophylaxis for the prevention of gonococcal and chlamydial ophthalmia neonatorum [33,34]. For suspected gonococcal eye infection, give antibiotics in accordance with local protocols and review after 48 hours.
- Preterm babies born weighing 2000 g or less also benefit from 'kangaroo care' (see *Box 3*).

Box 3: Key facts about kangaroo care

- Kangaroo care (skin-to-skin contact on the client's chest) is recommended for the routine care of newborns weighing 2000 g or less at birth and should be initiated in healthcare facilities as soon as a newborn is clinically stable.
- Unstable newborns weighing 2000 g or less at birth or stable newborns weighing less than 2000 g who cannot be given kangaroo care should be cared for in a thermoneutral environment under radiant warmers or in incubators.

Source: WHO [23].

5.2 Post-natal care for the client

5.2.1 Discharge from the facility

- Before discharge, an individualized post-natal care package should be provided that is a continuation of antenatal and intrapartum care. This should include contraception counselling and healthcare when desired (see *Chapter 4: Contraception*), and information about other sexual and reproductive healthcare.
- Clients should receive a card stating the details of the delivery, any complications that occurred and how they were treated, dates for post-partum follow-up appointments, phone numbers in case of emergencies, and any special instructions for specialist post-natal follow-up care for client or baby.
- Advise clients to seek care if they experience any warning signs, such as heavy bleeding, severe pain, fever, etc.
- There is no required waiting period before a client can resume sexual activity; however, most individuals need 4–6 weeks before they recover and feel ready.

5.2.2 Post-natal visits

At each post-natal care visit, healthcare providers should:

- Enquire about the client's general well-being and assess breastfeeding progress, physical function, and wound healing if needed.
- Provide counselling on nutrition, hygiene, safer sex, and contraception.
- Ask about the client's emotional well-being, what support they have, and how they are coping.

5.2.3 Mental health and puerperal psychosis

Mental health is an important part of health and well-being during the post-natal period. Healthcare providers should encourage clients to be aware of their own mental state and encourage them to seek assistance if they feel disheartened, anxious, or depressed. Pos-partum depression is an uncommon but serious mood disorder that requires treatment.

Puerperal psychosis is a serious mental illness that requires immediate medical intervention. It usually starts within the first 2 weeks after giving birth. Symptoms can include hallucinations, delusions, mood change, and behaviour change. Puerperal psychosis is a medical emergency. Clients should be referred for treatment immediately to avoid the illness worsening and to prevent harm to themselves or their babies.

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The 2016 WHO ANC model for a positive pregnancy experience: recommendations mapped to eight scheduled ANC contacts

Overarching aim: To provide pregnant women with respectful, individualized, person-centred care at every contact, with implementation of effective clinical practices (interventions and tests), and provision of relevant and timely information, and psychosocial and emotional support, by practitioners with good clinical and interpersonal skills within a well functioning health system.

Notes:

- These recommendations apply to pregnant women and adolescent girls within the context of routine ANC.
- This table does not include good clinical practices, such as measuring blood pressure, proteinuria and weight, and checking for fetal heart sounds, which would be included as part of an implementation manual aimed at practitioners.
- Remarks detailed in the shaded box with each recommendation should be taken into account when planning the implementation of these recommendations.

Type of intervention	Recommendation	Type of recommendation	Eight scheduled ANC contacts (weeks of gestation)							
			1 (12 weeks)	**2** (20 weeks)	**3** (26 weeks)	**4** (30 weeks)	**5** (34 weeks)	**6** (36 weeks)	**7** (38 weeks)	**8** (40 weeks)
A. Nutritional interventions										
Dietery interventions	**A.1.1:** Counselling about healthy eating and keeping physically active during pregnancy is recommended for pregnant women to stay healthy and to prevent excessive weight gain during pregnancy.[a]	Recommended	X	X	X	X	X	X	X	X
	A.1.2: In undernourished populations, nutrition education on increasing daily energy and protein intake is recommended for pregnant women to reduce the risk of low-birth-weight neonates.	Context-specific recommendation	X	X	X	X	X	X	X	X
	A.1.3: In undernourished populations, balanced energy and protein dietary supplementation is recommended for pregnant women to reduce the risk of stillbirths and small-for-gestational-age neonates.	Context-specific recommendation	X	X	X	X	X	X	X	X
	A.1.4: In undernourished populations, high-protein supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes.	Not recommended								
Iron and folic acid supplements	**A.2.1:** Daily oral iron and folic acid supplementation with 30 mg to 60 mg of elemental iron[b] and 400 µg (0.4 mg) of folic acid[c] is recommended for pregnant women to prevent maternal anaemia, puerperal sepsis, low birth weight, and preterm birth.[d]	Recommended	X	X	X	X	X	X	X	X

continued

a. A healthy diet contains adequate energy, protein, vitamins and minerals, obtained through the consumption of a variety of foods, including green and orange vegetables, meat, fish, beans, nuts, whole grains and fruit.
b. The equivalent of 60 mg of elemental iron is 300 mg of ferrous sulfate hepahydrate, 180 mg of ferrous fumarate or 500 mg of ferrous gluconate.
c. Folic acid should be commenced as early as possible (ideally before conception) to prevent neural tube defects.
d. This recommendation supersedes the previous recommendation found in the 2012 WHO publication *Guideline: daily iron and folic acid supplementation in pregnant women* (36).

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continued

Type of intervention	Recommendation	Type of recommendation	Eight scheduled ANC contacts (weeks of gestation)							
			1 (12 weeks)	**2** (20 weeks)	**3** (26 weeks)	**4** (30 weeks)	**5** (34 weeks)	**6** (36 weeks)	**7** (38 weeks)	**8** (40 weeks)
Iron and folic acid supplements	**A.2.2:** Intermittent oral iron and folic acid supplementation with 120 mg of elemental iron[e] and 2800 µg (2.8 mg) of folic acid once weekly is recommended for pregnant women to improve maternal and neonatal outcomes if daily iron is not acceptable due to side-effects, and in populations with an anaemia prevalence among pregnant women of less than 20%.[f]	Context-specific recommendation	X	X	X	X	X	X	X	X
Calcium supplements	**A.3:** In populations with low dietary calcium intake, daily calcium supplementation (1.5–2.0 g oral elemental calcium) is recommended for pregnant women to reduce the risk of pre-eclampsia.[g]	Context-specific recommendation	X	X	X	X	X	X	X	X
Vitamin A supplements	**A.4:** Vitamin A supplementation is only recommended for pregnant women in areas where vitamin A deficiency is a severe public health problem,[h] to prevent night blindness.[i]	Context-specific recommendation	X	X	X	X	X	X	X	X
Zinc supplements	**A.5:** Zinc supplementation for pregnant women is only recommended in the context of rigorous research.	Context-specific recommendation (research)								
Multiple micronutrient supplements	**A.6:** Multiple micronutrient supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes.	Not recommended								
Vitamin B6 (pyridoxine) supplements	**A.7:** Vitamin B6 (pyridoxine) supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes.	Not recommended								

continued

e. The equivalent of 120 mg of elemental iron equals 600 mg of ferrous sulfate heptahydrate, 360 mg of ferrous fumarate or 1000 mg of ferrous gluconate.
f. This recommendation supersedes the previous recommendation in the 2012 WHO publication *Guideline: intermittent iron and folic acid supplementation in non-anaemic pregnant women* (55).
g. This recommendation is consistent with the 2011 *WHO recommendations for prevention and treatment of pre-eclampsia and eclampsia* (57) and supersedes the previous recommendation found in the 2013 WHO publication *Guideline: calcium supplementation in pregnant women* (38).
h. Vitamin A deficiency is a severe public health problem if 5% of women in a population have a history of night blindness in their most recent pregnancy in the previous 3–5 years that ended in a live birth, or if 20% of pregnant women have a serum retinol level < 0.70 µmol/L. Determination of vitamin A deficiency as a public health problem involves estimating the prevalence of deficiency in a population by using specific biochemical and clinical indicators of vitamin A status.
i. This recommendation supersedes the previous recommendation found in the 2011 WHO publication *Guideline: vitamin A supplementation in pregnant women* (60).

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Type of intervention	Recommendation	Type of recommendation	Eight scheduled ANC contacts (weeks of gestation)							
			1 (12 weeks)	**2** (20 weeks)	**3** (26 weeks)	**4** (30 weeks)	**5** (34 weeks)	**6** (36 weeks)	**7** (38 weeks)	**8** (40 weeks)
Vitamin E and C supplements	**A.8:** Vitamin E and C supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes.	Not recommended								
Vitamin D supplements	**A.9:** Vitamin D supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes.[j]	Not recommended								
Restricting caffeine intake	**A.10.1:** For pregnant women with high daily caffeine intake (more than 300 mg per day),[k] lowering daily caffeine intake during pregnancy is recommended to reduce the risk of pregnancy loss and low-birth-weight neonates.	Context-specific recommendation	X	X	X	X	X	X	X	X
B. Maternal and fetal assessment[l]										
Anaemia	**B.1.1:** Full blood count testing is the recommended method for diagnosing anaemia in pregnancy. In settings where full blood count testing is not available, on-site haemoglobin testing with a haemoglobinometer is recommended over the use of the haemoglobin colour scale as the method for diagnosing anaemia in pregnancy.	Context-specific recommendation	X		X			X		
Asymptomatic bacteriuria (ASB)	**B.1.2:** Midstream urine culture is the recommended method for diagnosing asymptomatic bacteriuria (ASB) in pregnancy. In settings where urine culture is not available, on-site midstream urine Gram-staining is recommended over the use of dipstick tests as the method for diagnosing ASB in pregnancy.	Context-specific recommendation	X		X		X			

continued

j. This recommendation supersedes the previous recommendation found in the 2012 WHO publication Guideline: vitamin D supplementation in pregnant women (75).
k. This includes any product, beverage or food containing caffeine (i.e. brewed coffee, tea, cola-type soft drinks, caffeinated energy drinks, chocolate, caffeine tablets).
l. Evidence on essential ANC activities, such as measuring maternal blood pressure, proteinuria and weight, and checking for fetal heart sounds, was not assessed by the GDG as these activities are considered to be part of good clinical practice.

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continued

Type of intervention	Recommendation	Type of recommendation	Eight scheduled ANC contacts (weeks of gestation)							
			1 (12 weeks)	**2** (20 weeks)	**3** (26 weeks)	**4** (30 weeks)	**5** (34 weeks)	**6** (36 weeks)	**7** (38 weeks)	**8** (40 weeks)
Intimate partner violence (IPV)	**B.1.3:** Clinical enquiry about the possibility of intimate partner violence (IPV) should be strongly considered at antenatal care visits when assessing conditions that may be caused or complicated by IPV in order to improve clinical diagnosis and subsequent care, where there is the capacity to provide a supportive response (including referral where appropriate) and where the WHO minimum requirements are met.m n	Context-specific recommendation	X	X	X	X	X	X	X	X
Gestational diabetes mellitus (GDM)	**B.1.4:** Hyperglycaemia first detected at any time during pregnancy should be classified as either, gestational diabetes mellitus (GDM) or diabetes mellitus in pregnancy, according to WHO 2013 criteria.o	Recommended	X	X	X	X	X	X	X	X
Tobacco use	**B.1.5:** Health-care providers should ask all pregnant women about their tobacco use (past and present) and exposure to second-hand smoke as early as possible in the pregnancy and at every antenatal care visit.p	Recommended	X	X	X	X	X	X	X	X
Substance use	**B.1.6:** Health-care providers should ask all pregnant women about their use of alcohol and other substances (past and present) as early as possible in the pregnancy and at every antenatal care visit.q	Recommended	X	X	X	X	X	X	X	X

continued

m. Minimum requirements are: a protocol/standard operating procedure; training on how to ask about IPV, and on how to provide the minimum response or beyond; private setting; confidentiality ensured; system for referral in place; and time to allow for appropriate disclosure.

n. This recommendation is consistent with the 2013 publication *Responding to intimate partner violence and sexual violence against women: WHO clinical and policy guidelines* (86).

o. This is not a recommendation on routine screening for hyperglycaemia in pregnancy. It has been adapted and integrated from the 2013 WHO publication Diagnostic criteria and classification of hyperglycaemia first detected in pregnancy (94), which states that GDM should be diagnosed at any time in pregnancy if one or more of the following criteria are met:
- fasting plasma glucose 5.1–6.9 mmol/L (92–125 mg/dL)
- 1-hour plasma glucose ≥10.0 mmol/L (180 mg/dL) following a 75g oral glucose load
- 2-hour plasma glucose 8.5–11.0 mmol/L (153–199 mg/dL) following a 75g oral glucose load.

Diabetes mellitus in pregnancy should be diagnosed if one or more of the following criteria are met:
- fasting plasma glucose ≥7.0 mmol/L (126 mg/dL)
- 2-hour plasma glucose ≥11.1 mmol/L (200 mg/dL) following a 75g oral glucose load
- random plasma glucose ≥11.1 mmol/L (200 mg/dL) in the presence of diabetes symptoms.

p. Integrated from the 2013 publication WHO recommendations for the prevention and management of tobacco use and second-hand smoke exposure in pregnancy (96).

q. Integrated from the 2014 WHO publication *Guidelines for the identification and management of substance use and substance use disorders in pregnancy* (97).

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Chapter 9: Maternal health

continued

Type of intervention	Recommendation	Type of recommendation	Eight scheduled ANC contacts (weeks of gestation)							
			1 (12 weeks)	**2** (20 weeks)	**3** (26 weeks)	**4** (30 weeks)	**5** (34 weeks)	**6** (36 weeks)	**7** (38 weeks)	**8** (40 weeks)
Human immunodeficiency virus (HIV) and syphilis	**B.1.7:** In high prevalence settings,[r] provider-initiated testing and counselling (PITC) for HIV should be considered a routine component of the package of care for pregnant women in all antenatal care settings. In low-prevalence settings, PITC can be considered for pregnant women in antenatal care as a key component of the effort to eliminate mother-to-child transmission of HIV, and to integrate HIV testing with syphilis, viral or other key tests, as relevant to the setting, and to strengthen the underlying maternal and child health systems.[s]	Recommended	X							
Tuberculosis (TB)	**B.1.8:** In settings where the tuberculosis (TB) prevalence in the general population is 100/100 000 population or higher, systematic screening for active TB should be considered for pregnant women as part of antenatal care.[t]	Context-specific recommendation	X							
Daily fetal movement counting	**B.2.1:** Daily fetal movement counting, such as with "count-to-ten" kick charts, is only recommended in the context of rigorous research.	Context-specific recommendation (research)								
Symphysis-fundal height (SFH) measurement	**B.2.2:** Replacing abdominal palpation with symphysis-fundal height (SFH) measurement for the assessment of fetal growth is not recommended to improve perinatal outcomes. A change from what is usually practiced (abdominal palpation or SFH measurement) in a particular setting is not recommended.	Context-specific recommendation	X	X	X	X	X	X	X	X
Antenatal cardio-tocography	**B.2.3:** Routine antenatal cardiotocography[u] is not recommended for pregnant women to improve maternal and perinatal outcomes.	Not recommended								

continued

r. High-prevalence settings are defined in the 2015 WHO publication *Consolidated guidelines on HIV testing services as settings with greater than 5% HIV prevalence in the population being tested* (98). Low-prevalence settings are those with less than 5% HIV prevalence in the population being tested. In settings with a generalized or concentrated HIV epidemic, retesting of HIV-negative women should be performed in the third trimester because of the high risk of acquiring HIV infection during pregnancy; please refer to Recommendation B.1.7 for details.

s. Adapted and integrated from the 2015 WHO publication *Consolidated guidelines on HIV testing services* (98).

t. Adapted and integrated from the 2013 WHO publication *Systematic screening for active tuberculosis: principles and recommendations* (105).

u. Cardiotocography (CTG) is a continuous recording of the fetal heart rate and uterine contractions obtained via an ultrasound transducer placed on the mother's abdomen.

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continued

Type of intervention	Recommendation	Type of recommendation	Eight scheduled ANC contacts (weeks of gestation)							
			1 (12 weeks)	**2** (20 weeks)	**3** (26 weeks)	**4** (30 weeks)	**5** (34 weeks)	**6** (36 weeks)	**7** (38 weeks)	**8** (40 weeks)
Ultrasound scan	**B.2.4:** One ultrasound scan before 24 weeks of gestation (early ultrasound) is recommended for pregnant women to estimate gestational age, improve detection of fetal anomalies and multiple pregnancies, reduce induction of labour for post-term pregnancy, and improve a woman's pregnancy experience.	Recommended	X	X	X	X	X	X	X	X
Doppler ultrasound of fetal blood vessels	**B.2.5:** Routine Doppler ultrasound examination is not recommended for pregnant women to improve maternal and perinatal outcomes.[v]	Not recommended								
C. Preventive measures										
Antibiotics for asymptomatic bacteriuria (ASB)	**C.1:** A seven-day antibiotic regimen is recommended for all pregnant women with asymptomatic bacteriuria (ASB) to prevent persistent bacteriuria, preterm birth and low birth weight.	Recommended	X		X		X			
Antibiotic prophylaxis to prevent recurrent urinary tract infections	**C.2:** Antibiotic prophylaxis is only recommended to prevent recurrent urinary tract infections in pregnant women in the context of rigorous research.	Context-specific recommendation (research)								
Antenatal anti-D immunoglobulin administration	**C.3:** Antenatal prophylaxis with anti-D immunoglobulin in non-sensitized Rh-negative pregnant women at 28 and 34 weeks of gestation to prevent RhD alloimmunization is only recommended in the context of rigorous research.	Context-specific recommendation (research)								
Preventive anthelminthic treatment	**C.4:** In endemic areasw, preventive anthelminthic treatment is recommended for pregnant women after the first trimester as part of worm infection reduction programmes.x	Context-specific recommendation		X						

continued

v. Doppler ultrasound technology evaluates umbilical artery (and other fetal arteries) waveforms to assess fetal well-being in the third trimester of pregnancy.

w. Areas with greater than 20% prevalence of infection with any soil-transmitted helminths.

x. Consistent with the 2016 WHO publication *Guideline: preventive chemotherapy to control soil-transmitted helminth infections in high-risk groups* (140).

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continued

Type of intervention	Recommendation	Type of recommendation	Eight scheduled ANC contacts (weeks of gestation)							
			1 (12 weeks)	**2** (20 weeks)	**3** (26 weeks)	**4** (30 weeks)	**5** (34 weeks)	**6** (36 weeks)	**7** (38 weeks)	**8** (40 weeks)
Tetanus toxoid vaccination	**C.5:** Tetanus toxoid vaccination is recommended for all pregnant women, depending on previous tetanus vaccination exposure, to prevent neonatal mortality from tetanus.[y]	Recommended		X						
Malaria prevention: Intermittent preventive treatment in pregnancy (IPTp)	**C.6:** In malaria-endemic areas in Africa, intermittent preventive treatment with sulfadoxine-pyrimethamine (IPTp-SP) is recommended for all pregnant women. Dosing should start in the second trimester, and doses should be given at least one month apart, with the objective of ensuring that at least three doses are received.[z]	Context-specific recommendation	X (13 weeks)	X	X	X		X		X
Pre-exposure prophylaxis for HIV prevention	**C.7:** Oral pre-exposure prophylaxis (PrEP) containing tenofovir disoproxil fumarate (TDF) should be offered as an additional prevention choice for pregnant women at substantial risk of HIV infection as part of combination prevention approaches.[aa]	Context-specific recommendation								
D. Interventions for common physiological symptoms										
Nausea and vomiting	**D.1:** Ginger, chamomile, vitamin B6 and/or acupuncture are recommended for the relief of nausea in early pregnancy, based on a woman's preferences and available options.	Recommended	X	X	X	X	X	X	X	X
Heartburn	**D.2:** Advice on diet and lifestyle is recommended to prevent and relieve heartburn in pregnancy. Antacid preparations can be used to women with troublesome symptoms that are not relieved by lifestyle modification.	Recommended	X	X	X	X	X	X	X	X
Leg cramps	**D.3:** Magnesium, calcium or non-pharmacological treatment options can be used for the relief of leg cramps in pregnancy, based on a woman's preferences and available options.	Recommended	X	X	X	X	X	X	X	X

continued

y. This recommendation is consistent with the 2006 WHO guideline on *Maternal immunization against tetanus* (134). The dosing schedule depends on the previous tetanus vaccination exposure; please refer to Recommendation C.5 for details.

z. Integrated from the 2015 WHO publication *Guidelines for the treatment of malaria*, which also states: "WHO recommends that, in areas of moderate-to-high malaria transmission of Africa, IPTp-SP be given to all pregnant women at each scheduled antenatal care visit, starting as early as possible in the second trimester, provided that the doses of SP are given at least 1 month apart. WHO recommends a package of interventions for preventing malaria during pregnancy, which includes promotion and use of insecticide-treated nets, as well as IPTp-SP" (153). To ensure that pregnant women in endemic areas start IPTp-SP as early as possible in the second trimester, policy-makers should ensure health system contact with women at 13 weeks of gestation.

aa. Integrated from the 2015 WHO publication *Guideline on when to start antiretroviral therapy and on pre-exposure prophylaxis for HIV* (99). Substantial risk of HIV infection is defined by an incidence of HIV infection in the absence of PrEP that is sufficiently high (> 3% incidence) to make offering PrEP potentially cost-saving (or cost–effective). Offering PrEP to people at substantial risk of HIV infection maximizes the benefits relative to the risks and costs.

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Chapter 9: Maternal health

continued

Type of intervention	Recommendation	Type of recommendation	Eight scheduled ANC contacts (weeks of gestation)							
			1 (12 weeks)	**2** (20 weeks)	**3** (26 weeks)	**4** (30 weeks)	**5** (34 weeks)	**6** (36 weeks)	**7** (38 weeks)	**8** (40 weeks)
Low back and pelvic pain	**D.4:** Regular exercise throughout pregnancy is recommended to prevent low back and pelvic pain. There are a number of different treatment options that can be used, such as physiotherapy, support belts and acupuncture, based on a woman's preferences and available options.	Recommended	X	X	X	X	X	X	X	X
Constipation	**D.5:** Wheat bran or other fibre supplements can be used to relieve constipation in pregnancy if the condition fails to respond to dietary modification, based on a woman's preferences and available options.	Recommended	X	X	X	X	X	X	X	X
Varicose veins and oedema	**D.6:** Non-pharmacological options, such as compression stockings, leg elevation and water immersion, can be used for the management of varicose veins and oedema in pregnancy, based on a woman's preferences and available options.	Recommended	X	X	X	X	X	X	X	X
E: Health systems interventions to improve utilization and quality of antenatal care										
Woman-held case notes	**E.1:** It is recommended that each pregnant woman carries her own case notes during pregnancy to improve continuity, quality of care and her pregnancy experience.	Recommended	X	X	X	X	X	X	X	X
Midwife-led continuity of care	**E.2:** Midwife-led continuity of care models, in which a known midwife or small group of known midwives supports a woman throughout the antenatal, intrapartum and postnatal continuum, are recommended for pregnant women in settings with well functioning midwifery programmes.	Context-specific recommendation	X	X	X	X	X	X	X	X
Group antenatal care	**E.3:** Group antenatal care provided by qualified health-care professionals may be offered as an alternative to individual antenatal care for pregnant women in the context of rigorous research, depending on a woman's preferences and provided that the infrastructure and resources for delivery of group antenatal care are available.	Context-specific recommendation (research)	X	X	X	X	X	X	X	X

continued

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continued

Type of intervention	Recommendation	Type of recommendation	Eight scheduled ANC contacts (weeks of gestation)							
			1 (12 weeks)	**2** (20 weeks)	**3** (26 weeks)	**4** (30 weeks)	**5** (34 weeks)	**6** (36 weeks)	**7** (38 weeks)	**8** (40 weeks)
Community-based interventions to improve communication and support	**E.4.1:** The implementation of community mobilization through facilitated participatory learning and action (PLA) cycles with women's groups is recommended to improve maternal and newborn health, particularly in rural settings with low access to health services.ab Participatory women's groups represent an opportunity for women to discuss their needs during pregnancy, including barriers to reaching care, and to increase support to pregnant women.	Context-specific recommendation	X	X	X	X	X	X	X	X
	E.4.2: Packages of interventions that include household and community mobilization and antenatal home visits are recommended to improve antenatal care utilization and perinatal health outcomes, particularly in rural settings with low access to health services.	Context-specific recommendation	X	X	X	X	X	X	X	X
Task shifting components of antenatal care delivery[ac]	**E.5.1:** Task shifting the promotion of health-related behaviours for maternal and newborn healthad to a broad range of cadres, including lay health workers, auxiliary nurses, nurses, midwives and doctors is recommended.	Recommended	X	X	X	X	X	X	X	X
	E.5.2: Task shifting the distribution of recommended nutritional supplements and intermittent preventive treatment in pregnancy (IPTp) for malaria prevention to a broad range of cadres, including auxiliary nurses, nurses, midwives and doctors is recommended.	Recommended	X	X	X	X	X	X	X	X
Recruitment and retention of staff in rural and remote areas[ae]	**E.6:** Policy-makers should consider educational, regulatory, financial, and personal and professional support interventions to recruit and retain qualified health workers in rural and remote areas.	Context-specific recommendation	X	X	X	X	X	X	X	X
Antenatal care contact schedules	**E.7:** Antenatal care models with a minimum of eight contacts are recommended to reduce perinatal mortality and improve women's experience of care.	Recommended	X	X	X	X	X	X	X	X

ab. Integrated from the 2014 publication WHO recommendations on community mobilization through facilitated participatory learning and action cycles with women's groups for maternal and newborn health (183).

ac. Including promotion of the following: care-seeking behaviour and ANC utilization; birth preparedness and complication readiness; sleeping under insecticide-treated bednets; skilled care for childbirth; companionship in labour and childbirth; nutritional advice; nutritional supplements; other context-specific supplements and interventions; HIV testing during pregnancy; exclusive breastfeeding; postnatal care and family planning; immunization according to national guidelines.

ad. Recommendations adapted and integrated from the 2012 WHO guideline on Optimizing health worker roles to improve access to key maternal and newborn health interventions through task shifting (OptimizeMNH) (201).

ae. Adapted and integrated from the 2010 WHO publication Increasing access to health workers in remote and rural areas through improved retention: global policy recommendations (202).

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Appendix 2: Diagnosis of pregnancy

It is important that providers of maternity care can reliably confirm pregnancy. A broad range of techniques are available for the diagnosis of pregnancy and different methods may be used in particular settings depending on their affordability and feasibility.

Clinical diagnosis of pregnancy

Diagnosis of pregnancy by clinical (non-laboratory) means relies on the detection, through a careful medical history and physical examination, of the signs and symptoms associated with pregnancy.

The most important symptom is amenorrhoea which, when it is accompanied by other symptoms, is highly suggestive of pregnancy. Pelvic examination by a trained provider is useful in the diagnosis of pregnancy after 6 weeks of gestation; however, it is dependent on the skill of the provider, gestational age, and physique/build/body shape of the pregnant individual.

It should be remembered that characteristic findings on history and physical examination are not highly sensitive for diagnosis but help the healthcare provider distinguish normal pregnancy from coexisting disorders.

Symptoms of pregnancy

- Absent menses (amenorrhoea)
  - Pregnancy should be suspected whenever an individual in their reproductive years has a delay or new irregularities in menstruation if they have been sexually active (even if using contraception)
  - Irregular and/or painful bleeding can be a sign of ectopic pregnancy or miscarriage
    - Nausea (with or without vomiting) and changes in appetite
    - Persistent fatigue
    - Breast tenderness and breast enlargement
    - Increased frequency of urination
    - Perception of fetal movements (a late sign, between 16 and 20 weeks of pregnancy)

Signs of pregnancy

- Uterine softness, roundness, and enlargement begins to be noticeable at 6 weeks of pregnancy
- Hegar's sign becomes manifest at about 6 weeks of pregnancy. The isthmus between the cervix and the body of the uterus is felt to be soft and compressible on bimanual pelvic examination
- Uterine pulsations may be a helpful sign of pregnancy at less than 6 weeks
- The enlarged uterus is palpable above the pubic symphysis after 12 weeks
- Fetal heart tones are detectable with a stethoscope starting at 18–20 weeks
- Fetal movements can be perceived by the examiner starting at 18–20 weeks

If there is any lack of certainty, the next step is to confirm the pregnancy using clinical examination with laboratory methods and/or ultrasound (see *Chapter 4: Contraception, Box 3*).

Appendix 3: Birth and emergency plan

A birth and emergency plan is a document recording the pregnant individual's preferences and plans for labour and delivery, including what to do in possible emergency situations.

At the first antenatal contact, the healthcare provider should initiate discussions with the client using the information below, as the basis for developing a detailed birth and emergency plan. The provider should support the client by reviewing the birth and emergency plan at each subsequent contact to further develop and adjust it, considering any changes in risk factors for the client or fetus or changes in the client's wishes.

Explain why birth in a facility is recommended

- Any complication can develop during delivery – they do not happen only to those with risk factors and are often unpredictable.
- A facility should have required staff, equipment, supplies, and drugs available to provide the best care if needed, as well as a referral system.
- Clients who are living with HIV will need appropriate antiretroviral treatment for themselves and for the baby during childbirth.
- Complications are more common in pregnant individuals who are living with HIV and their newborns. These deliveries should take place in a facility.

Review and advise on arrangements for delivery and preparations in case of emergency

- How will the client get to the facility?
- Will they have to pay for transport, and/or for delivery at the facility? If so, how much?
- How will they pay? (e.g. do they need to start saving)
- Who will provide companionship/support during labour and delivery?
- Who will help care for their home and other children in their absence?

Advise when to go to the facility

- Clients who live near the facility should go at the first signs of labour or if there are any danger signs (see below).
- Clients who live far from the facility should go 2–3 weeks before the baby's due date and stay at the maternity waiting home, if there is one, or with family or friends near the facility.

Advise what to take to the facility

- Home-based maternal record.
- Clean cloths, towels, and/or blankets for washing, drying, and wrapping the baby.
- Sanitary pads, if available, or additional clean cloths to use as sanitary pads after the birth.
- Cloth or newborn-size disposable nappies for baby.
- Clothes for themselves and the baby, including a hat and socks for baby.
- Food and water for themselves and the support person.

Advise on signs of labour

Advise to go to the facility or contact the skilled birth attendant if they experience any of the following signs:

- a bloody, sticky discharge
- painful contractions every 20 minutes or less
- waters have broken

Advise on danger signs

Advise to go to the health facility ***immediately*** *if they experience any of the following signs:*

- vaginal bleeding
- convulsions
- severe headache with blurred vision
- fever and too weak to get out of bed
- severe abdominal pain
- fast or difficult breathing

Advise to go to the health facility ***as soon as possible*** *if they experience any of the following signs:*

- fever
- abdominal pain
- feeling ill
- swelling of fingers, face, legs

Source: Adapted from World Health Organization, United Nations Population Fund, World Bank and United Nations Children's Fund. Pregnancy, childbirth, postpartum and newborn care: a guide for essential practice. Third edition. Geneva: WHO; 2015. https://apps.who.int/iris/handle/10665/249580. Accessed 19 November 2019.

Appendix 4: Triage for antenatal, intrapartum, and post-natal care

The healthcare provider responsible for initial reception of pregnant individuals and newborns should be competent to conduct triage and to start resuscitation if required.

The healthcare facility should have a clear policy on:

- when to refer, and
- the referral procedure, including:
  - agreement with suitable facilities for upward referral
  - transport arrangements including who should accompany the client
  - copies of record card or notes
  - follow-up of those clients referred for care in other facilities

Key principles

- Assess the general condition of any pregnant, labouring, or post-partum individual arriving at the facility (see details below).
- If the client is unable to speak because they are too unwell, ask the accompanying person to describe the client's condition and needs and refer to written health records.
- Repeat the assessment periodically until medical issues are resolved.

Clinical assessment

History: Why did you come? Is it for youself or the baby? What is the concern? How old is the baby?

Examination:

- Assess the client's general condition.
- Assess the baby's condition.
- Observe vital signs: take temperature and blood pressure.

What to do	
Adult pregnant or post-partum individual	**Newborn**
TREAT AS EMERGENCY IF • unconscious (unable to talk) • bleeding vaginally • convulsing • severe abdominal pain • fever • headache and visual disturbance • severe difficulty breathing • severe vomiting	**TREAT AS EMERGENCY IF** • very small • having convulsions • difficulty breathing • heavy hypotonia • hypothermia (moderate <36°C; severe <32°C) • just been delivered • any maternal concern
ACTION • call for help • transfer immediately to treatment room for full assessment and management • ensure that the client and/or companion are fully informed • transfer to delivery room for assessment if in labour or delivery is imminent	**ACTION** • ask parent to stay with the baby • transfer the baby to the treatment room for immediate newborn care
TREAT AS ROUTINE IF • no danger signs	**TREAT AS ROUTINE IF** • no danger signs or maternal complaints

Source: Adapted from World Health Organization, United Nations Population Fund, World Bank and United Nations Children's Fund. Pregnancy, childbirth, postpartum and newborn care: a guide for essential practice. Third edition. Geneva: WHO; 2015. https://apps.who.int/iris/handle/10665/249580. Accessed 26 November 2019.

Appendix 5: Initial assessment of an individual presenting with possible labour or ruptured membranes

History: Ask the client	• Are you having contractions? If so: How strong? How often? How long do they last? When did they begin? • Have your waters broken (prelabour rupture of membranes)? If yes, when? Were they clear or green? (see *Section 3.2.1* on PROM at term) • Have you had any bleeding? If yes, when? How much? • Is the baby moving? • Is there anything else you are concerned about?
Check the record (or ask the client/ accompanying person	• Based on estimated date of delivery, calculate current weeks of pregnancy to check if preterm (<37 weeks) (if preterm, refer to *Section 4.4*) • Review the birth plan • If any prior pregnancies: How many prior pregnancies/deliveries? Any prior caesarean deliveries, forceps or vacuum, or other complications such as post-partum haemorrhage? Any prior third- or fourth-degree tears? • Current pregnancy: Rapid plasma reagin status, haemoglobin results, tetanus immunization status, HIV status • Infant feeding plan • Any current medication
Examination	• Observe response to contractions: Coping well or distressed? Pushing or grunting? • Check abdomen for caesarean delivery scar and/or horizontal ridge across lower abdomen; this may be a sign of obstructed labour (if present, empty bladder and observe again) • Feel abdomen for frequency and duration of contractions: Are there any continuous contractions? Is the fetal lie longitudinal or transverse? Is fetal presentation head, breech, other? • If no ultrasound of this pregnancy, check for >1 fetus (3 fetal poles on palpation) and for fetal movement • Listen to fetal heartbeat with Pinard or Doppler: Count number of beats in 1 minute; if <100 or >180 beats/minute, turn the client on their left side and count again • Measure blood pressure • Measure temperature • Look for pallor • Look for sunken eyes, dry mouth • Pinch the skin of the forearm: Does it go back quickly?
Warning signs to look out for during admission and labour	• Bleeding • Severe abdominal pain • Severe headache or visual disturbance • Breathing difficulty • Fever or chills • Difficulty emptying bladder • Epigastric pain

Source: World Health Organization, United Nations Population Fund, World Bank and United Nations Children's Fund. Pregnancy, childbirth, postpartum and newborn care: a guide for essential practice. Third edition. Geneva: WHO; 2015. https://apps.who.int/iris/handle/10665/249580. Accessed 25 April 2022.

Appendix 6: Treatment of severe pre-eclampsia and eclampsia

1: Give magnesium sulphate intravenous (IV) + intramuscular (IM) combined dose (loading dose) (see *Table 1*)

- Insert IV line and:
  - give fluids slowly (normal saline or Ringer's lactate): 1 litre over 6–8 hours (3 ml/minute)
  - give 4 g magnesium sulphate (20 ml of 20 per cent solution) slowly over 20 minutes

AND

- Administer IM injection:
  - 10 g magnesium sulphate: 5 g (10 ml of 50 per cent solution) IM deep in upper outer quadrant of each buttock with 1 ml of 2 per cent lignocaine in the same syringe.

If unable to give IV, only give the IM dose as above.

Also:

- Help the client onto their left side and protect them from fall and injury.
- Place padded tongue blades between the client's teeth to prevent a tongue bite and secure it to prevent aspiration (DO NOT attempt this during a convulsion).

Antihypertensive medications should be started if the systolic blood pressure is 160 mm Hg or higher and/or the diastolic blood pressure is 100 mm Hg or higher (see *Table 2* – next page). It is important to maintain blood pressure above the lower limits of normal. While the intravenous route is preferred for acute treatment of severe hypertension, if this is not available or feasible, oral treatment can be given.

TABLE 1: Formulations of magnesium sulphate

		50 per cent solution	20 per cent solution
Route	Dose	Vial containing 5 g in 10 ml (1 g/2 ml)	To make 10 ml of 20 per cent solution, add 4 ml 50 per cent solution to 6 ml sterile water
IM	5 g	10 ml + 1 ml 2 per cent lignocaine in the same syringe	Not applicable
IV	4 g	8 ml	20 ml
IV	2 g	4 ml	10 ml

TABLE 2: Antihypertensive medications and dosing options for acute treatment of severe hypertension

Antihypertensive option	Dosing
Hydralazine	Intravenous treatment: • Administer 5 mg IV, slowly • Repeat every 5 minutes until the blood pressure goal has been achieved • Repeat hourly as needed or give 12.5 mg IM every 2 hours as needed • Maximum dose is 20 mg per 24 hours
Labetalol	Oral treatment: • Administer 200 mg • Repeat dose after 1 hour until treatment goal is achieved • Maximum does is 1200 mg in 24 hours Intravenous treatment: • Administer 10 mg IV • If response is inadequate after 10 minutes, administer 20 mg IV • The dose can be doubled to 40 mg and then 80 mg with 10-minute intervals between each increased dose until blood pressure is lowered below threshold • Maximum total dose in 300 mg; then switch to oral treatment Note: Clients with congestive heart failure, hypovolaemic shock, or predisposition to bronchospasm (asthma) should not receive labetalol
Nifedipine immediate-release capsule	Oral treatment: • Administer 5–10 mg orally • Repeat dose after 30 minutes if response is inadequate until optimal blood pressure is reached • Maximum total dose is 30 mg in the acute treatment setting – other options should be considered if blood pressure is not lowered within 90 minutes of receipt of 30 mg
Alpha methyldopa	Oral treatment: • Administer 750 mg orally • Repeat dose after 3 hours until the treatment goal is achieved • Maximum dose is 3 g in 24 hours

2: If convulsions recur

- After 15 minutes of treatment, give an additional 2 g magnesium sulphate IV (10 ml of 20 per cent solution) slowly over 20 minutes (rapid injection can cause respiratory failure or death).
- If convulsions continue, give diazepam.*

  Loading dose IV:
  - Give 10 mg diazepam IV, slowly over 2 minutes.
  - If convulsions recur, give a repeat dose of 10 mg.

* Guidance is to give diazepam if convulsions occur in early pregnancy or if magnesium sulphate toxicity occurs or magnesium sulphate is not available.

Maintenance dose:

- Give 40 mg diazepam in 500 ml IV fluids (normal saline or Ringer's lactate), titrated over 6–8 hours to keep the client sedated but rousable.
- Stop the maintenance dose if breathing less than 16 breaths/minute.
- Assist ventilation, if necessary, with mask and bag.
- Do not give more than 100 mg in 24 hours.

3: If referral is not possible, or if delayed, or the client is still in labour, continue treatment

- Give 5 g magnesium sulphate IM (10 ml of 50 per cent solution) with 1 ml of 2 per cent lignocaine in the same syringe every 4 hours in alternate buttocks until 24 hours after birth or after the last convulsion (whichever is later).
- Monitor urine output: collect urine; measure and record the quantity.
- Before giving each subsequent dose of magnesium sulphate, ensure:
  - knee-jerk reflex is present
  - urine output is greater than 100 ml/4 hours
  - respiratory rate is greater than 16 breaths/minute.
- DO NOT give the next dose if there are any signs of magnesium toxicity:
  - knee-jerk reflex is absent
  - urine output less than 100 ml/4 hours
  - respiratory rate is less than 16 breaths/minute
- If there are signs of magnesium toxicity, give 1 g calcium gluconate IV (10 ml of 10 per cent solution) over 10 minutes.

Source: World Health Organization, United Nations Population Fund, World Bank and United Nations Children's Fund. Pregnancy, childbirth, postpartum and newborn care: a guide for essential practice. Third edition. Geneva: WHO; 2015. https://apps.who.int/iris/handle/10665/249580. Accessed 26 November 2019. World Health Organization. Managing complications in pregnancy and childbirth: a guide for midwives and doctors. Second edition. Geneva: WHO; 2017. https://apps.who.int/iris/bitstream/handle/10665/255760/9789241565493-eng.pdf. Accessed 26 November 2019.

Appendix 7: Basic newborn resuscitation

Some babies may require help to establish normal breathing at delivery. Most of these infants only need supported perinatal transition into the extra-uterine environment rather than resuscitation.

Babies born at less than 37 weeks of gestation have a higher chance of requiring resuscitation, particularly if the individual has an infection or a multiple pregnancy (twins or more), and the baby has any signs during delivery of abnormal fetal heart rate or the presence of meconium.

What is normal and what is abnormal?

- A healthy infant might be born with a bluish hue but will have good tone, will cry within a few seconds of delivery, and will have a good heart rate within a few minutes of birth (the heart rate of a healthy newborn is about 120–150 beats/minute).
- A less healthy infant will be blue at birth, will have less good tone, may have a slow heart rate (less than 100 beats/minute), and may not establish adequate breathing by 90–120 seconds after birth.
- An unwell infant will be born pale and floppy, not breathing, and with a slow, very slow, or undetectable heart rate.

Key principles

- **Be prepared**: Be aware that resuscitation may be required (call for help in advance if needed) if there have been any antenatal or intrapartum events or concerns regarding the fetal condition.
- **Delay cord clamping**: The cord should not be clamped earlier than 1 minute after birth (preferably 3 minutes) to increase the transition time to the extra-uterine environment for uncompromised term or preterm babies.
- **Keep the baby warm**: Keep the baby's temperature between 36.6°C and 37.5°C and stimulate breathing with thorough drying, removing any wet towels.
- **Rub the baby's back and use positive pressure ventilation**: Newly born babies who do not breathe spontaneously after thorough drying should be stimulated by rubbing the back 2–3 times before clamping the cord and initiating positive pressure ventilation.
- **Assessment**: Assess breathing, heart rate (with a stethoscope), and tone.

What to do for newborns who do not start breathing despite thorough drying and additional stimulation

- Positive pressure ventilation should be initiated within 1 minute after birth after opening the airway by giving five inflation breaths.
- This should not be delayed, but if the baby is floppy and was born through thick meconium it is reasonable to first inspect the oropharynx rapidly to remove potential obstructions.
- Positive pressure ventilation should be initiated with air using a self-inflating bag and face mask (not nasal tubing).
- Adequacy of positive pressure ventilation should be assessed by measurement of the heart rate after 60 seconds of ventilation with visible chest movements.
- If the newborn does not start breathing within 1 minute after birth, give priority to providing adequate ventilation rather than chest compressions.
- Reassess heart rate every 30 seconds.
- If there is no increase in heart rate, look for chest movements:
  - If the chest is not moving, recheck the head position, consider if help is required to keep the airway open, and repeat inflation breaths.
  - If the chest is moving but heart rate is not detectable, or very slow (<60 beats/minute), ventilate for 30 seconds.
  - Reassess heart rate. If it is still <60 beats/minute start chest compressions with inflation breaths using a ratio of 3:1.

When to stop resuscitation

- In newborns with no detectable heart rate after 10 minutes of effective ventilation, resuscitation should be stopped.
- In newborns who continue to have a heart rate below 60 beats/minute and no spontaneous breathing after 20 minutes of resuscitation, resuscitation should be stopped.
- Tracheal intubation should not be routine in the presence of meconium and should only be performed for suspected tracheal obstruction.

Note: If available, nasal continuous positive airways pressure (CPAP) rather than routine intubation may be used to provide initial respiratory support of all spontaneously breathing preterm infants with respiratory distress.

Recommendations on use of suction

The healthcare provider should use a bulb syringe (single use or easy to clean) rather than a mucous extractor with a trap to generate suction by aspiration if there is no mechanical equipment to generate negative pressure for suctioning.

Do	Do not	Not recommended
• Perform tracheal suctioning before initiating positive pressure ventilation in neonates born through meconium-stained amniotic fluid who do not start breathing on their own	• Suction mouth and nose in neonates born through clear amniotic fluid who start breathing on their own after birth • Suction the mouth and nose routinely before initiating positive pressure ventilation in neonates born through clear amniotic fluid who do not start breathing after thorough drying and rubbing the back 2–3 times (suctioning should be done only if the mouth or nose is full of secretions) • Perform tracheal suctioning in neonates born through meconium-stained amniotic fluid who start breathing on their own	• Intrapartum suctioning of the mouth and nose at the delivery of the head in the presence of meconium-stained amniotic fluid • Suctioning of the mouth or nose in neonates born through meconium-stained amniotic fluid who start breathing on their own

Source: World Health Organization. Guidelines on Basic Newborn Resuscitation. Geneva: WHO; 2012. Available at: http://apps.who.int/iris/bitstream/10665/75157/1/9789241503693_eng.pdf. Accessed 5 June 2020. Fawke J, Wyllie J, Madar J, et al. Newborn resuscitation and support of transition of infants at birth Guidelines. Resuscitation Council UK. May 2021. Available at: https://www.resus.org.uk/library/2021-resuscitation-guidelines/newborn-resuscitation-and-support-transition-infants-birth. Accessed 27 April 2022.