SECTION 1
CLINICAL PRINCIPLES

RAPID INITIAL ASSESSMENT

When a woman of childbearing age presents with a problem, rapidly assess her condition to determine her degree of illness.

TABLE C-1 Rapid initial assessment[a]

Assess	Danger Signs	Consider
Airway and breathing	**LOOK FOR:** • cyanosis (blueness) • respiratory distress **EXAMINE:** • skin: pallor • lungs: wheezing or rales	• severe anaemia • heart failure • pneumonia • asthma See **Difficulty in breathing, page S-125**
Circulation (signs of shock)	**EXAMINE:** • skin: cool and clammy • pulse: fast (110 or more) and weak • blood pressure: low (systolic less than 90 mm Hg)	**Shock, page S-1**
Vaginal bleeding (early or late pregnancy or after childbirth)	**ASK IF:** • pregnant, length of gestation • recently given birth • placenta delivered **EXAMINE:** • vulva: amount of bleeding, placenta retained, obvious tears • uterus: atony • bladder: full **DO NOT DO A VAGINAL EXAM AT THIS STAGE**	• abortion • ectopic pregnancy • molar pregnancy See **Vaginal bleeding in early pregnancy, page S-7** • abruptio placentae • ruptured uterus • placenta praevia See **Vaginal bleeding in later pregnancy and labour, page S-17** • atonic uterus • tears of cervix and vagina • retained placenta • inverted uterus See **Vaginal bleeding after childbirth, page S-25**
Unconscious or convulsing	**ASK IF:** • pregnant, length of gestation **EXAMINE:** • blood pressure: high (diastolic 90 mm Hg or more) • temperature: 38°C or more	• eclampsia • malaria • epilepsy • tetanus See **Convulsions or loss of consciousness, page S-35**

[a] This list does not include all the possible problems a woman may face in pregnancy or the puerperal period. It is meant to identify those problems that put the woman at greater risk of maternal morbidity and mortality.

TABLE C-1 Cont. Rapid initial assessment

Assess	Danger Signs	Consider
Dangerous fever	**ASK IF:** • weak, lethargic • frequent, painful urination **EXAMINE:** • temperature: 38°C or more • unconscious • neck: stiffness • lungs: shallow breathing, consolidation • abdomen: severe tenderness • vulva: purulent discharge • breasts: tender	• urinary tract infection • malaria See **Fever during pregnancy and labour, page S-99** • metritis • pelvic abscess • peritonitis • breast infection See **Fever after childbirth, page S-107** • complications of abortion See **Vaginal bleeding in early pregnancy, page S-7** • pneumonia See **Difficulty in breathing, page S-125**
Abdominal pain	**ASK IF:** • pregnant, length of gestation **EXAMINE:** • blood pressure: low (systolic less than 90 mm Hg) • pulse: fast (110 or more) • temperature: 38°C or more • uterus: state of pregnancy	• ovarian cyst • appendicitis • ectopic pregnancy See **Abdominal pain in early pregnancy, page S-115** • possible term or preterm labour • amnionitis • abruptio placentae • ruptured uterus See **Abdominal pain in later pregnancy and after childbirth, page S-119**

The woman also needs **prompt attention** if she has any of the following signs:

- blood-stained mucus discharge (show) with palpable contractions;
- ruptured membranes;
- pallor;

- weakness;
- fainting;
- severe headaches;
- blurred vision;
- vomiting;
- fever;
- respiratory distress.

Send the woman to the front of the queue and treat promptly.

IMPLEMENTING A RAPID INITIAL ASSESSMENT SCHEME

Rapid initiation of treatment requires immediate recognition of the specific problem and quick action. This can be done by:

- training all staff—including clerks, guards, door-keepers or switchboard operators—to react in an agreed upon fashion ("sound the alarm," call for help) when a woman arrives at the facility with an obstetric emergency or pregnancy complication or when the facility is notified that a woman is being referred;
- conducting clinical or emergency drills with staff to ensure their readiness at all levels;
- ensuring that access is not blocked (keys are available) and equipment is in working order (daily checks) and staff are properly trained to use it;
- having norms and protocols (and knowing how to use them) to recognize a genuine emergency and knowing how to react immediately;
- clearly identifying which women in the waiting room—even those waiting for routine consultations—warrant prompt or immediate attention from the health worker and should therefore pass to the front of the queue (agreeing that women in labour or pregnant women who have any of the problems noted in **Table C-1** should immediately be seen by a health worker);
- agreeing on schemes by which women with emergencies can be exempted from payment, at least temporarily (local insurance schemes, health committee emergency funds).

Pregnancy is typically a time of joy and anticipation. It can also be a time of anxiety and concern. Talking effectively with a woman and her family can help build the woman's trust and confidence in her health care providers.

Women who develop complications may have difficulty talking to the provider and explaining their problem. It is the responsibility of the entire health care team to speak with the woman respectfully and put her at ease. Focusing on the woman means that the health care provider and staff:

- respect the woman's dignity and right to privacy;
- are sensitive and responsive to the woman's needs;
- are non-judgmental about the decisions that the woman and her family have made thus far regarding her care.

It is understandable to disagree with a woman's risky behaviour or a decision which has resulted in a delay in seeking care. It is **not acceptable**, however, to show disrespect for a woman or disregard for a medical condition that is a result of her behaviour. Provide corrective counselling after the complication has been dealt with, not before or during management of the problem.

RIGHTS OF WOMEN

Providers should be aware of the rights of women when receiving maternity care services:

- Every woman receiving care has a right to information about her health.
- Every woman has the right to discuss her concerns in an environment in which she feels confident.
- A woman should know in advance the type of procedure that is going to be performed.
- A woman (or her family, if necessary) should give informed consent before the provider performs any procedure.
- Procedures should be conducted in an environment (e.g. labour ward) in which the woman's right to privacy is respected.
- A woman should be made to feel as comfortable as possible when receiving services.

- The woman has a right to express her views about the service she receives.

When a provider talks to a woman about her pregnancy or a complication, s/he should use basic communication techniques. These techniques help the provider establish an honest, caring and trusting relationship with the woman. If a woman trusts the provider and feels that s/he has the best interests of the woman at heart, she will be more likely to return to the facility for delivery or come early if there is a complication.

COMMUNICATION TECHNIQUES

Speak in a calm, quiet manner and assure the woman that the conversation is confidential. Be sensitive to any cultural or religious considerations and respect her views. In addition:

- Encourage the woman and her family to speak honestly and completely about events surrounding the complication.
- Listen to what the woman and her family have to say and encourage them to express their concerns; try not to interrupt.
- Respect the woman's sense of privacy and modesty by closing the door or drawing curtains around the examination table.
- Let the woman know that she is being listened to and understood.
- Use supportive nonverbal communication such as nodding and smiling.
- Answer the woman's questions directly in a calm, reassuring manner.
- Explain what steps will be taken to manage the situation or complication.
- Ask the woman to repeat back to you the key points to assure her understanding.

If a **woman must undergo a surgical procedure**, explain to her the nature of the procedure and its risks and help to reduce her anxiety. Women who are extremely anxious have a more difficult time during surgery and recovery.

For more information on providing emotional support during an emergency, see **page C-7**.

EMOTIONAL AND PSYCHOLOGICAL SUPPORT

Emergency situations are often very disturbing for all concerned and evoke a range of emotions that can have significant consequences.

EMOTIONAL AND PSYCHOLOGICAL REACTIONS

How each member of the family reacts to an emergency situation depends on the:

- marital status of the woman and her relationship with her partner;
- social situation of the woman/couple and their cultural and religious practices, beliefs and expectations;
- personalities of the people involved and the quality and nature of social, practical and emotional support;
- nature, gravity and prognosis of the problem and the availability and quality of the health care services.

Common reactions to obstetric emergencies or death include:

- denial (feelings of "it can't be true");
- guilt regarding possible responsibility;
- anger (frequently directed towards health care staff but often masking anger that parents direct at themselves for "failure");
- bargaining (particularly if the patient hovers for a while between life and death);
- depression and loss of self-esteem, which may be long-lasting;
- isolation (feelings of being different or separate from others), which may be reinforced by care givers who may avoid people who experience loss;
- disorientation.

GENERAL PRINCIPLES OF COMMUNICATION AND SUPPORT

While each emergency situation is unique, the following general principles offer guidance. Communication and genuine empathy are probably the most important keys to effective care in such situations.

AT THE TIME OF THE EVENT

- Listen to those who are distressed. The woman/family will need to discuss their hurt and sorrow.
- Do not change the subject and move on to easier or less painful topics of conversation. Show empathy.
- Tell the woman/family as much as you can about what is happening. Understanding the situation and its management can reduce their anxiety and prepare them for what happens next.
- Be honest. Do not hesitate to admit what you do not know. Maintaining trust matters more than appearing knowledgeable.
- If language is a barrier to communication, find a translator.
- Do not pass the problem on to nursing staff or junior doctors.
- Ensure that the woman has a companion of her choice and, where possible, the same care giver throughout labour and delivery. Supportive companionship can enable a woman to face fear and pain, while reducing loneliness and distress.
- Where possible, encourage companions to take an active role in care. Position the companion at the top of the bed to allow the companion to focus on caring for the woman's emotional needs.
- Both during and after the event, provide as much privacy as possible for the woman and her family.

AFTER THE EVENT

- Give practical assistance, information and emotional support.
- Respect traditional beliefs and customs and accommodate the family's needs as far as possible.
- Provide counselling for the woman/family and allow for reflection on the event.
- Explain the problem to help reduce anxiety and guilt. Many women/families blame themselves for what has happened.
- Listen and express understanding and acceptance of the woman's feelings. Nonverbal communication may speak louder than words: a squeeze of the hand or a look of concern can say an enormous amount.

- Repeat information several times and give written information, if possible. People experiencing an emergency will not remember much of what is said to them.
- Health care providers may feel anger, guilt, sorrow, pain and frustration in the face of obstetric emergencies that may lead them to avoid the woman/family. Showing emotion is not a weakness.
- Remember to care for staff who themselves may experience guilt, grief, confusion and other emotions.

MATERNAL MORTALITY AND MORBIDITY

MATERNAL MORTALITY

Death of a woman in childbirth or from pregnancy-related events is a devastating experience for the family and for surviving children. In addition to the principles listed above, remember the following:

AT THE TIME OF THE EVENT

- Provide psychological care as long as the woman is awake or even vaguely aware of what is or might be happening to her.
- If death is inevitable, provide emotional and spiritual comfort rather than focusing on the emergency (now futile) medical care.
- Provide dignity and respectful treatment at all times, even if the woman is unconscious or has already died.

AFTER THE EVENT

- Allow the woman's partner or family to be with her.
- Facilitate the family's arrangements for the funeral, if possible, and see that they have all the necessary documents.
- Explain what happened and answer any questions. Offer the opportunity for the family to return to ask additional questions.

SEVERE MATERNAL MORBIDITY

Childbirth sometimes leaves a woman with severe physical or psychological damage.

AT THE TIME OF THE EVENT

- Include the woman and her family in the proceedings of the delivery if possible, particularly if this is culturally appropriate.
- Ensure that a staff member cares for the emotional and informational needs of the woman and her partner, if possible.

AFTER THE EVENT

- Clearly explain the condition and its treatment so that it is understood by the woman and her companions.
- Arrange for treatment and/or referral, when indicated.
- Schedule a follow-up visit to check on progress and discuss available options.

NEONATAL MORTALITY OR MORBIDITY

While general principles of emotional support for women experiencing obstetrical emergencies apply, when a baby dies or is born with an abnormality some specific factors should be considered.

INTRAUTERINE DEATH OR STILLBIRTH

Many factors will influence the woman's reaction to the death of her baby. These include those mentioned above as well as:

- the woman's previous obstetric and life history;
- the extent to which the baby was "wanted";
- the events surrounding the birth and the cause of the loss;
- previous experiences with death.

AT THE TIME OF THE EVENT

- Avoid using sedation to help the woman cope. Sedation may delay acceptance of the death and may make reliving the experience later—part of the process of emotional healing—more difficult.
- Allow the parents to see the efforts made by the care givers to revive their baby.
- Encourage the woman/couple to see and hold the baby to facilitate grieving.

- Prepare the parents for the possibly disturbing or unexpected appearance of the baby (red, wrinkled, peeling skin). If necessary, wrap the baby so that it looks as normal as possible at first glance.
- Avoid separating the woman and baby too soon (before she indicates she is ready), as this can interfere with and delay the grieving process.

AFTER THE EVENT

- Allow the woman/family to continue to spend time with the baby. Parents of a stillborn still need to get to know their baby.
- People grieve in different ways, but for many remembrance is important. Offer the woman/family small mementos such as a lock of hair, a cot label or a name tag.
- Where it is the custom to name babies at birth, encourage the woman/family to call the baby by the name they have chosen.
- Allow the woman/family to prepare the baby for the funeral if they wish.
- Encourage locally-accepted burial practices and ensure that medical procedures (such as autopsies) do not preclude them.
- Arrange a discussion with both the woman and her partner to discuss the event and possible preventive measures for the future.

DESTRUCTIVE OPERATIONS

Craniotomy or other destructive operations on the dead fetus may be distressing and call for additional psychosocial care.

AT THE TIME OF THE EVENT

- It is crucial that you explain to the mother and her family that the baby is dead and that the priority is to save the mother.
- Encourage the partner to provide support and comfort for the mother until she is anaesthetized or sedated.
- If the mother is awake or partially awake during the procedure, protect her from visual exposure to the procedure and to the baby.
- After the intervention, make arrangements so the baby can be seen and/or held by the woman/family if they wish, especially if the family is going to take care of the burial.

AFTER THE EVENT

- Allow unlimited visiting time for the woman's companion.
- Counsel the mother and her companion and reassure them that an alternative was not available.
- Arrange a follow-up visit several weeks after the event to answer any questions and to prepare the woman for a subsequent pregnancy (or the inability/inadvisability of another pregnancy).
- Family planning should be provided, if appropriate (**Table S-3, page S-13**).

BIRTH OF A BABY WITH AN ABNORMALITY

The birth of a baby with a malformation is a devastating experience for the parents and family. Reactions may vary.

- Allow the woman to see and hold the baby. Some women accept their baby immediately while others may take longer.
- Disbelief, denial and sadness are normal reactions, especially if the abnormality is unpredicted. Feelings of unfairness, despair, depression, anxiety, anger, failure and apprehension are common.

AT THE TIME OF THE EVENT

- Give the baby to the parents at delivery. Allowing the parents to see the problem immediately may be less traumatic.
- In cases of severe deformity, wrap the baby before giving to the mother to hold so that she can see the normality of the baby first. Do not force the mother to examine the abnormality.
- Provide a bed or cot in the room so the companion can stay with the woman if she chooses.

AFTER THE EVENT

- Discuss the baby and the problem with the woman and her family together, if possible.
- Allow the woman and her partner free access to their baby. Keep the baby with the mother at all times. The more the woman and her partner can do for the baby themselves, the more quickly they will accept the baby as their own.
- Ensure access to supportive professional individuals and groups.

PSYCHOLOGICAL MORBIDITY

Postpartum emotional distress is fairly common after pregnancy and ranges from mild postpartum blues (affecting about 80% of women), to postpartum depression or psychosis. Postpartum psychosis can pose a threat to the life of the mother or baby.

POSTPARTUM DEPRESSION

Postpartum depression affects up to 34% of women and typically occurs in the early postpartum weeks or months and may persist for a year or more. Depression is not necessarily one of the leading symptoms although it is usually evident. Other symptoms include exhaustion, irritability, weepiness, low energy and motivational levels, feelings of helplessness and hopelessness, loss of libido and appetite and sleep disturbances. Headache, asthma, backache, vaginal discharge and abdominal pain may be reported. Symptoms may include obsessional thinking, fear of harming the baby or self, suicidal thoughts and depersonalization.

The prognosis for postpartum depression is good with early diagnosis and treatment. More than two-thirds of women recover within a year. Providing a companion during labour may prevent postpartum depression.

Once established, postpartum depression requires psychological counselling and practical assistance. In general:

- Provide psychological support and practical help (with the baby and with home care).
- Listen to the woman and provide encouragement and support.
- Assure the woman that the experience is fairly common and that many other women experience the same thing.
- Assist the mother to rethink the image of motherhood and assist the couple to think through their respective roles as new parents. They may need to adjust their expectations and activities.
- If depression is severe, consider antidepressant drugs, if available. Be aware that medication can be passed through breastmilk and that breastfeeding should be reassessed.

Care can be home-based or can be offered through day-care clinics. Local support groups of women who have had similar experiences are most valuable.

POSTPARTUM PSYCHOSIS

Postpartum psychosis typically occurs around the time of delivery and affects less than 1% of women. The cause is unknown, although about half of the women experiencing psychosis also have a history of mental illness. Postpartum psychosis is characterized by abrupt onset of delusions or hallucinations, insomnia, a preoccupation with the baby, severe depression, anxiety, despair and suicidal or infanticidal impulses.

Care of the baby can sometimes continue as usual. Prognosis for recovery is excellent but about 50% of women will suffer a relapse with subsequent deliveries. In general:

- Provide psychological support and practical help (with the baby as well as with home care).
- Listen to the woman and provide support and encouragement. This is important for avoiding tragic outcomes.
- Lessen stress.
- Avoid dealing with emotional issues when the mother is unstable.
- If antipsychotic drugs are used, be aware that medication can be passed through breastmilk and that breastfeeding should be reassessed.

Emergencies can happen suddenly, as with a convulsion, or they can develop as a result of a complication that is not properly managed or monitored.

PREVENTING EMERGENCIES

Most emergencies can be prevented by:

- careful planning;
- following clinical guidelines;
- close monitoring of the woman.

RESPONDING TO AN EMERGENCY

Responding to an emergency promptly and effectively requires that members of the clinical team know their roles and how the team should function to respond most effectively to emergencies. Team members should also know:

- clinical situations and their diagnoses and treatments;
- drugs and their use, administration and side effects;
- emergency equipment and how it functions.

The ability of a facility to deal with emergencies should be assessed and reinforced by frequent practice emergency drills.

INITIAL MANAGEMENT

In managing an emergency:

- Stay calm. Think logically and focus on the needs of the woman.
- Do not leave the woman unattended.
- Take charge. Avoid confusion by having one person in charge.
- **SHOUT FOR HELP.** Have one person go for help and have another person gather emergency equipment and supplies (e.g. oxygen cylinder, emergency kit).
- If the **woman is unconscious**, assess the airway, breathing and circulation.

- If **shock is suspected**, immediately begin treatment (**page S-1**). Even if signs of shock are not present, keep shock in mind as you evaluate the woman further because her status may worsen rapidly. If **shock develops**, it is important to begin treatment immediately.
- Position the woman lying down on her left side with her feet elevated. Loosen tight clothing.
- Talk to the woman and help her to stay calm. Ask what happened and what symptoms she is experiencing.
- Perform a quick examination including vital signs (blood pressure, pulse, respiration, temperature) and skin colour. Estimate the amount of blood lost and assess symptoms and signs.

INFECTION PREVENTION

- Infection prevention (IP) has two primary objectives:
  - prevent major infections when providing services;
  - minimize the risk of transmitting serious diseases such as hepatitis B and HIV/AIDS to the woman and to service providers and staff, including cleaning and housekeeping personnel.
- The recommended IP practices are based on the following principles:
  - Every person (patient or staff) must be considered potentially infectious;
  - Handwashing is the most practical procedure for preventing cross-contamination;
  - Wear gloves before touching anything wet—broken skin, mucous membranes, blood or other body fluids (secretions or excretions);
  - Use barriers (protective goggles, face masks or aprons) if splashes and spills of any body fluids (secretions or excretions) are anticipated;
  - Use safe work practices, such as not recapping or bending needles, proper instrument processing and proper disposal of medical waste.

HANDWASHING

- Vigorously rub together all surfaces of the hands lathered with plain or antimicrobial soap. Wash for 15–30 seconds and rinse with a stream of running or poured water.
- Wash hands:
  - before and after examining the woman (or having any direct contact);
  - after exposure to blood or any body fluids (secretions or excretions), even if gloves were worn;
  - after removing gloves because the gloves may have holes in them.

- To encourage handwashing, programme managers should make every effort to provide soap and a continuous supply of clean water, either from the tap or a bucket, and single-use towels. Do not use shared towels to dry hands.
- To wash hands for surgical procedures, see **page C-48**.

GLOVES AND GOWNS

- Wear gloves:
  - when performing a procedure (**Table C-2, page C-19**);
  - when handling soiled instruments, gloves and other items;
  - when disposing of contaminated waste items (cotton, gauze or dressings).
- A separate pair of gloves must be used for each woman to avoid cross-contamination.
- Disposable gloves are preferred, but where resources are limited, surgical gloves can be reused if they are:
  - decontaminated by soaking in 0.5% chlorine solution for 10 minutes;
  - washed and rinsed;
  - sterilized by autoclaving (eliminates all microorganisms) or high-level disinfected by steaming or boiling (eliminates all microorganisms except some bacterial endospores).

  Note: If single-use disposable surgical gloves are reused, they should not be processed more than three times because invisible tears may occur.

Do not use gloves that are cracked, peeling or have detectable holes or tears.

- A clean, but not necessarily sterile, gown should be worn during all delivery procedures:
  - If the gown has long sleeves, the gloves should be put over the gown sleeve to avoid contamination of the gloves;
  - Ensure that gloved hands (high-level disinfected or sterile) are held above the level of the waist and do not come into contact with the gown.

TABLE C-2 Glove and gown requirements for common obstetric procedures

Procedure	Preferred Gloves[a]	Alternative Gloves[b]	Gown
Blood drawing, starting IV infusion	Exam[c]	High-level disinfected surgical[d]	None
Pelvic examination	Exam	High-level disinfected surgical	None
Manual vacuum aspiration, dilatation and curettage, colpotomy, culdocentesis	High-level disinfected surgical	Sterile surgical	None
Laparotomy and intra-abdominal procedures, artificial rupture of membranes, delivery, instrumental delivery, symphysiotomy, episiotomy, repair of cervical or perineal tears, craniotomy, craniocentesis, bimanual compression of uterus, manual removal of placenta, correcting uterine inversion	High-level disinfected surgical	Sterile surgical	Clean, high-level disinfected or sterile
Handling and cleaning instruments	Utility[e]	Exam or surgical	None
Handling contaminated waste	Utility	Exam or surgical	None
Cleaning blood or body fluid spills	Utility	Exam or surgical	None

[a] Gloves and gowns are not required to be worn to check blood pressure or temperature, or to give injections.
[b] Alternative gloves are generally more expensive and require more preparation than preferred gloves.
[c] Exam gloves are single-use disposable latex gloves. If gloves are reusable, they should be decontaminated, cleaned and either sterilized or high-level disinfected before use.
[d] Surgical gloves are latex gloves that are sized to fit the hand.
[e] Utility gloves are thick household gloves.

HANDLING SHARP INSTRUMENTS AND NEEDLES

OPERATING THEATRE AND LABOUR WARD

- Do not leave sharp instruments or needles ("sharps") in places other than "safe zones" (**page C-51**).
- Tell other workers before passing sharps.

HYPODERMIC NEEDLES AND SYRINGES

- Use each needle and syringe only once.
- Do not disassemble needle and syringe after use.
- Do not recap, bend or break needles prior to disposal.
- Dispose of needles and syringes in a puncture-proof container.
- Make hypodermic needles unusable by burning them.

Note: Where disposable needles are not available and recapping is practised, use the "one-handed" recap method:

- Place the cap on a hard, flat surface;
- Hold the syringe with one hand and use the needle to "scoop up" the cap;
- When the cap covers the needle completely, hold the base of the needle and use the other hand to secure the cap.

WASTE DISPOSAL

- The purpose of waste disposal is to:
  - prevent the spread of infection to hospital personnel who handle the waste;
  - prevent the spread of infection to the local community;
  - protect those who handle waste from accidental injury.
- Noncontaminated waste (e.g. paper from offices, boxes) poses no infectious risk and can be disposed of according to local guidelines.
- Proper handling of contaminated waste (blood- or body fluid-contaminated items) is required to minimize the spread of infection to hospital personnel and the community. Proper handling means:
  - wearing utility gloves;

- transporting solid contaminated waste to the disposal site in covered containers;
- disposing of all sharp items in puncture-proof containers;
- carefully pouring liquid waste down a drain or flushable toilet;
- burning or burying contaminated solid waste;
- washing hands, gloves and containers after disposal of infectious waste.

STARTING AN IV INFUSION

- Start an IV infusion (two if the woman is in shock) using a large-bore (16-gauge or largest available) cannula or needle.
- Infuse IV fluids (normal saline or Ringer's lactate) at a rate appropriate for the woman's condition.

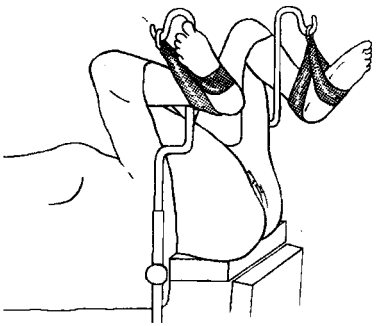
  Note: If the **woman is in shock**, avoid using plasma substitutes (e.g. dextran). There is no evidence that plasma substitutes are superior to normal saline in the resuscitation of a shocked woman and dextran can be harmful in large doses.
- If a **peripheral vein cannot be cannulated**, perform a venous cut-down (**Fig S-1, page S-3**).

BASIC PRINCIPLES FOR PROCEDURES

Before any simple (nonoperative) procedure, it is necessary to:

- Gather and prepare all supplies. Missing supplies can disrupt a procedure.
- Explain the procedure and the need for it to the woman and obtain consent.
- Provide adequate pain medication according to the extent of the procedure planned. Estimate the length of time for the procedure and provide pain medication accordingly (**page C-37**).
- Place the patient in a position appropriate for the procedure being performed. The most common position used for obstetric procedures (e.g. manual vacuum aspiration) is the lithotomy position (**Fig C-1, page C-22**).

FIGURE C-1 The lithotomy position



- Wash hands with soap and water (**page C-17**) and put on gloves appropriate for the procedure (**Table C-2, page C-19**).
- If the **vagina and cervix need to be prepared with an antiseptic** for the procedure (e.g. manual vacuum aspiration):
  - Wash the woman's lower abdomen and perineal area with soap and water, if necessary;
  - Gently insert a high-level disinfected or sterile speculum or retractor(s) into the vagina;
  - Apply antiseptic solution (e.g. iodophors, chlorhexidine) three times to the vagina and cervix using a high-level disinfected or sterile ring forceps and a cotton or gauze swab.
- If the **skin needs to be prepared with an antiseptic** for the procedure (e.g. symphysiotomy):
  - Wash the area with soap and water, if necessary;
  - Apply antiseptic solution (e.g. iodophors, chlorhexidine) three times to the area using a high-level disinfected or sterile ring forceps and a cotton or gauze swab. If the **swab is held with a gloved hand**, do not contaminate the glove by touching unprepared skin;
  - Begin at the centre of the area and work outward in a circular motion away from the area;
  - At the edge of the sterile field discard the swab.
- Never go back to the middle of the prepared area with the same swab. Keep your arms and elbows high and surgical dress away from the surgical field.

CLINICAL USE OF BLOOD, BLOOD PRODUCTS AND REPLACEMENT FLUIDS

Obstetric care may require blood transfusions. It is important to use blood, blood products and replacement fluids appropriately and to be aware of the principles designed to assist health workers in deciding when (and when not) to transfuse.

The appropriate use of blood products is defined as the transfusion of safe blood products to treat a condition leading to significant morbidity or mortality that cannot be prevented or managed effectively by other means.

Conditions that may require blood transfusion include:

- postpartum haemorrhage leading to shock;
- loss of a large volume of blood at operative delivery;
- severe anaemia, especially in later pregnancy or if accompanied by cardiac failure.

  Note: For anaemia in early pregnancy, treat the cause of anaemia and provide haematinics.

District hospitals should be prepared for the urgent need for blood transfusion. It is mandatory for obstetric units to keep stored blood available, especially type O negative blood and fresh frozen plasma, as these can be life-saving.

UNNECESSARY USE OF BLOOD PRODUCTS

Used correctly, blood transfusion can save lives and improve health. As with any therapeutic intervention it may, however, result in acute or delayed complications and it carries the risk of transmission of infectious agents. It is also expensive and uses scarce resources.

- Transfusion is often unnecessary because:
  - Conditions that may eventually require transfusion can often be prevented by early treatment or prevention programmes;
  - Transfusions of whole blood, red cells or plasma are often given to prepare a woman quickly for planned surgery, or to allow earlier discharge from the hospital. Other treatments, such as the infusion of IV fluids, are often cheaper, safer and equally effective (**page C-30**).

- Unnecessary transfusion can:
  - expose the woman to unnecessary risks;
  - cause a shortage of blood products for women in real need. Blood is an expensive, scarce resource.

RISKS OF TRANSFUSION

Before prescribing blood or blood products for a woman, it is essential to consider the risks of transfusing against the risks of not transfusing.

WHOLE BLOOD OR RED CELL TRANSFUSION

- The transfusion of red cell products carries a risk of incompatible transfusion and serious haemolytic transfusion reactions.
- Blood products can transmit infectious agents—including HIV, hepatitis B, hepatitis C, syphilis, malaria and Chagas disease—to the recipient.
- Any blood product can become bacterially contaminated and very dangerous if it is manufactured or stored incorrectly.

PLASMA TRANSFUSION

- Plasma can transmit most of the infections present in whole blood.
- Plasma can also cause transfusion reactions.
- There are very few clear indications for plasma transfusion (e.g. coagulopathy) and the risks often outweigh any possible benefit.

BLOOD SAFETY

- The risks associated with transfusion can be reduced by:
  - effective blood donor selection, deferral and exclusion;
  - screening for transfusion-transmissible infections in the blood donor population (e.g. HIV/AIDS and hepatitis);
  - quality-assurance programmes;
  - high-quality blood grouping, compatibility testing, component separation and storage and transportation of blood products;
  - appropriate clinical use of blood and blood products.

SCREENING FOR INFECTIOUS AGENTS

- Every unit of donated blood should be screened for transfusion-transmissible infections using the most appropriate and effective tests, in accordance with both national policies and the prevalence of infectious agents in the potential blood donor population.
- All donated blood should be screened for the following:
  - HIV-1 and HIV-2;
  - Hepatitis B surface antigen (HBsAg);
  - *Treponema pallidum* antibody (syphilis).
- Where possible, all donated blood should also be screened for:
  - Hepatitis C;
  - Chagas disease, in countries where the seroprevalence is significant;
  - Malaria, in low-prevalence countries when donors have travelled to malarial areas. In areas with a high prevalence of malaria, blood transfusion should be accompanied by prophylactic antimalarials.
- No blood or blood product should be released for transfusion until all nationally required tests are shown to be negative.
- Perform compatibility tests on all blood components transfused even if, in life-threatening emergencies, the tests are performed after the blood products have been issued.

Blood that has not been obtained from appropriately selected donors and that has not been screened for transfusion-transmissible infectious agents (e.g. HIV, hepatitis), in accordance with national requirements, should not be issued for transfusion, other than in the most exceptional life-threatening situations.

PRINCIPLES OF CLINICAL TRANSFUSION

The fundamental principle of the appropriate use of blood or blood product is that transfusion is only one element of the woman's management. When there is sudden rapid loss of blood due to haemorrhage, surgery or complications of childbirth, the most urgent need is usually the rapid replacement of the fluid lost from circulation.

Transfusion of red cells may also be vital to restore the oxygen-carrying capacity of the blood.

Minimize "wastage" of a woman's blood (to reduce the need for transfusion) by:

- using replacement fluids for resuscitation;
- minimizing the blood taken for laboratory use;
- using the best anaesthetic and surgical techniques to minimize blood loss during surgery;
- salvaging and reinfusing surgical blood lost during procedures (autotransfusion), where appropriate (**page S-14**).

Principles to remember:

- Transfusion is only one element of managing a woman.
- Decisions about prescribing a transfusion should be based on national guidelines on the clinical use of blood, taking the woman's needs into account.
- Blood loss should be minimized to reduce the woman's need for transfusion.
- The woman with acute blood loss should receive effective resuscitation (IV replacement fluids, oxygen, etc.) while the need for transfusion is being assessed.
- The woman's haemoglobin value, although important, should not be the sole deciding factor in starting the transfusion. The decision to transfuse should be supported by the need to relieve clinical signs and symptoms and prevent significant morbidity and mortality.
- The clinician should be aware of the risks of transfusion-transmissible infection in blood products that are available.
- Transfusion should be prescribed only when the benefits to the woman are likely to outweigh the risks.
- A trained person should monitor the transfused woman and respond immediately if any adverse effects occur (**page C-27**).
- The clinician should record the reason for transfusion and investigate any adverse effects (**page C-28**).

PRESCRIBING BLOOD

Prescribing decisions should be based on national guidelines on the clinical use of blood, taking the woman's needs into account.

- Before prescribing blood or blood products for a woman, keep in mind the following:
  - expected improvement in the woman's clinical condition;
  - methods to minimize blood loss to reduce the woman's need for transfusion;
  - alternative treatments that may be given, including IV replacement fluids or oxygen, before making the decision to transfuse;
  - specific clinical or laboratory indications for transfusion;
  - risks of transmitting HIV, hepatitis, syphilis or other infectious agents through the blood products that are available;
  - benefits of transfusion versus risk for the particular woman;
  - other treatment options if blood is not available in time;
  - need for a trained person to monitor the woman and immediately respond if a transfusion reaction occurs.

MONITORING THE TRANSFUSED WOMAN

For each unit of blood transfused, monitor the woman at the following stages:

- before starting the transfusion;
- at the onset of the transfusion;
- 15 minutes after starting the transfusion;
- at least every hour during the transfusion;
- at four-hour intervals after completing the transfusion.

Closely monitor the woman during the first 15 minutes of the transfusion and regularly thereafter to detect early symptoms and signs of adverse effects.

At each of these stages, record the following information on the woman's chart:

- general appearance;
- temperature;
- pulse;
- blood pressure;
- respiration;
- fluid balance (oral and IV fluid intake, urinary output).

In addition, record:

- the time the transfusion is started;
- the time the transfusion is completed;
- the volume and type of all products transfused;
- the unique donation numbers of all products transfused;
- any adverse effects.

RESPONDING TO A TRANSFUSION REACTION

Transfusion reactions may range from a minor skin rash to anaphylactic shock. Stop the transfusion and keep the IV line open with IV fluids (normal saline or Ringer's lactate) while making an initial assessment of the acute transfusion reaction and seeking advice. If the **reaction is minor**, give promethazine 10 mg by mouth and observe.

MANAGING ANAPHYLACTIC SHOCK FROM MISMATCHED BLOOD TRANSFUSION

- Manage as for shock (**page S-1**) and give:
  - adrenaline 1:1000 solution (0.1 mL in 10 mL normal saline or Ringer's lactate) IV slowly;
  - promethazine 10 mg IV;
  - hydrocortisone 1 g IV every two hours as needed.
- If **bronchospasm occurs**, give aminophylline 250 mg in 10 mL normal saline or Ringer's lactate IV slowly.
- Combine resuscitation measures above until stabilized.
- Monitor renal, pulmonary and cardiovascular functions.

- Transfer to referral centre when stable.

DOCUMENTING A TRANSFUSION REACTION

- Immediately after the reaction occurs, take the following samples and send with a request form to the blood bank for laboratory investigations.
  - immediate post-transfusion blood samples:
    - one clotted;
    - one anticoagulated (EDTA/sequestrene) taken from the vein opposite the infusion site;
  - the blood unit and giving set containing red cell and plasma residues from the transfused donor blood;
  - the first specimen of the woman's urine following the reaction.
- If **septic shock is suspected due to a contaminated blood unit**, take a blood culture in a special blood culture bottle.
- Complete a transfusion reaction report form.
- After the initial investigation of the transfusion reaction, send the following to the blood bank for laboratory investigations:
  - blood samples at 12 hours and 24 hours after the start of the reaction:
    - one clotted;
    - one anticoagulated (EDTA/sequestrene) taken from the vein opposite the infusion site;
  - all urine for at least 24 hours after the start of the reaction.
- Immediately report all acute transfusion reactions, with the exception of mild skin rashes, to a medical officer and to the blood bank that supplied the blood.
- Record the following information on the woman's chart:
  - type of transfusion reaction;
  - length of time after the start of transfusion that the reaction occurred;
  - volume and type of blood products transfused;
  - unique donation numbers of all products transfused.

REPLACEMENT FLUIDS: SIMPLE SUBSTITUTES FOR TRANSFUSION

Only normal saline (sodium chloride 0.9%) or balanced salt solutions that have a similar concentration of sodium to plasma are effective replacement fluids. These should be available in all hospitals where IV replacement fluids are used.

Replacement fluids are used to replace abnormal losses of blood, plasma or other extracellular fluids by increasing the volume of the vascular compartment. They are used principally in:

- management of women with established hypovolaemia (e.g. haemorrhagic shock);
- maintenance of normovolaemia in women with on-going fluid losses (e.g. surgical blood loss).

INTRAVENOUS REPLACEMENT THERAPY

Intravenous replacement fluids are first-line treatment for hypovolaemia. Initial treatment with these fluids may be life-saving and can provide some time to control bleeding and obtain blood for transfusion if it becomes necessary.

CRYSTALLOID FLUIDS

- Crystalloid replacement fluids:
  - contain a similar concentration of sodium to plasma;
  - cannot enter cells because the cell membrane is impermeable to sodium;
  - pass from the vascular compartment to the extracellular space (normally only a quarter of the volume of crystalloid infused remains in the vascular compartment) compartment.
- To restore circulating blood volume (intravascular volume), infuse crystalloids in a volume at least three times the volume lost.

Dextrose (glucose) solutions are poor replacement fluids. Do not use them to treat hypovolaemia unless there is no other alternative.

COLLOID FLUIDS

- Colloid solutions are composed of a suspension of particles that are larger than crystalloids. Colloids tend to remain in the blood where they mimic plasma proteins to maintain or raise the colloid osmotic pressure of blood.
- Colloids are usually given in a volume equal to the blood volume lost. In many conditions where the capillary permeability is increased (e.g. trauma, sepsis), leakage out of the circulation will occur and additional infusions will be necessary to maintain blood volume. ·

Points to remember:

- There is no evidence that colloid solutions (albumin, dextrans, gelatins, hydroxyethyl starch solutions) have advantages over normal saline or balanced salt solutions for resuscitation.
- There is evidence that colloid solutions may have an adverse effect on survival.
- Colloid solutions are much more expensive than normal saline and balanced salt solutions.
- Human plasma should not be used as a replacement fluid. All forms of plasma carry a similar risk as whole blood of transmitting infection, such as HIV and hepatitis.
- Plain water should never be infused intravenously. It will cause haemolysis and will probably be fatal.

There is a very limited role for colloids in resuscitation.

SAFETY

Before giving any IV infusion:

- check that the seal of the infusion bottle or bag is not broken;
- check the expiry date;
- check that the solution is clear and free from visible particles.

MAINTENANCE FLUID THERAPY

Maintenance fluids are crystalloid solutions, such as dextrose or dextrose in normal saline, used to replace normal physiological losses through skin, lungs, faeces and urine. If it is anticipated that the woman

will receive IV fluids for 48 hours or more, infuse a balanced electrolyte solution (e.g. potassium chloride 1.5 g in 1 L IV fluids) with dextrose. The volume of maintenance fluids required by a woman will vary, particularly if the woman has fever or with high ambient temperature or humidity, when losses will increase.

OTHER ROUTES OF FLUID ADMINISTRATION

There are other routes of fluid administration in addition to the IV route.

ORAL AND NASOGASTRIC ADMINISTRATION

- This route can often be used for women who are mildly hypovolaemic and for women who can receive oral fluids.
- Oral and nasogastric administration should not be used if:
  - the woman is severely hypovolaemic;
  - the woman is unconscious;
  - there are gastrointestinal lesions or reduced gut motility (e.g. obstruction);
  - imminent surgery with general anaesthesia is planned.

RECTAL ADMINISTRATION

- Rectal administration of fluids is not suitable for severely hypovolaemic women.
- Advantages of rectal administration include:
  - It allows the ready absorption of fluids;
  - Absorption ceases and fluids are ejected when hydration is complete;
  - It is administered through a plastic or rubber enema tube inserted into the rectum and connected to a bag or bottle of fluid;
  - The fluid rate can be controlled by using an IV set, if necessary;
  - The fluids do not have to be sterile. A safe and effective solution for rectal rehydration is 1 L of clean drinking water to which a teaspoon of table salt is added.

SUBCUTANEOUS ADMINISTRATION

- Subcutaneous administration can occasionally be used when other routes of administration are unavailable, but this method is unsuitable for severely hypovolaemic women.
- Sterile fluids are administered through a cannula or needle inserted into the subcutaneous tissue (the abdominal wall is a preferred site).

Solutions containing dextrose can cause tissue to die and should not be given subcutaneously.

Infection during pregnancy and the postpartum period may be caused by a combination of organisms, including aerobic and anaerobic cocci and bacilli. Antibiotics should be started based on observation of the woman. If there is no clinical response, culture of uterine or vaginal discharge, pus or urine may help in choosing other antibiotics. In addition, blood culture may be done if septicaemia (bloodstream invasion) is suspected.

Uterine infection can follow an abortion or childbirth and is a major cause of maternal death. Broad spectrum antibiotics are often required to treat these infections. In cases of unsafe abortion and non-institutional delivery, anti-tetanus prophylaxis should also be provided (**Box S-5, page S-51**).

PROVIDING PROPHYLACTIC ANTIBIOTICS

Performing certain obstetrical procedures (e.g. caesarean section, manual removal of placenta) increases a woman's risk of infectious morbidity. This risk can be reduced by:

- following recommended infection prevention practices (**page C-17**);
- providing prophylactic antibiotics at the time of the procedure.

Prophylactic antibiotics are given to help prevent infection. **If a woman is suspected to have or is diagnosed as having an infection**, therapeutic antibiotics are more appropriate.

Give prophylactic antibiotics 30 minutes before the start of a procedure, when possible, to allow adequate blood levels of the antibiotic at the time of the procedure. An exception to this is caesarean section, for which prophylactic antibiotics should be given when the cord is clamped **after** delivery of the baby. One dose of prophylactic antibiotics is sufficient and is no less effective than three doses or 24 hours of antibiotics in preventing infection. If the **procedure lasts longer than six hours** or **blood loss is 1500 mL or more**, give a second dose of prophylactic antibiotics to maintain adequate blood levels during the procedure.

PROVIDING THERAPEUTIC ANTIBIOTICS

- As a first defense against serious infections, give a combination of antibiotics:

- ampicillin 2 g IV every six hours;
- PLUS gentamicin 5 mg/kg body weight IV every 24 hours;
- PLUS metronidazole 500 mg IV every eight hours.

Note: If the **infection is not severe**, amoxicillin 500 mg by mouth every eight hours can be used instead of ampicillin. Metronidazole can be given by mouth instead of IV.

- If the **clinical response is poor after 48 hours**, ensure adequate dosages of antibiotics are being given, thoroughly re-evaluate the woman for other sources of infection or consider altering treatment according to reported microbial sensitivity (or adding an additional agent to cover anaerobes, if not yet given).
- If **culture facilities are not available**, re-examine for pus collection, especially in the pelvis, and for non-infective causes such as deep vein and pelvic vein thrombosis. Consider the possibility of infection due to organisms resistant to the above combination of antibiotics:
  - If **staphylococcal infection is suspected**, add:
    - cloxacillin 1 g IV every four hours;
    - OR vancomycin 1 g IV every 12 hours infused over one hour;
  - If **clostridial infection or Group A haemolytic streptococci is suspected**, add penicillin 2 million units IV every four hours;
  - If **neither of the above are possibilities**, add ceftriaxone 2 g IV every 24 hours.

  Note: To avoid phlebitis, change the infusion site every three days or at the first sign of inflammation.
- If the **infection does not clear**, evaluate for the source of infection.

For the treatment of metritis, combinations of antibiotics are usually continued until the woman is fever-free for 48 hours. Discontinue antibiotics once the woman has been fever-free for 48 hours. There is no need to continue with oral antibiotics, as this has not been proven to have additional benefit. Women with blood-stream infections, however, will require antibiotics for at least seven days.

Pain relief may be required during labour and is required during and after operative procedures. Analgesic drugs and methods of support during labour, local anaesthesia, general principles for using anaesthesia and analgesia, and postoperative analgesia are discussed.

ANALGESIC DRUGS DURING LABOUR

- The perception of pain varies greatly with the woman's emotional state. Supportive care during labour provides reassurance and decreases the perception of pain (**page C-57**).
- If the **woman is distressed by pain**, allow her to walk around or assume any comfortable position. Encourage her companion to massage her back or sponge her face between contractions. Encourage the use of breathing techniques and allow the woman to take a warm bath or shower if she chooses. For most women, this is enough to cope with the pain of labour. If necessary, give:
  - pethidine 1 mg/kg body weight (but not more than 100 mg) IM or IV slowly every four hours as needed or give morphine 0.1 mg/kg body weight IM;
  - promethazine 25 mg IM or IV if vomiting occurs.

Barbiturates and sedatives should not be used to relieve anxiety in labour.

DANGER

If **pethidine or morphine is given to the mother**, the baby may suffer from respiratory depression. Naloxone is the antidote.

Note: Do not administer naloxone to newborns whose mothers are suspected of having recently abused narcotic drugs.

- If there are **signs of respiratory depression** in the newborn, begin resuscitation immediately:
  - After vital signs have been established, give naloxone 0.1 mg/kg body weight IV to the newborn;
  - If the **infant has adequate peripheral circulation after successful resuscitation**, naloxone can be given IM. Repeated doses may be required to prevent recurrent respiratory depression.

- If there are **no signs of respiratory depression** in the newborn, but **pethidine or morphine was given within four hours of delivery**, observe the baby expectantly for signs of respiratory depression and treat as above if they occur.

PREMEDICATION WITH PROMETHAZINE AND DIAZEPAM

Premedication is required for procedures that last longer than 30 minutes. The dose must be adjusted to the weight and condition of the woman and to the condition of the fetus (when present).

A popular combination is pethidine and diazepam:

- Give pethidine 1 mg/kg body weight (but not more than 100 mg) IM or IV slowly or give morphine 0.1 mg/kg body weight IM.
- Give diazepam in increments of 1 mg IV and wait at least two minutes before giving another increment. A safe and sufficient level of sedation has been achieved when the woman's upper eye lid droops and just covers the edge of the pupil. Monitor the respiratory rate every minute. If the **respiratory rate falls below 10 breaths per minute**, stop administration of all sedative or analgesic drugs.

Do not administer diazepam with pethidine in the same syringe, as the mixture forms a precipitate. Use separate syringes.

LOCAL ANAESTHESIA

Local anaesthesia (lignocaine with or without adrenaline) is used to infiltrate tissue and block the sensory nerves.

- Because a woman with local anaesthesia remains awake and alert during the procedure, it is especially important to ensure:
  - counselling to increase cooperation and minimize her fears;
  - good communication throughout the procedure as well as physical reassurance from the provider, if necessary;
  - time and patience, as local anaesthetics do not take effect immediately.

- The following conditions are required for the safe use of local anaesthesia:
  - All members of the operating team must be knowledgeable and experienced in the use of local anaesthetics;
  - Emergency drugs and equipment (suction, oxygen, resuscitation equipment) should be readily available and in usable condition, and all members of the operating team trained in their use.

LIGNOCAINE

Lignocaine preparations are usually 2% or 1% and require dilution before use (**Box C-1**). For most obstetric procedures, the preparation is diluted to 0.5%, which gives the maximum effect with the least toxicity.

BOX C-1 Preparation of lignocaine 0.5% solution

Combine:
- lignocaine 2%, one part;
- normal saline or sterile distilled water, three parts (do not use glucose solution as it increases the risk of infection).

or
- lignocaine 1%, one part;
- normal saline or sterile distilled water, one part.

ADRENALINE

Adrenaline causes local vasoconstriction. Its use with lignocaine has the following advantages:

- less blood loss;
- longer effect of anaesthetic (usually one to two hours);
- less risk of toxicity because of slower absorption into the general circulation.

If the **procedure requires a small surface to be anaesthetized** or **requires less than 40 mL of lignocaine**, adrenaline is not necessary. For larger surfaces, however, especially when more than 40 mL is needed, adrenaline is required to reduce the absorption rate and thereby reduce toxicity.

The best concentration of adrenaline is 1:200 000 (5 mcg/mL). This gives maximum local effect with the least risk of toxicity from the adrenaline itself (**Table C-3, page C-40**).

Note: It is critical to measure adrenaline carefully and accurately using a syringe such as a BCG or insulin syringe. Mixtures must be prepared observing strict infection prevention practices (**page C-17**).

TABLE C-3 Formulas for preparing 0.5% lignocaine solutions containing 1:200 000 adrenaline

Desired Amount of Local Anaesthetic Needed	Normal Saline/ Lignocaine 2%	Normal Saline/ Lignocaine 1%	Adrenaline 1:1 000
20 mL	15 mL/5 mL	10 mL/10 mL	0.1 mL
40 mL	30 mL/10 mL	20 mL/20 mL	0.2 mL
100 mL	75 mL/25 mL	50 mL/50 mL	0.5 mL
200 mL	150 mL/50 mL	100 mL/100 mL	1.0 mL

COMPLICATIONS

PREVENTION OF COMPLICATIONS

All local anaesthetic drugs are potentially toxic. Major complications from local anaesthesia are, however, extremely rare (**Table C-5, page C-41**). The best way to avoid complications is to prevent them:

- Avoid using concentrations of lignocaine stronger than 0.5%.
- If **more than 40 mL of the anaesthetic solution is to be used**, add adrenaline to delay dispersion. Procedures that may require more than 40 mL of 0.5% lignocaine are caesarean section or repair of extensive perineal tears.
- Use the lowest effective dose.
- Observe the maximum safe dose. For an adult, this is 4 mg/kg body weight of lignocaine without adrenaline and 7 mg/kg body weight of lignocaine with adrenaline. The anaesthetic effect should last for at least two hours. Doses can be repeated if needed after two hours (**Table C-4**).

TABLE C-4 Maximum safe doses of local anaesthetic drugs

Drug	Maximum Dose (mg/kg of body weight)	Maximum Dose for 60 kg Adult (mg)
Lignocaine	4	240
Lignocaine + adrenaline 1:200 000 (5 mcg/mL)	7	420

- Inject slowly.
- Avoid accidental injection into a vessel. There are three ways of doing this:
  - moving needle technique (preferred for tissue infiltration): the needle is constantly in motion while injecting; this makes it impossible for a substantial amount of solution to enter a vessel;
  - plunger withdrawal technique (preferred for nerve block when considerable amounts are injected into one site): the syringe plunger is withdrawn before injecting; if blood appears, the needle is repositioned and attempted again;
  - syringe withdrawal technique: the needle is inserted and the anaesthetic is injected as the syringe is being withdrawn.

To avoid lignocaine toxicity:
- use a dilute solution;
- add adrenaline when more than 40 mL will be used;
- use lowest effective dose;
- observe maximum dose;
- avoid IV injection.

DIAGNOSIS OF LIGNOCAINE ALLERGY AND TOXICITY

TABLE C-5 Symptoms and signs of lignocaine allergy and toxicity

Allergy	Mild Toxicity	Severe Toxicity	Life-Threatening Toxicity (very rare)
• Shock • Redness of skin • Skin rash/hives • Bronchospasm • Vomiting • Serum sickness	• Numbness of lips and tongue • Metallic taste in mouth • Dizziness/light headedness • Ringing in ears • Blurred vision	• Sleepiness • Disorientation • Muscle twitching and shivering • Slurred speech	• Tonic-clonic convulsions • Respiratory depression or arrest • Cardiac depression or arrest

MANAGEMENT OF LIGNOCAINE ALLERGY

- Give adrenaline 1:1000, 0.5 mL IM, repeated every 10 minutes if necessary.
- In acute situations, give hydrocortisone 100 mg IV every hour.
- To prevent recurrence, give diphenhydramine 50 mg IM or IV slowly, then 50 mg by mouth every six hours.
- Treat bronchospasm with aminophylline 250 mg in normal saline 10 mL IV slowly.
- Laryngeal oedema may require immediate tracheostomy.
- For shock, begin standard shock management (**page S-1**).
- Severe or recurrent signs may require corticosteroids (e.g. hydrocortisone IV 2 mg/kg body weight every four hours until condition improves). In **chronic situations** give prednisone 5 mg or prednisolone 10 mg by mouth every six hours until condition improves.

MANAGEMENT OF LIGNOCAINE TOXICITY

Symptoms and signs of toxicity (**Table C-5, page C-41**) should alert the practitioner to immediately stop injecting and prepare to treat severe and life-threatening side effects. If **symptoms and signs of mild toxicity are observed**, wait a few minutes to see if the symptoms subside, check vital signs, talk to the woman and then continue the procedure, if possible.

CONVULSIONS

- Turn the woman to her left side, insert an airway and aspirate secretions.
- Give oxygen at 6–8 L per minute by mask or nasal cannulae.
- Give diazepam 1–5 mg IV in 1-mg increments. Repeat if convulsions recur.

  Note: The use of diazepam to treat convulsions may cause respiratory depression.

RESPIRATORY ARREST

- If the **woman is not breathing**, assist ventilation using an Ambu bag and mask or via endotracheal tube; give oxygen at 4–6 L per minute.

CARDIAC ARREST

- Hyperventilate with oxygen.
- Perform cardiac massage.
- If the **woman has not yet delivered**, immediately deliver the baby by caesarean section (**page P-43**) using general anaesthesia.
- Give adrenaline 1:10 000, 0.5 mL IV.

ADRENALINE TOXICITY

- Systemic adrenaline toxicity results from excessive amounts or inadvertent IV administration and results in:
  - restlessness;
  - sweating;
  - hypertension;
  - cerebral haemorrhage;
  - rapid heart rate;
  - ventricular fibrillation.
- Local adrenaline toxicity occurs when the concentration is excessive, and results in ischaemia at the infiltration site with poor healing.

GENERAL PRINCIPLES FOR ANAESTHESIA AND ANALGESIA

The keys to pain management and comfort of the woman are:

- supportive attention from staff before, during and after a procedure (helps reduce anxiety and lessen pain);
- a provider who is comfortable working with women who are awake and who is trained to use instruments gently;
- the selection of an appropriate type and level of pain medication.

- Tips for performing procedures on women who are awake include:
  - Explain each step of the procedure before performing it;
  - Use adequate premedication in cases expected to last longer than 30 minutes;

- Give analgesics or sedatives at an appropriate time before the procedure (30 minutes before for IM and 60 minutes before for oral medication) so that maximum relief will be provided during the procedure;
- Use dilute solutions in adequate amounts;
- Check the level of anaesthesia by pinching the area with forceps. If the woman feels the pinch, wait two minutes and then retest;
- Wait a few seconds after performing each step or task for the woman to prepare for the next one;
- Move slowly, without jerky or quick motions;
- Handle tissue gently and avoid undue retraction, pulling or pressure;
- Use instruments with confidence;
- Avoid saying things like "this won't hurt" when, in fact, it will hurt; or "I'm almost finished" when you are not;
- Talk with the woman throughout the procedure.

• The need for supplemental analgesic or sedative medications (by mouth, IM or IV) will depend on:
  - the emotional state of the woman;
  - the procedure to be performed (**Table C-6, page C-45**);
  - the anticipated length of the procedure;
  - the skill of the provider and the assistance of the staff.

TABLE C-6 Analgesia and anaesthesia options

Procedure	Analgesia/Anaesthesia Options[a]
Breech delivery	• **General methods of labour support** (page C-57) • Pudendal block (**page P-3**)
Caesarean section	• **Spinal anaesthesia** (**page P-11**) • Local anaesthesia (**page P-7**) • Ketamine (**page P-13**) • General anaesthesia
Cervical tears (extensive)	• **Pethidine and diazepam** (page C-38) • Ketamine (**page P-13**)
Colpotomy/ Culdocentesis	• **Local anaesthesia** (page C-38)
Craniotomy/ Craniocentesis	• **Emotional support and encouragement** (page C-7) • Diazepam (**page C-38**) • Pudendal block (**page P-3**)
Dilatation and curettage	• **Paracervical block** (page P-1) • Pethidine (**page C-38**)
Episiotomy	• **Local anaesthesia** (page C-38) • Pudendal block (**page P-3**)
Forceps delivery	• **Emotional support and encouragement** (page C-7) • Pudendal block (**page P-3**)
Labour and childbirth	• **General methods of labour support** (page C-57) • Pethidine and promethazine (**page C-38**)
Laparotomy	• **General anaesthesia** • Spinal anaesthesia (**page P-11**)
Manual removal of placenta	• **Pethidine and diazepam** (page C-38) • Ketamine (**page P-13**)
MVA	• **Paracervical block** (page P-1) • Pethidine (**page C-38**)
Perineal tears (first and second degree)	• **Local anaesthesia** (page C-38) • Pudendal block (**page P-3**)
Perineal tears (third and fourth degree)	• **Pudendal block** (page P-3) • Ketamine (**page P-13**) • Local anaesthesia, pethidine, and diazepam (**page C-38**) • Spinal anaesthesia (**page P-11**)
Symphysiotomy	• **Local anaesthesia** (page C-38)
Uterine inversion (correction of)	• **Pethidine and diazepam** (page C-38) • General anaesthesia
Vacuum extraction	• **Emotional support and encouragement** (page C-7) • Pudendal block (**page P-3**)

[a]The preferred analgesia/anaesthesia option is listed in bold.

POSTOPERATIVE ANALGESIA

Adequate postoperative pain control is important. A woman who is in severe pain does not recover well.

Note: Avoid over sedation as this will limit mobility, which is important during the postoperative period.

Good postoperative pain control regimens include:

- non-narcotic mild analgesics such as paracetamol 500 mg by mouth as needed;
- narcotics such as pethidine 1 mg/kg body weight (but not more than 100 mg) IM or IV slowly or morphine 0.1 mg/kg body weight IM every four hours as needed;
- combinations of lower doses of narcotics with paracetamol.

Note: If the **woman is vomiting**, narcotics may be combined with anti-emetics such as promethazine 25 mg IM or IV every four hours as needed.

The woman is the primary focus of the physician/midwife and nurse during any procedure. The surgical or scrub nurse has her attention focused on the procedure and the needs of the physician/midwife performing the procedure.

PRE-OPERATIVE CARE PRINCIPLES

PREPARING THE OPERATING THEATRE

Ensure that:

- the operating theatre is clean (it should be cleaned after every procedure);
- necessary supplies and equipment are available, including drugs and an oxygen cylinder;
- emergency equipment is available and in working order;
- there are adequate supply of theatre dress for the anticipated members of the surgical team;
- clean linens are available;
- sterile supplies (gloves, gauze, instruments) are available and not beyond expiry date.

PREPARING THE WOMAN FOR A SURGICAL PROCEDURE

- Explain the procedure to be performed and its purpose to the woman. If the woman is unconscious, explain the procedure to her family.
- Obtain informed consent for the procedure.
- Assist the woman and her family to prepare emotionally and psychologically for the procedure (**page C-7**).
- Review the woman's medical history:
  - Check for any possible allergies;
  - Ensure that the woman has received the complete antitetanus regimen and give one dose of tetanus vaccine, if necessary.
- Send a blood sample for haemoglobin or haematocrit and type and screen, and order blood for possible transfusion. Do not delay transfusion if needed.

- Wash the area around the proposed incision site with soap and water, if necessary.
- Do not shave the woman's pubic hair as this increases the risk of wound infection. The hair may be trimmed, if necessary.
- Monitor and record vital signs (blood pressure, pulse, respiratory rate and temperature).
- Administer premedication appropriate for the anaesthesia used (**page C-38**).
- Give an antacid (sodium citrate 0.3% 30 mL or magnesium trisilicate 300 mg) to reduce stomach acid in case there is aspiration.
- Catheterize the bladder if necessary and monitor urine output.
- Ensure that all relevant information is passed on to other members of the team (doctor/midwife, nurse, anaesthetist, assistant and others).

INTRA-OPERATIVE CARE PRINCIPLES

POSITION

Place the woman in a position appropriate for the procedure to allow:

- optimum exposure of the operative site;
- access for the anaesthetist;
- access for the nurse to take vital signs and monitor IV drugs and infusions;
- safety of the woman by preventing injuries and maintaining circulation;
- maintenance of the woman's dignity and modesty.

Note: If the **woman has not delivered**, have the operating table tilted to the left or place a pillow or folded linen under her right lower back to decrease supine hypotension syndrome.

SURGICAL HANDSCRUB

- Remove all jewelry.
- Hold hands above the level of the elbow, wet hands thoroughly and apply soap (preferably an iodophore, e.g. betadine).
- Begin at the fingertips and lather and wash, using a circular motion:
  - Wash between all fingers;
  - Move from the fingertips to the elbows of one hand and then repeat for the second hand;
  - Wash for three to five minutes.
- Rinse each arm separately, fingertips first, holding hands above the level of the elbows.
- Dry hands with a clean or disposable towel, wiping from the fingertips to the elbows, or allow hands to air dry.
- Ensure that scrubbed hands do not come into contact with objects (e.g. equipment, protective gown) that are not high-level disinfected or sterile. If the **hands touch a contaminated surface**, repeat surgical handscrub.

PREPARING THE INCISION SITE

- Prepare the skin with an antiseptic (e.g. iodophors, chlorhexidine):
  - Apply antiseptic solution three times to the incision site using a high-level disinfected or sterile ring forceps and cotton or gauze swab. If the **swab is held with a gloved hand**, do not contaminate the glove by touching unprepared skin;
  - Begin at the proposed incision site and work outward in a circular motion away from the incision site;
  - At the edge of the sterile field discard the swab.
- Never go back to the middle of the prepared area with the same swab. Keep your arms and elbows high and surgical dress away from the surgical field.
- Drape the woman immediately after the area is prepared to avoid contamination:
  - If the drape has a window, place the window directly over the incision site first.

- Unfold the drape away from the incision site to avoid contamination.

MONITORING

Monitor the woman's condition regularly throughout the procedure.

- Monitor vital signs (blood pressure, pulse, respiratory rate), level of consciousness and blood loss.
- Record the findings on a monitoring sheet to allow quick recognition if the woman's condition deteriorates.
- Maintain adequate hydration throughout surgery.

MANAGING PAIN

Maintain adequate pain management throughout the procedure (**page C-37**). Women who are comfortable during a procedure are less likely to move and cause injury to themselves. Pain management can include:

- emotional support and encouragement;
- local anaesthesia;
- regional anaesthesia (e.g. spinal);
- general anaesthesia.

ANTIBIOTICS

- Give prophylactic antibiotics before starting the procedure. If the **woman is going to have a caesarean section**, give prophylactic antibiotics **after** the baby is delivered (**page C-35**).

MAKING THE INCISION

- Make the incision only as large as necessary for the procedure.
- Make the incision with great care and proceed one layer at a time.

HANDLING TISSUE

- Handle tissue gently.
- When using clamps, close the clamp only one ratchet (click), when possible. This will minimize discomfort and reduce the amount of

dead tissue that remains behind at the end of the procedure, thus decreasing the risk of infection.

HAEMOSTASIS

- Ensure haemostasis throughout the procedure.
- Women with obstetrical complications often have anaemia. Therefore, keep blood loss to a minimum.

INSTRUMENTS AND SHARPS

- Start and finish the procedure with a count of instruments, sharps and sponges:
  - Perform the count every time a body cavity (e.g. uterus) is closed;
  - Document in the woman's record that the surgical counts were correct.
- Use instruments, especially sharps, carefully to reduce the risk of injury (**page C-20**). Use "safe zones" when handling and passing instruments and sharps:
  - Use a pan such as a kidney basin to carry and pass sharp items, and pass suture needles on a needle holder;
  - Alternatively, pass the instrument with the handle, rather than the sharp end, pointing toward the receiver.

DRAINAGE

- Always leave an abdominal drain in place if:
  - bleeding persists after hysterectomy;
  - a clotting disorder is suspected;
  - infection is present or suspected.
- A closed drainage system can be used or a corrugated rubber drain can be placed through the abdominal wall or pouch of Douglas.
- Remove the drain once the infection has cleared or when no pus or blood-stained fluid has drained for 48 hours.

SUTURE

- Select the appropriate type and size of suture for the tissue (**Table C-7**). Sizes are reported by a number of "0"s:
  - Smaller suture has a greater number of "0"s [e.g. 000 (3-0) suture is smaller than 00 (2-0) suture]; suture labeled as "1" is larger in diameter than "0" suture;
  - A suture that is too small will be weak and may break easily; a suture that is too large in diameter will tear through tissue.
- Refer to the appropriate section for the recommended size and type of suture for a procedure.

TABLE C-7 Recommended suture types

Suture Type	Tissue	Recommended Number of Knots
Plain catgut	Fallopian tube	3[a]
Chromic catgut	Muscle, fascia	3[a]
Polyglycolic	Muscle, fascia, skin	4
Nylon	Skin	6
Silk	Skin, bowel	3[a]

[a] These are natural sutures. Do not use more than three knots because this will abrade the suture and weaken the knot.

DRESSING

At the conclusion of surgery, cover the surgical wound with a sterile dressing (**page C-54**).

POSTOPERATIVE CARE PRINCIPLES

INITIAL CARE

- Place the woman in the recovery position:
  - Position the woman on her side with her head slightly extended to ensure a clear airway;
  - Place the upper arm in front of the body for easy access to check blood pressure;

- Place legs so that they are flexed, with the upper leg slightly more flexed than the lower to maintain balance.

- Assess the woman's condition immediately after the procedure:
  - Check vital signs (blood pressure, pulse, respiratory rate) and temperature every 15 minutes during the first hour, then every 30 minutes for the next hour;
  - Assess the level of consciousness every 15 minutes until the woman is alert.

  Note: Ensure the woman has constant supervision until conscious.

- Ensure a clear airway and adequate ventilation.
- Transfuse if necessary (**page C-23**).
- If **vital signs become unstable** or if the **haematocrit continues to fall despite transfusion**, quickly return to the operating theatre because bleeding may be the cause.

GASTROINTESTINAL FUNCTION

Gastrointestinal function typically returns rapidly for obstetrical patients. For most uncomplicated procedures, bowel function should be normal within 12 hours of surgery.

- If the **surgical procedure was uncomplicated**, give a liquid diet.
- If there were **signs of infection**, or if the **caesarean was for obstructed labour or uterine rupture**, wait until bowel sounds are heard before giving liquids.
- When the **woman is passing gas**, begin giving solid food.
- If the **woman is receiving IV fluids**, continue the fluids until she is taking liquids well.
- If you **anticipate that the woman will receive IV fluids for 48 hours or more**, infuse a balanced electrolyte solution (e.g. potassium chloride 1.5 g in 1 L IV fluids).
- If the **woman receives IV fluids for more than 48 hours**, monitor electrolytes every 48 hours. Prolonged infusion of IV fluids can alter electrolyte balance.
- Ensure the woman is eating a regular diet prior to discharge from hospital.

DRESSING AND WOUND CARE

The dressing is a protective barrier against infection while a healing process known as "re-epithelialization" occurs. Keep the dressing on the wound for the first day after surgery to protect against infection while re-epithelialization occurs. Thereafter, a dressing is not necessary.

- If **blood or fluid is leaking through the initial dressing**, do not change the dressing:
  - Reinforce the dressing;
  - Monitor the amount of blood/fluid lost by outlining the blood stain on the dressing with a pen;
  - If **bleeding increases or the blood stain covers half the dressing or more**, remove the dressing and inspect the wound. Replace with another sterile dressing.
- If the **dressing comes loose**, reinforce with more tape rather than removing the dressing. This will help maintain the sterility of the dressing and reduce the risk of wound infection.
- Change the dressing using sterile technique.
- The wound should be clean and dry, without evidence of infection or seroma prior to the woman's discharge from the hospital.

ANALGESIA

Adequate postoperative pain control is important (**page C-37**). A woman who is in severe pain does not recover well.

Note: Avoid over-sedation as this will limit mobility, which is important during the postoperative period.

BLADDER CARE

A urinary catheter may be required for some procedures. Early catheter removal reduces the risk of infection and encourages the woman to walk.

- If the **urine is clear**, remove the catheter eight hours after surgery or after the first postoperative night.
- If the **urine is not clear**, leave the catheter in place until the urine is clear.
- Wait 48 hours after surgery before removing the catheter if there was:

- uterine rupture;
- prolonged or obstructed labour;
- massive perineal oedema;
- puerperal sepsis with pelvic peritonitis.

Note: Ensure that the urine is clear before removing the catheter.

- If the **bladder was injured** (either from uterine rupture or during caesarean section or laparotomy):
  - Leave the catheter in place for a minimum of seven days and until the urine is clear;
  - If the **woman is not currently receiving antibiotics**, give nitrofurantoin 100 mg by mouth once daily until the catheter is removed, for prophylaxis against cystitis.

ANTIBIOTICS

- If there were **signs of infection or the woman currently has fever**, continue antibiotics until the woman is fever-free for 48 hours (**page C-35**).

SUTURE REMOVAL

Major support for abdominal incisions comes from the closure of the fascial layer. Remove skin sutures five days after surgery.

FEVER

- Fever (temperature 38°C or more) that occurs postoperatively should be evaluated (**page S-107**).
- Ensure the woman is fever-free for a minimum of 24 hours prior to discharge from hospital.

AMBULATION

Ambulation enhances circulation, encourages deep breathing and stimulates return of normal gastrointestinal function. Encourage foot and leg exercises and mobilize as soon as possible, usually within 24 hours.

NORMAL LABOUR

- Perform a rapid evaluation of the general condition of the woman including vital signs (pulse, blood pressure, respiration, temperature).
- Assess fetal condition:
  - Listen to the fetal heart rate immediately after a contraction:
    - Count the fetal heart rate for a full minute at least once every 30 minutes during the active phase and every five minutes during the second stage;
    - If there are **fetal heart rate abnormalities** (less than 100 or more than 180 beats per minute), suspect fetal distress (**page S-95**).
  - If the **membranes have ruptured**, note the colour of the draining amniotic fluid:
    - Presence of thick meconium indicates the need for close monitoring and possible intervention for management of fetal distress (**page S-95**);
    - Absence of fluid draining after rupture of the membranes is an indication of reduced volume of amniotic fluid, which may be associated with fetal distress.

SUPPORTIVE CARE DURING LABOUR AND CHILDBIRTH

- Encourage the woman to have personal support from a person of her choice throughout labour and birth:
  - Encourage support from the chosen birth companion;
  - Arrange seating for the companion next to the woman;
  - Encourage the companion to give adequate support to the woman during labour and childbirth (rub her back, wipe her brow with a wet cloth, assist her to move about).
- Ensure good communication and support by staff:
  - Explain all procedures, seek permission and discuss findings with the woman;

- Provide a supportive, encouraging atmosphere for birth that is respectful of the woman's wishes;
- Ensure privacy and confidentiality.

- Maintain cleanliness of the woman and her environment:
  - Encourage the woman to wash herself or bathe or shower at the onset of labour;
  - Wash the vulval and perineal areas before each examination;
  - Wash your hands with soap before and after each examination;
  - Ensure cleanliness of labouring and birthing area(s);
  - Clean up all spills immediately.
- Ensure mobility:
  - Encourage the woman to move about freely;
  - Support the woman's choice of position during labour and birth (**Fig C-2, page C-59**).
- Encourage the woman to empty her bladder regularly.

  Note: Do not routinely give an enema to women in labour.
- Encourage the woman to eat and drink as she wishes. If the **woman has visible severe wasting or tires during labour**, make sure she is fed. Nutritious liquid drinks are important, even in late labour.
- Teach breathing techniques for labour and delivery. Encourage the woman to breathe out more slowly than usual and relax with each expiration.
- Help the woman in labour who is anxious, fearful or in pain:
  - Give her praise, encouragement and reassurance;
  - Give her information on the process and progress of her labour;
  - Listen to the woman and be sensitive to her feelings.
- If the **woman is distressed by pain**:
  - Suggest changes of position (**Fig C-2, page C-59**);
  - Encourage mobility;
  - Encourage her companion to massage her back or hold her hand and sponge her face between contractions;

- Encourage breathing techniques;
- Encourage warm bath or shower;
- If necessary, give pethidine 1 mg/kg body weight (but not more than 100 mg) IM or IV slowly or give morphine 0.1 mg/kg body weight IM.

FIGURE C-2 Some positions that a woman may adopt during labour and birth

DIAGNOSIS

Diagnosis of labour includes:

- diagnosis and confirmation of labour;
- diagnosis of stage and phase of labour;
- assessment of engagement and descent of the fetus;
- identification of presentation and position of the fetus.

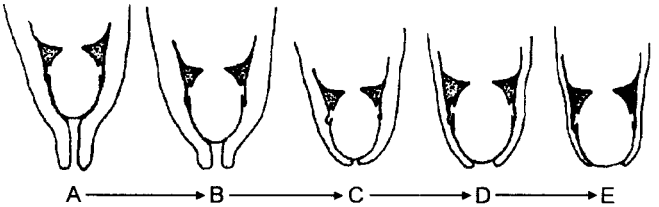
An incorrect diagnosis of labour can lead to unnecessary anxiety and interventions.

DIAGNOSIS AND CONFIRMATION OF LABOUR

- Suspect or anticipate labour if the woman has:
  - intermittent abdominal pain after 22 weeks gestation;
  - pain often associated with blood-stained mucus discharge (show);
  - watery vaginal discharge or a sudden gush of water.
- Confirm the onset of labour if there is:

- cervical effacement—the progressive shortening and thinning of the cervix during labour; and
- cervical dilatation—the increase in diameter of the cervical opening measured in centimetres (**Fig C-3 A–E**).

FIGURE C-3 Effacement and dilatation of the cervix



DIAGNOSIS OF STAGE AND PHASE OF LABOUR

TABLE C-8 Diagnosis of stage and phase of labour[a]

Symptoms and Signs	Stage	Phase
• Cervix not dilated	False labour/ Not in labour	
• Cervix dilated less than 4 cm	First	Latent
• Cervix dilated 4–9 cm • Rate of dilatation typically 1 cm per hour or more • Fetal descent begins	First	Active
• Cervix fully dilated (10 cm) • Fetal descent continues • No urge to push	Second	Early (non-expulsive)
• Cervix fully dilated (10 cm) • Presenting part of fetus reaches pelvic floor • Woman has the urge to push	Second	Late (expulsive)

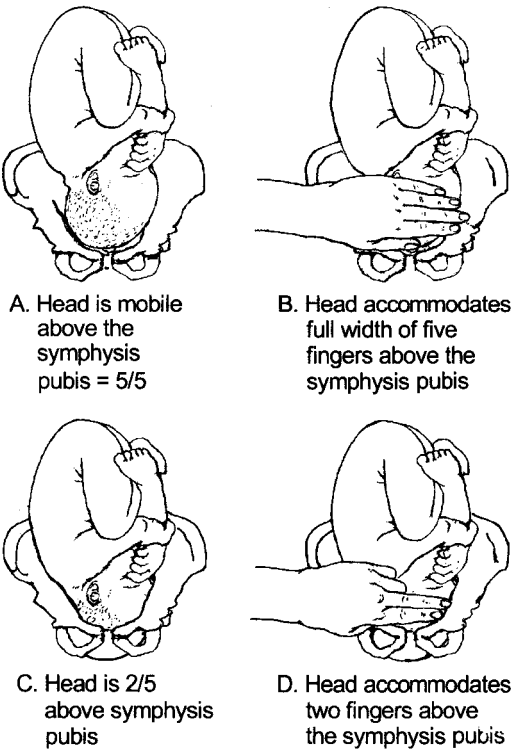
[a] The third stage of labour begins with delivery of the baby and ends with the expulsion of the placenta.

DESCENT

ABDOMINAL PALPATION

- By abdominal palpation, assess descent in terms of fifths of fetal head palpable above the symphysis pubis (**Fig C-4 A–D**):
  - A head that is entirely above the symphysis pubis is five-fifths (5/5) palpable (**Fig C-4 A–B**);
  - A head that is entirely below the symphysis pubis is zero-fifths (0/5) palpable.

FIGURE C-4 Abdominal palpation for descent of the fetal head



A. Head is mobile above the symphysis pubis = 5/5

B. Head accommodates full width of five fingers above the symphysis pubis

C. Head is 2/5 above symphysis pubis

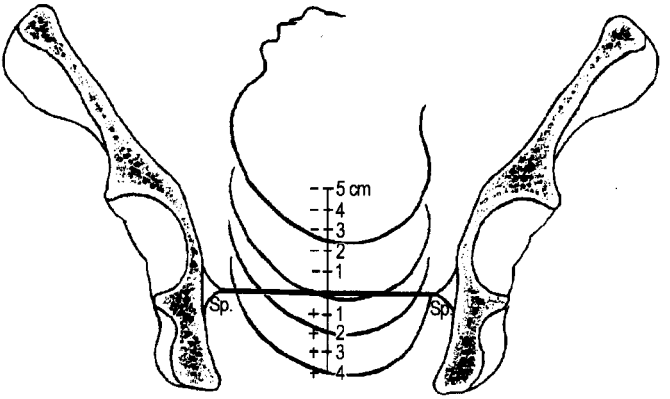
D. Head accommodates two fingers above the symphysis pubis

VAGINAL EXAMINATION

- If necessary, a vaginal examination may be used to assess descent by relating the level of the fetal presenting part to the ischial spines of the maternal pelvis (**Fig C-5, page C-62**).

Note: When there is a **significant degree of caput or moulding**, assessment by abdominal palpation using fifths of head palpable is more useful than assessment by vaginal exam.

FIGURE C-5 Assessing descent of the fetal head by vaginal examination; 0 station is at the level of the ischial spine (Sp)

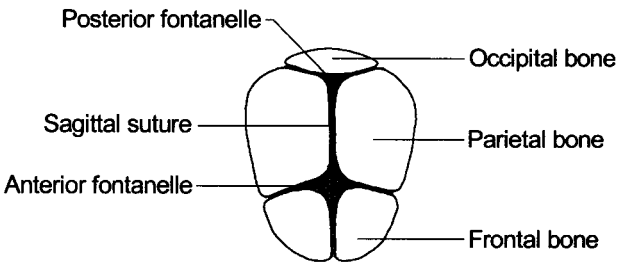


PRESENTATION AND POSITION

DETERMINE THE PRESENTING PART

- The most common presenting part is the vertex of the fetal head. If the **vertex is not the presenting part**, manage as a malpresentation (**Table S-12, page S-73**).
- If the **vertex is the presenting part**, use landmarks on the fetal skull to determine the position of the fetal head in relation to the maternal pelvis (**Fig C-6**).

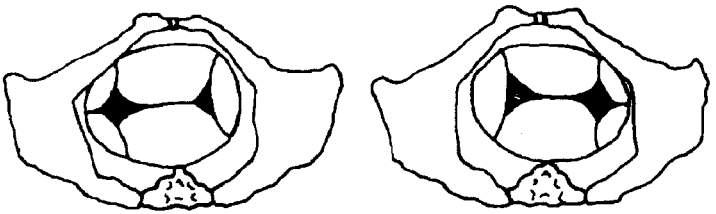
FIGURE C-6 Landmarks of the fetal skull



DETERMINE THE POSITION OF THE FETAL HEAD

- The fetal head normally engages in the maternal pelvis in an **occiput transverse position**, with the fetal occiput transverse in the maternal pelvis (**Fig C-7**).

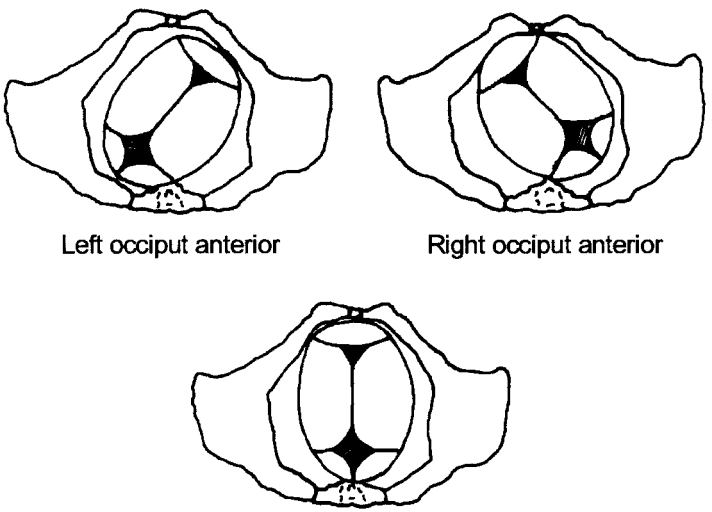
FIGURE C-7 Occiput transverse positions



Left occiput transverse Right occiput transverse

- With descent, the fetal head rotates so that the fetal occiput is anterior in the maternal pelvis (**occiput anterior positions, Fig C-8**). Failure of an occiput transverse position to rotate to an occiput anterior position should be managed as an occiput posterior position (**page S-75**).

FIGURE C-8 Occiput anterior positions

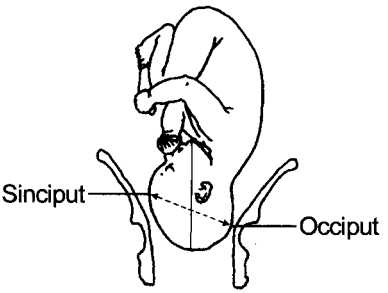


Left occiput anterior Right occiput anterior

Occiput anterior

- An additional feature of a normal presentation is a **well-flexed vertex** (**Fig C-9**), with the occiput lower in the vagina than the sinciput.

FIGURE C-9 Well-flexed vertex



ASSESSMENT OF PROGRESS OF LABOUR

Once diagnosed, progress of labour is assessed by:

- measuring changes in cervical effacement and dilatation (**Fig C-3 A–E, page C-60**) during the latent phase;
- measuring the rate of cervical dilatation and fetal descent (**Fig C-4, page C-61** and **Fig C-5, page C-62**) during the active phase;
- assessing further fetal descent during the second stage.

Progress of the first stage of labour should be plotted on a partograph once the woman enters the active phase of labour. A sample partograph is shown in **Fig C-10, page C-67**. Alternatively, plot a simple graph of cervical dilatation (centimetres) on the vertical axis against time (hours) on the horizontal axis.

VAGINAL EXAMINATIONS

Vaginal examinations should be carried out at least once every four hours during the first stage of labour and after rupture of the membranes. Plot the findings on a partograph.

- At each vaginal examination, record the following:
  - colour of amniotic fluid;
  - cervical dilatation;
  - descent (can also be assessed abdominally).

- If the **cervix is not dilated on first examination** it may not be possible to diagnose labour.
  - If **contractions persist**, re-examine the woman after four hours for cervical changes. At this stage, if there is **effacement and dilatation**, the woman is in labour; if there is **no change**, the diagnosis is false labour.
- In the second stage of labour, perform vaginal examinations once every hour.

USING THE PARTOGRAPH

The WHO partograph has been modified to make it simpler and easier to use. The latent phase has been removed and plotting on the partograph begins in the active phase when the cervix is 4 cm dilated. A sample partograph is included (**Fig C-10, page C-67**). Note that the partograph should be enlarged to full size before use. Record the following on the partograph:

Patient information: Fill out name, gravida, para, hospital number, date and time of admission, and time of ruptured membranes or time elapsed since rupture of membranes (if rupture occurred before charting on the partograph began).

Fetal heart rate: Record every half hour.

Amniotic fluid: Record the colour of amniotic fluid at every vaginal examination:

- I: membranes intact;
- R: membranes ruptured;
- C: membranes ruptured, clear fluid;
- M: meconium-stained fluid;
- B: blood-stained fluid.

Moulding:

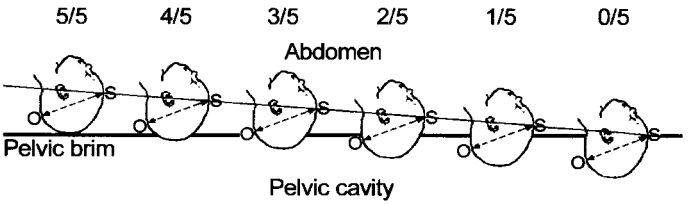
- 1: sutures apposed;
- 2: sutures overlapped but reducible;
- 3: sutures overlapped and not reducible.

Cervical dilatation: Assessed at every vaginal examination and marked with a cross (**X**). Begin plotting on the partograph at 4 cm.

Alert line: A line starts at 4 cm of cervical dilatation to the point of expected full dilatation at the rate of 1 cm per hour.

Action line: Parallel and four hours to the right of the alert line.

Descent assessed by abdominal palpation: Refers to the part of the head (divided into five parts) palpable above the symphysis pubis; recorded as a circle (***O***) at every abdominal examination. At 0/5, the sinciput (S) is at the level of the symphysis pubis.



Completely above	Sinciput high, Occiput easily felt	Sinciput easily felt, Occiput felt	Sinciput felt, Occiput just felt	Sinciput felt, Occiput not felt	None of head palpable

Hours: Refers to the time elapsed since onset of active phase of labour (observed or extrapolated).

Time: Record actual time.

Contractions: Chart every half hour; count the number of contractions in a 10-minute time period, and their duration in seconds.

- Less than 20 seconds: ⬚
- Between 20 and 40 seconds: ▨
- More than 40 seconds: ■

Oxytocin: Record the amount of oxytocin per volume IV fluids in drops per minute every 30 minutes when used.

Drugs given: Record any additional drugs given.

Pulse: Record every 30 minutes and mark with a dot (•).

Blood pressure: Record every four hours and mark with arrows.

Temperature: Record every two hours.

Protein, acetone and volume: Record when urine is passed.

FIGURE C-10 The modified WHO Partograph

Name Gravida Para Hospital number

Date of admission Time of admission Ruptured membranes hours

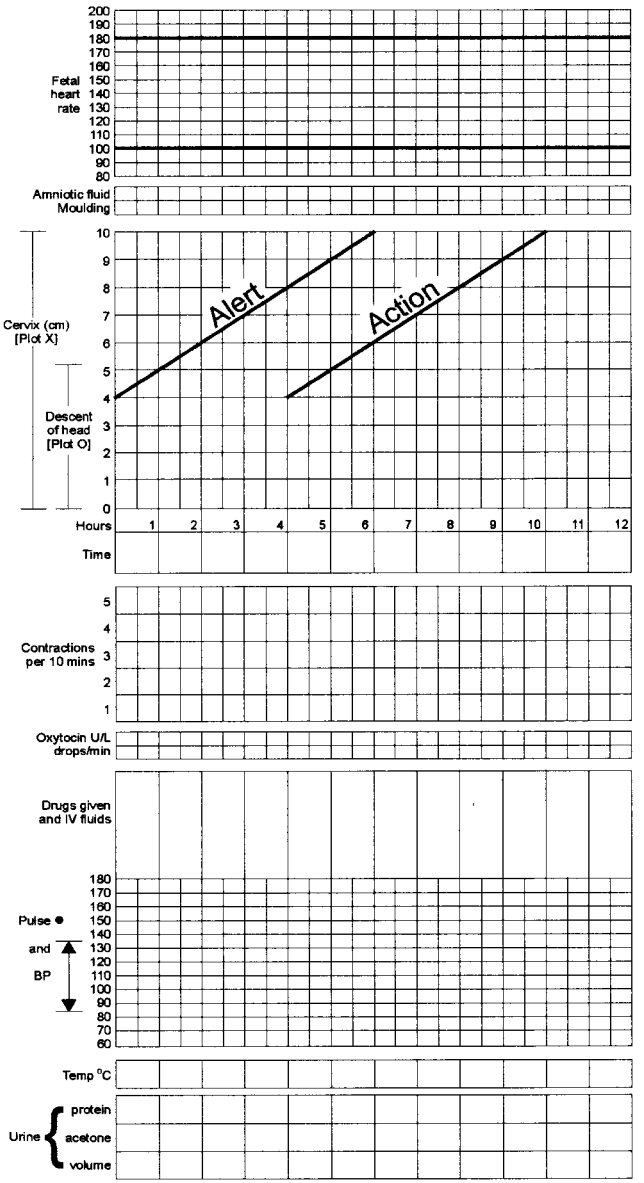


Figure C-11, page C-69 is a sample partograph for normal labour:

- A primigravida was admitted in the latent phase of labour at 5 AM:
  - fetal head was 4/5 palpable;
  - cervix dilated 2 cm;
  - three contractions in 10 minutes, each lasting 20 seconds;
  - normal maternal and fetal condition.

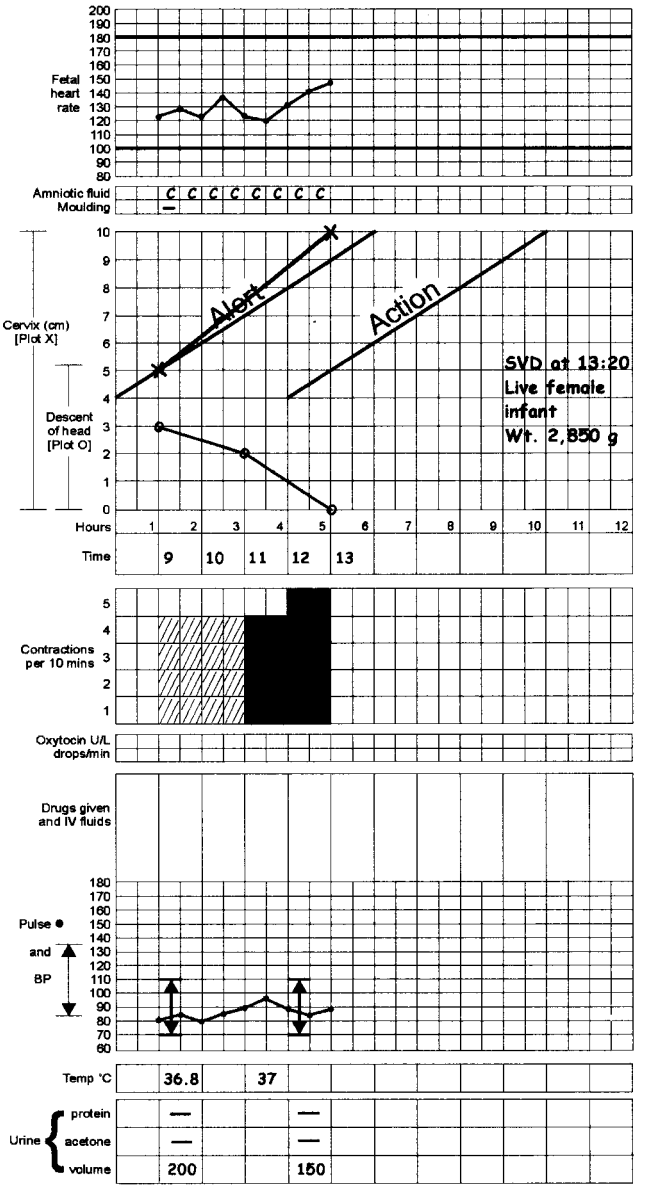
  Note: Because the woman was in the latent phase of labour, this information is not plotted on the partograph.
- At 9 AM:
  - fetal head 3/5 palpable;
  - cervix dilated 5 cm;
  - four contractions in 10 minutes, each lasting 35 seconds.

  Note: The woman was in the active phase of labour and this information is plotted on the partograph. Cervical dilatation is plotted on the alert line.
- At 11 AM:
  - fetal head 2/5 palpable;
  - four contractions in 10 minutes, each lasting 45 seconds.
- At 1 PM:
  - fetal head 0/5 palpable;
  - cervical dilatation progressed at rate of more than 1 cm per hour and cervix fully dilated;
  - five contractions in 10 minutes each lasting 45 seconds;
  - spontaneous vaginal delivery at 1:20 PM.

FIGURE C-11 Sample partograph for normal labour

Name Mrs. S Gravida 3 Para 2+0 Hospital number 7886

Date of admission 12.5.2000 Time of admission 5:00 A.M. Ruptured membranes 1 hours



PROGRESS OF FIRST STAGE OF LABOUR

- Findings suggestive of **satisfactory progress** in the first stage of labour are:
  - regular contractions of progressively increasing frequency and duration;
  - rate of cervical dilatation at least 1 cm per hour during the active phase of labour (cervical dilatation on or to the left of alert line);
  - cervix well applied to the presenting part.
- Findings suggestive of **unsatisfactory progress** in the first stage of labour are:
  - irregular and infrequent contractions after the latent phase;
  - OR rate of cervical dilatation slower than 1 cm per hour during the active phase of labour (cervical dilatation to the right of alert line);
  - OR cervix poorly applied to the presenting part.

Unsatisfactory progress in labour can lead to prolonged labour (**Table S-10, page S-57**).

PROGRESS OF SECOND STAGE OF LABOUR

- Findings suggestive of **satisfactory progress** in the second stage of labour are:
  - steady descent of fetus through birth canal;
  - onset of expulsive (pushing) phase.
- Findings suggestive of **unsatisfactory progress** in second stage of labour are:
  - lack of descent of fetus through birth canal;
  - failure of expulsion during the late (expulsive) phase.

PROGRESS OF FETAL CONDITION

- If there are **fetal heart rate abnormalities** (less than 100 or more than 180 beats per minute), suspect fetal distress (**page S-95**).

- Positions or presentations in labour other than occiput anterior with a well-flexed vertex are considered malpositions or malpresentations (**page S-69**).
- If **unsatisfactory progress of labour** or **prolonged labour is suspected**, manage the cause of slow progress (**page S-57**).

PROGRESS OF MATERNAL CONDITION

Evaluate the woman for signs of distress:

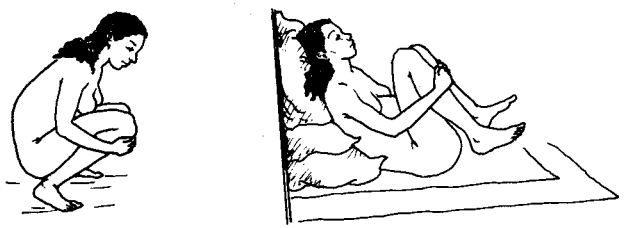
- If the **woman's pulse is increasing**, she may be dehydrated or in pain. Ensure adequate hydration via oral or IV routes and provide adequate analgesia (**page C-37**).
- If the **woman's blood pressure decreases**, suspect haemorrhage (**page S-17**).
- If **acetone is present in the woman's urine**, suspect poor nutrition and give dextrose IV.

NORMAL CHILDBIRTH

General methods of supportive care during labour are most useful in helping the woman tolerate labour pains.

- Once the **cervix is fully dilated** and the **woman is in the expulsive phase of the second stage**, encourage the woman to assume the position she prefers (**Fig C-12**) and encourage her to push.

FIGURE C-12 Some positions that a woman may adopt during childbirth



Note: Episiotomy is no longer recommended as a routine procedure. There is no evidence that routine episiotomy decreases perineal damage, future vaginal prolapse or urinary incontinence. In fact, routine episiotomy is associated with an increase of third and fourth degree tears and subsequent anal sphincter muscle dysfunction.

Episiotomy (page P-71) should be considered only in the case of:

- complicated vaginal delivery (breech, shoulder dystocia, forceps, vacuum extraction);
- scarring from female genital cutting or poorly healed third or fourth degree tears;
- fetal distress.

DELIVERY OF THE HEAD

- Ask the woman to pant or give only small pushes with contractions as the baby's head delivers.
- To control birth of the head, place the fingers of one hand against the baby's head to keep it flexed (bent).
- Continue to gently support the perineum as the baby's head delivers.
- Once the baby's head delivers, ask the woman not to push.
- Suction the baby's mouth and nose.
- Feel around the baby's neck for the umbilical cord:
  - If the **cord is around the neck but is loose**, slip it over the baby's head;
  - If the **cord is tight around the neck**, doubly clamp and cut it before unwinding it from around the neck.

COMPLETION OF DELIVERY

- Allow the baby's head to turn spontaneously.
- After the head turns, place a hand on each side of the baby's head. Tell the woman to push gently with the next contraction.
- Reduce tears by delivering one shoulder at a time. Move the baby's head posteriorly to deliver the shoulder that is anterior.

Note: If there is **difficulty delivering the shoulders**, suspect shoulder dystocia (**page S-83**).

- Lift the baby's head anteriorly to deliver the shoulder that is posterior.
- Support the rest of the baby's body with one hand as it slides out.
- Place the baby on the mother's abdomen. Thoroughly dry the baby, wipe the eyes and assess the baby's breathing:

  Note: Most babies begin crying or breathing spontaneously within 30 seconds of birth:

  - If the **baby is crying or breathing** (chest rising at least 30 times per minute) leave the baby with the mother;
  - If **baby does not start breathing within 30 seconds, SHOUT FOR HELP** and take steps to resuscitate the baby (**page S-142**).

Anticipate the need for resuscitation and have a plan to get assistance for every baby but especially if the mother has a history of eclampsia, bleeding, prolonged or obstructed labour, preterm birth or infection.

- Clamp and cut the umbilical cord within one minute of delivery of the baby.
- Ensure that the baby is kept warm and in skin-to-skin contact on the mother's chest. Wrap the baby in a soft, dry cloth, cover with a blanket and ensure the head is covered to prevent heat loss.
- If the **mother is not well**, ask an assistant to care for the baby.
- Palpate the abdomen to rule out the presence of an additional baby(s) and proceed with active management of the third stage.

ACTIVE MANAGEMENT OF THE THIRD STAGE

Active management of the third stage (active delivery of the placenta) helps prevent postpartum haemorrhage. Active management of the third stage of labour includes:

- immediate oxytocin;
- controlled cord traction; and

- uterine massage.

OXYTOCIN

- Within one minute of delivery of the baby, palpate the abdomen to rule out the presence of an additional baby(s) and give oxytocin 10 units IM.
- Oxytocin is preferred because it is effective two to three minutes after injection, has minimal side effects and can be used in all women. If **oxytocin is not available**, give ergometrine 0.2 mg IM or prostaglandins. Make sure there is no additional baby(s) before giving these medications.

Do not give ergometrine to women with pre-eclampsia, eclampsia or high blood pressure because it increases the risk of convulsions and cerebrovascular accidents.

CONTROLLED CORD TRACTION

- Clamp the cord close to the perineum using sponge forceps within one minute of delivery. Hold the clamped cord and the end of forceps with one hand.
- Place the other hand just above the woman's pubic bone and stabilize the uterus by applying counter traction during controlled cord traction. This helps prevent inversion of the uterus.
- Keep slight tension on the cord and await a strong uterine contraction (two to three minutes).
- When the **uterus becomes rounded or the cord lengthens**, very gently pull downward on the cord to deliver the placenta. Do not wait for a gush of blood before applying traction on the cord. Continue to apply counter traction to the uterus with the other hand.
- If the **placenta does not descend** during 30 to 40 seconds of controlled cord traction (i.e. there are no signs of placental separation), do not continue to pull on the cord:
  - Gently hold the cord and wait until the uterus is well contracted again. If necessary, use a sponge forceps to clamp the cord closer to the perineum as it lengthens;
  - With the next contraction, repeat controlled cord traction with counter traction.

Never apply cord traction (pull) without applying counter traction (push) above the pubic bone with the other hand.

- As the placenta delivers, the thin membranes can tear off. Hold the placenta in two hands and gently turn it until the membranes are twisted.
- Slowly pull to complete the delivery.
- If the **membranes tear**, gently examine the upper vagina and cervix wearing high-level disinfected or sterile gloves and use a sponge forceps to remove any pieces of membrane that are present.
- Look carefully at the placenta to be sure none of it is missing. If a **portion of the maternal surface is missing or there are torn membranes with vessels**, suspect retained placental fragments (**page S-32**).
- If **uterine inversion occurs**, reposition the uterus (**page P-91**).
- If the **cord is pulled off**, manual removal of the placenta may be necessary (**page P-77**).

UTERINE MASSAGE

- Immediately massage the fundus of the uterus through the woman's abdomen until the uterus is contracted.
- Repeat uterine massage every 15 minutes for the first two hours.
- Ensure that the uterus does not become relaxed (soft) after you stop uterine massage.

EXAMINATION FOR TEARS

- Examine the woman carefully and repair any tears to the cervix (**page P-81**) or vagina (**page P-83**) or repair episiotomy (**page P-73**).

INITIAL CARE OF THE NEWBORN

- Check the baby's breathing and colour every five minutes.

- If the **baby becomes cyanotic** (bluish) or is **having difficulty breathing** (less than 30 or more than 60 breaths per minute), give oxygen by nasal catheter or prongs (**page S-146**).
- Check warmth by feeling the baby's feet every 15 minutes:
  - If the **baby's feet feel cold**, check axillary temperature;
  - If the **baby's temperature is less than 36.5°C**, rewarm the baby (**page S-148**).
- Check the cord for bleeding every 15 minutes. If the **cord is bleeding**, retie the cord more tightly.
- Apply antimicrobial drops (1% silver nitrate solution or 2.5% povidone-iodine solution) or ointment (1% tetracycline ointment) to the baby's eyes.

  Note: Povidone-iodine should not be confused with tincture of iodine, which could cause blindness if used.
- Wipe off any meconium or blood from skin.
- Encourage breastfeeding when the baby appears ready (begins "rooting"). Do not force the baby to the breast.

Avoid separating mother from baby whenever possible. Do not leave mother and baby unattended at any time.

When a baby is born to a mother being treated for complications, the management of the newborn will depend on:

- whether the baby has a condition or problem requiring rapid treatment;
- whether the mother's condition permits her to care for her newborn completely, partially or not at all.

NEWBORN BABIES WITH PROBLEMS

- If the **newborn has an acute problem that requires treatment within one hour of delivery**, health care providers in the labour ward will be required to give the care (**page S-141**). Problems or conditions of the newborn requiring urgent interventions include:
  - gasping or not breathing;
  - breathing with difficulty (less than 30 or more than 60 breaths per minute, indrawing of the chest or grunting);
  - central cyanosis (blueness);
  - preterm or very low birth weight (less than 1500 g);
  - lethargy;
  - hypothermia (axillary temperature less than 36.5°C);
  - convulsions.
- The following conditions require early treatment:
  - low birth weight (1500–2500 g);
  - possible bacterial infection in an apparently normal newborn whose mother had prelabour or prolonged rupture of membranes or amnionitis;
  - possible congenital syphilis (mother has positive serologic test or is symptomatic).
- If the **newborn has a malformation or other problem that does not require urgent (labour ward) care**:
  - Provide routine initial newborn care (**page C-75**);
  - Transfer the baby to the appropriate service to care for sick newborns as quickly as possible (**page C-78**).

NEWBORN BABIES WITHOUT PROBLEMS

- If the **newborn has no apparent problems**, provide routine initial newborn care, including skin-to-skin contact with the mother and early breastfeeding (**page C-75**).
- If the **mother's condition permits**, keep the baby in skin-to-skin contact with the mother at all times.
- If the **mother's condition does not permit her to maintain skin-to-skin contact** with the baby after the delivery (e.g. caesarean section):
  - Wrap the baby in a soft, dry cloth, cover with a blanket and ensure the head is covered to prevent heat loss;
  - Observe frequently.
- If the **mother's condition requires prolonged separation** from the baby, transfer the baby to the appropriate service to care for newborns (see below).

TRANSFERRING NEWBORN BABIES

- Explain to the mother why the baby is being transferred (**page C-5**).
- Keep the baby warm. Wrap the baby in a soft, dry cloth, cover with a blanket and ensure the head is covered to prevent heat loss.
- Transfer the baby in the arms of a health care provider if possible. If the **baby requires special treatment such as oxygen**, transfer in an incubator or bassinet.
- Initiate breastfeeding as soon as the baby is ready to suckle or as soon as the mother's condition permits.
- If **breastfeeding has to be delayed** due to maternal or newborn problems, teach the mother to express breastmilk as soon as possible and ensure that this milk is given to the newborn.
- Ensure that the service caring for the newborn receives the record of the labour and delivery and of any treatments given to the newborn.

CREATING AN IMPROVED HEALTH CARE ENVIRONMENT

The district hospital should strive to create a welcoming environment for women, communities and providers from peripheral health units. It should support the worthy efforts of other providers and work with them to correct deficiencies.

When dealing with other providers, doctors and midwives at the district hospital should:

- encourage and thank providers who refer patients, especially in the presence of the woman and her family;
- offer clinical guidance and corrective suggestions in private, so as to maintain the provider's credibility in the community;
- involve the provider (to an appropriate extent) in the continued care of the woman.

When dealing with the community, doctors and midwives at the district hospital should:

- invite members of the community to be part of the district hospital or health development committee;
- identify key persons in the community and invite them to the facility to learn about its function, as well as its constraints and limitations;
- create opportunities for the community to view the district hospital as a wellness facility (e.g. through vaccination campaigns and screening programs).

MEETING THE NEEDS OF WOMEN

To enhance its appeal to women and the community, the district hospital should examine its own service delivery practices. The facility should create a culturally sensitive and comfortable environment which:

- respects the woman's modesty and privacy;
- welcomes family members;
- provides a comfortable place for the woman and/or her newborn (e.g. lower delivery bed, warm and clean room).

With careful planning, the facility can create this environment without interfering with its ability to respond to complications or emergencies.

IMPROVING REFERRAL PATTERNS

Each woman who is referred to the district hospital should be given a standard referral slip containing the following information:

- general patient information (name, age, address);
- obstetrical history (parity, gestational age, complications in the antenatal period);
- relevant past obstetrical complications (previous caesarean section, postpartum haemorrhage);
- the specific problem for which she was referred;
- treatments applied thus far and the results of those treatments.

Include the outcome of the referral on the referral slip. **Send the referral slip back to the referring facility** with the woman or the person who brought her. Both the district hospital and the referring facility should keep a record of all referrals as a quality assurance mechanism:

- Referring facilities can assess the success and appropriateness of their referrals;
- The district hospital can review the records for patterns indicating that a provider or facility needs additional technical support or training.

PROVIDING TRAINING AND SUPPORTIVE SUPERVISION

District hospitals should offer clinical training for peripheral providers that is high-quality and **participatory**. Participatory training is skill-focused and is more effective than classroom-based training because it:

- improves the relationship between providers at the district hospital and the auxiliary and multipurpose workers from peripheral units;
- increases the familiarity of the peripheral providers with the clinical care provided at the district hospital;
- promotes team building and facilitates supervision of health workers once they return to their community to implement the skills they have learned.