

Infection Prevention Practices in Emergency Obstetric Care

***A Supplement
to Infection Prevention:
A Reference Booklet
for Health Care Providers***

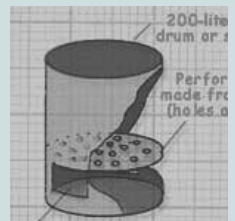
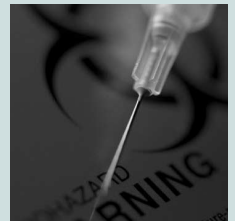
Prepared by EngenderHealth
for the AMDD Program

AMDD

Averting Maternal Death
& Disability Program



Columbia University
MAILMAN SCHOOL
OF PUBLIC HEALTH



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Improving Women's Health Worldwide

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Introduction

Though good aseptic technique can prevent or minimize the risk of infection during clinical procedures, infection prevention practices and universal precautions are often compromised in emergency situations. This booklet serves as a supplement to EngenderHealth's *Infection Prevention: A Reference Booklet for Health Care Providers*, providing specific information on applying principles of aseptic technique to emergency obstetric care services.

General infection prevention practices such as handwashing, gloving, handling of sharps, instrument processing, housekeeping, and waste disposal are addressed in detail in the reference booklet. This supplement focuses on aseptic practices that are recommended for use in specific emergency obstetric care procedures, and provides information about options and acceptable modifications to routine practice during emergency situations. Tables summarizing the guidelines for specific emergency obstetric and neonatal procedures are also included.

In areas where the risk of tetanus is high, appropriate prophylaxis against tetanus is critical in situations where septic procedures have been performed. This supplement provides information about measures to prevent tetanus infections in mothers who have undergone unhygienic procedures and in infants.

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Handwashing

Proper handwashing is one of the most effective ways to reduce the spread of infections in health care settings, and should be done whenever possible in emergency situations.

For any procedures that involve touching a client, staff should wash their hands:

- Before and after examining each client
- Before putting on gloves for clinical procedures
- After removing gloves worn during clinical procedures

Handwashing may not be possible before emergency stabilization procedures such as administering drugs, inserting an IV, placing pressure on lacerations, or emergency delivery. Wearing gloves during these procedures is critical, even if hands were not washed.

Aseptic Technique

“Aseptic technique” refers to the practices performed just before or during a clinical or surgical procedure to reduce the client’s risk of infection by reducing the likelihood that microorganisms will enter areas of the body where they can cause infection.

Aseptic technique includes:

- Surgical scrub
- Using physical barriers (such as gloves and other surgical attire, surgical drapes, and pads)
- Client prep
- Establishing and maintaining a sterile field
- Good surgical technique
- Appropriate use of prophylactic antibiotics
- Creating a safer surgical/procedure area

These are discussed below.

Surgical scrub

Surgical scrub with an antiseptic reduces the client’s risk of infection in case surgical gloves develop holes, tears, or nicks during the procedure. Scrubbing should be performed before all surgical procedures.

Ideally, a full surgical scrub—systematically and thoroughly washing your hands under clean, running water* for 3–5 minutes—should be performed before every surgical procedure. For faster stabilization during emergencies, a rapid surgical scrub (1–2 minutes) that focuses on the fingertips and hands is acceptable.

* *Running water* is defined as water that runs freely from a tap or is stored in a container with a tap. If water is stored in a container without a tap, pour some of the water into a smaller container, and have another person pour the water over the hands being washed.

Physical barriers (gloves and other surgical attire, surgical drapes, and pads)

The use of barriers helps reduce the risk of inadvertent infection in both clients and service providers by reducing the likelihood that clients or providers will be exposed to microorganisms.

Barriers include:

- Gloves
- Other surgical attire (caps, masks, protective eyewear, gowns, waterproof aprons, and sturdy footwear)
- Drapes
- Waterproof pads

Gloves

Gloves provide a highly effective barrier against microorganisms, and they are worn to protect both the provider and the client from potential infection.

Health care staff should wear gloves whenever:

- Touching potentially infectious tissues and secretions or tissues that are vulnerable to infection (such as broken skin, mucous membranes, and surgically exposed tissues)
- Handling blood or other body fluids (such as secretions and excretions)
- Handling materials and environmental surfaces that have been contaminated by potentially infectious tissues and secretions
- Performing cleaning and instrument-processing duties (such as decontamination, cleaning, sterilization/high-level disinfection, and waste disposal)

See Appendix A (page 13) for recommendations of the type of glove to be worn for specific procedures.

It is *not recommended practice* to use the same gloves more than once—either on the same client or on different clients—unless they have been processed for safe reuse. Remove gloves after performing examinations during labor, and use a new glove with the same client again or with any other client.

Note: Single-use exam gloves cannot be processed for safe reuse; only surgical gloves can be processed for safe reuse as exam gloves. Discard single-use exam gloves after use. If surgical gloves are to be reused, they should be processed first.

Adequate supplies of single-use exam gloves or surgical gloves (new or processed) should be available in *all* procedure areas.

Even during emergency procedures, sterile gloves should be put on in a sterile fashion, and should be changed whenever they are believed to be contaminated.

Other surgical attire

Providers' exposure to blood and other body fluids is great during obstetric care procedures, especially in emergencies, putting them at high risk of infection. HIV and the hepatitis B virus can enter the body through the thin mucosa of the eyes, nose, lips, and mouth and through the broken or abraded skin of the hands (intact skin is not vulnerable to these viruses). Therefore, the proper attire depends on the nature of the anticipated procedure and the risk of splashing or spills.

Masks and protective eyewear protect the provider's eyes, nose, lips, and mouth from exposure to splashes of amniotic fluids and blood. Waterproof aprons protect the underlying clothing (as well as the underlying skin) so that it does not need to be changed after every procedure. Sturdy, closed footwear provides protection from accidental injury with sharps.

Caps and gowns provide an important barrier between the provider's "normal" bacteria and the client's tissues, and, thus, are worn more for the protection of the client than the provider. Gowns do provide some protection to the provider's skin (which is normally resistant to the infectious agents encountered in blood and secretions), acting as an effective barrier against potentially infectious secretions. However, gowns provide protection against infection only as long as they are dry; once a gown is wet, it is no longer sterile and does not act as an effective barrier to infection for either the client or the provider.

See Appendix A (page 13) for the proper attire to be worn for specific procedures.

Gloves and other surgical attire should be available and functional in all designated delivery and procedure areas, as well as in any areas (such as the emergency admissions department, or Casualty) where emergency deliveries or other emergency obstetric care procedures are likely to be performed. At a minimum, gloves should be available in all client-care areas, since providers' hands are most prone to exposure to microorganisms.

During emergency procedures, staff should wear as much of the recommended or required surgical attire as possible.

Client prep

Proper client preparation with antiseptics before an obstetric procedure, such as a cesarean section or uterine evacuation, involves applying an antiseptic solution to the client's skin, vagina, cervix, or perineum to destroy or prevent the growth of microorganisms. Most surgical-site infections result from contamination during surgery—not, as many people believe, because clients do not keep the wound clean after surgery. Frequently, infections are caused by bacteria from the client's skin or tissues. Therefore, *proper client prep before a procedure is critical.*

Even in emergency situations, there is usually time for adequate client prep, provided the materials and antiseptics are easily available.

Common antiseptics used for client prep:

- An iodophor (e.g., Betadine)
- 4% chlorhexidine gluconate (e.g., Hibiclens)
- Chlorhexidine gluconate with cetrimide (e.g., Savlon)
- 1–3% iodine, followed by 60–90% alcohol (ethyl or isopropyl). *Note:* Alcohol and alcohol-based antiseptics should be used *on the skin only*; do not use them to prepare the vagina, cervix, or perineum.

Preparation of the skin

To properly prep the skin:

1. Wash the area with soap and water. (This may not be possible during emergency procedures.)
2. Place dry, sterile cotton balls or gauze sponges in a solution cup, or gallipot, filled with antiseptic.
3. Pick up a soaked cotton ball or sponge with sterile forceps. Wipe the area of incision or instrumentation first, then gradually enlarge the area covered with antiseptic—taking care not to go over areas that were already wiped—until an area several times the anticipated incision or instrumentation area has been cleaned with antiseptic. Repeat at least once, preferably two times, using a new antiseptic-soaked cotton ball or sponge each time.

Remember: Surgical drapes should not be applied to excessively wet skin, as this compromises the sterile field. If there is not time to allow the skin to dry on its own, blot the excess antiseptic with a sterile towel.

Preparation of the cervix and vagina

For manual vacuum aspiration (MVA) or dilation and curettage (D&C): Apply a liberal amount of an appropriate antiseptic (such as an iodophor) to the cervix and vagina before instrumentation of the uterus, as follows:

1. Place dry, sterile cotton balls or gauze sponges in a solution cup, or gallipot, filled with antiseptic.
2. Insert a vaginal speculum (bivalve or two single valves) to visualize and stabilize the cervix.
3. Pick up a soaked cotton ball or sponge with sterile forceps. In the sequential manner described for skin prep (see page 5), wipe the cervix first, then progress in a spiral fashion along the vaginal walls to the entrance to the vagina. Repeat at least once, preferably two times, using a new antiseptic-soaked cotton ball or sponge each time.

For manual removal of the placenta, internal podalic version, correction of uterine inversion, or other procedures in which the provider is manually “instrumenting” the uterus: It is common practice to put the antiseptic on a gloved hand rather than to swab the vagina.

Preparation of the perineum

For spontaneous vaginal delivery: The perineum should be washed by the client or clinic staff with soap and water beforehand. The perineum should *not* be shaved; the hair may be clipped, if it interferes with the procedure. No other preparation is necessary.

For urethral catheterization:

- Put on gloves.
- Place dry, sterile cotton balls or gauze sponges in a solution cup, or gallipot, filled with antiseptic.
- With one hand, separate the labia.
- Using forceps or your other hand, pick up a soaked cotton ball or gauze sponge and swab the area around the urethra in gradually enlarging circles. Repeat two times, using a new antiseptic-soaked cotton ball or sponge each time.
- Insert the catheter using the no-touch technique.

For forceps delivery: It is common practice to apply the antiseptic to an area up to the symphysis and out onto the proximal thighs.

For vaginal procedures such as MVA and manual exploration of the uterus: Perineal prep is not necessary.

Though the perineum often is cleaned prior to a vaginal procedure, this is not required if the procedure will be confined to the vagina or uterus and will not involve the labia or perineum.

Remember: Do not use alcohol or alcohol-based antiseptics to prepare the vaginal, cervical, or perineal mucosa.

Establishing and maintaining a sterile field

A sterile field is established and maintained to reduce the risk of contaminating the surgical/procedure site and to maintain the sterility of instruments and other items used during the procedure.

A sterile surgical field is created by placing sterile towels or surgical drapes around the surgical/procedure site. A sterile field for instruments and supplies is created by placing sterile towels or drapes on a flat surface, such as an instrument stand, or in a sterile instrument container.

Principles of maintaining a sterile field should be applied during procedures that are being performed under conditions of high-level disinfection.

The “boundaries” or limits of the sterile field include:

- *Surgical personnel/gowns:* The sterile area includes the front of the gown, from the shoulders down to the level of the procedure table, and the forearms and gloved hands that remain above the level of the waist (or the table). The back of the gown, the shoulders, and all areas below the waist or the table are not considered sterile.
- *The sterile operative field:* This includes all areas covered by dry, sterile drapes *above the level of the table*. A drape hanging down the side of the table below the level of the table is not considered sterile.
- *The instrument and supplies tray/container:* This field is defined by the surface area that is covered with a dry, sterile drape or that has been sterilized (e.g., the inside of an instrument container).

To maintain a sterile field:

- Know and maintain the boundaries of the sterile field.
- Allow only sterile items and personnel within the sterile field.
- Do not contaminate items when opening, dispensing, or transferring them to a sterile field.

- Do not contaminate sterile items in the sterile field with nonsterile hands or contaminated instruments. Keep contaminated items well away from sterile instruments and supplies.
- Place sterile drapes in a no-touch manner (hold them by the edges or underneath). Sterile leggings applied by ungowned and ungloved staff are not considered sterile.
- Use the no-touch technique whenever possible.
- Consider any sterile item that has been penetrated (cut, wet, or torn) to be nonsterile.
- Never set up a sterile field near a door or an open window.
- When in doubt about whether an item is still sterile, consider it to be contaminated.

Good surgical technique

Meticulous attention to bleeding and gentle tissue handling during surgical and clinical procedures can help reduce the risk of infection. Good surgical technique, as well as good infection prevention, *can* and *should* be practiced during all obstetric procedures, even emergency procedures.

Appropriate use of prophylactic antibiotics

The use of prophylactic antibiotics (giving antibiotics before or after a procedure to prevent infections from developing) does not take the place of good infection prevention. Avoid routine and indiscriminate use of prophylactic antibiotics: It increases costs and the likelihood of promoting antibiotic resistance.

There are some procedures for which use of prophylactic antibiotics is indicated. These include:

- Intra-uterine procedures where contamination by vaginal flora is unavoidable, including:
 - Manual removal of the placenta
 - Internal podalic version
 - Bimanual compression of the uterus
 - Correction of uterine inversion
 - Cesarean section in a laboring client
- Any invasive procedure where adequate infection prevention practices were not followed
- Any procedure performed on a client who is severely immunocompromised

There is insufficient evidence to support the use of prophylactic antibiotics in elective cesarean section (nonlaboring client, intact membranes) and uncomplicated incomplete abortion.

When the use of prophylactic antibiotics is indicated for emergency obstetric care:

- Use broad-spectrum antibiotics (e.g., ampicillin, cephalosporins, or combination antibiotics) that are effective against the microorganisms most likely to cause infections.
- Whenever possible, give prophylactic antibiotics before or during the procedure, not afterward. (During cesarean sections, administer broad-spectrum antibiotics immediately after clamping the cord.)
- Give only a single dose of antibiotics, unless surgery is prolonged (more than 6 hours) or blood loss is excessive (more than 1.5 L).

Creating a safer surgical/procedure area

A clean environment in the surgical/procedure area is necessary both for routine deliveries and for emergency procedures. Routine cleaning and housekeeping—both before and after procedures—are important components of infection prevention.

General principles:

1. **Minimize the number of staff in procedure areas.** The number of people and amount of activity in a surgical/procedure area influence the number of potentially disease-causing microorganisms and, thus, the risk of contamination and infection. During procedures, restrict the number of people permitted in the area to only those involved in the activities being carried out. Traffic in these areas should be minimal when not in use: They should be cleaned, closed, and then considered to be off-limits.
2. **Maintain a sterile field during procedures** (see page 7).
3. **Clean and safely handle all contaminated surfaces and materials following procedures.**
 - *Contaminated surfaces:* Wipe the following surfaces with a cloth soaked in a 0.5% chlorine solution (or a mixture of detergent and chlorine solution) after every procedure:
 - Labor table (including the legs of the table)
 - Procedure table (including the legs of the table)
 - Other tables (e.g., mayo tray, auxiliary tables)
 - Kelly’s pad or plastic sheet/drape (Ideally, these should be replaced with clean ones after every delivery and decontaminated for 10 minutes in a chlorine solution and then thoroughly cleaned.)

- Floor
- Any surface splattered with blood or other body fluids or that has come in contact with a provider’s or other staff person’s gloved/soiled hands (e.g., instrument trolleys, lamps, walls, door handles, gurneys)
- *Other contaminated materials:*
 - Dispose of all contaminated medical waste in sturdy, waterproof containers.
 - Keep contaminated drapes and other linens from contact with skin, mucosa, clothing, and surfaces. Place them in or on a waterproof surface and transport them to the processing area immediately. All linens that have come in contact with the client (e.g., sheets on gurneys or wheelchairs) should be routinely changed between clients.
 - Follow the same principles when handling the client’s soiled clothing. Place the soiled clothes in a plastic bag and give them to the family for cleaning and safekeeping.
- *Disposal of the placenta:* Always wear gloves when handling the placenta. After inspection, place the placenta immediately in a clean, closed container or sturdy plastic bag, and have it buried or burned. If the placenta will be given to the family, place it in a clean, closed container or sturdy plastic bag, and instruct the family not to open it until it reaches its final disposal.
- *Provider/staff cleanup:* Providers and all other involved staff should remove soiled gloves and clothing and wash their hands, arms, and other contaminated skin surfaces as soon as possible after every emergency procedure. This is usually done after cleanup, but before leaving the procedure area.

Always wear heavy utility gloves and protective clothing when cleaning and handling contaminated materials.

Preventing Tetanus Infections in Mothers and Newborns

Clostridium tetani, the bacterium that causes tetanus, can be transmitted to the uterine cavity by contaminated instruments, hands, and supplies, particularly during deliveries and terminations of pregnancy performed under unhygienic or unsafe conditions. Infections in the infant usually occur when contaminated instruments are used to cut the umbilical cord or when contaminated substances or supplies are applied as traditional cord dressings.

When the mother has active immunity to tetanus, she is protected, and the antibodies pass through her placenta, protecting the newborn for some weeks after birth as well. A woman and her newborn are considered protected when the woman has received two doses of tetanus vaccine at least four weeks apart, with an interval of at least four weeks between the last vaccine dose and the delivery or the termination of pregnancy. In most women, a booster is recommended in every pregnancy.

Provide the following immunization to any woman who had an unhygienic delivery or an unsafe termination of pregnancy:

- ***If she has already been immunized, give a booster injection of tetanus toxoid 0.5 mL IM.***
- ***If she has not been immunized, give antitetanus serum 1,500 units IM immediately, and tell her to return in four weeks for a booster injection of tetanus toxoid 0.5 mL IM.***

Careful, clean cord care is the best way to prevent neonatal tetanus in an infant who is not protected by maternal antibodies (that is, an infant whose mother had not received adequate immunization). See Appendix B (page 19) for recommendations on aseptic technique for cutting and tying the cord, as well as on general aseptic technique for newborn care and procedures.*

* For information on treatment of active tetanus, see World Health Organization, 2000, pages S-50 and S-51.

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Appendix A: Aseptic Technique for Specific Emergency Obstetric Care Procedures

Procedure(s)	Surgical attire required/ recommended	Surgical scrub required?	Gloves*		Client prep with antiseptic required?	Sterile field required?
			Preferred	Acceptable		
Starting an IV infusion, drawing blood	None	No	Single-use exam	HLD† surgical	Yes	No
Venous cut down (open)	None	No	Single-use exam	HLD surgical	Yes	Yes
Pelvic examination	None	No	Single-use exam	Sterile surgical	No	No
Pelvic examination in labor	None	No	Sterile surgical	HLD surgical	No	No
Catheterization	None	No	Sterile surgical	HLD surgical	Yes	No
Normal vaginal delivery	Required: Plastic apron Recommended: Eyewear, mask, and footwear	No	Sterile surgical	HLD surgical	Perineum should have been washed by the client or staff before hand	No

* Use the “preferred” glove whenever possible, and the “acceptable” glove if the preferred glove is not available.

† High-level disinfectant.

Appendix A: Aseptic Technique for Specific Emergency Obstetric Care Procedures *(continued)*

Procedure(s)	Surgical attire required/ recommended	Surgical scrub required?	Gloves		Client prep with antiseptic required?	Sterile field required?
			Preferred	Acceptable		
Artificial rupture of membranes	Required: Plastic apron Recommended: Eyewear, mask, and footwear	No	Sterile surgical	HLD surgical	No	No
Episiotomy	Required: Plastic apron Recommended: Eyewear, mask, and footwear	Yes	Sterile surgical	HLD surgical	Perineum should have been washed by the client or staff beforehand	Yes
Cervical and perineal tear repair	Required: Plastic apron Recommended: Eyewear, mask, and footwear	Yes	Sterile surgical	HLD surgical	Perineum should have been washed by the client or staff beforehand	Yes

Appendix A: Aseptic Technique for Specific Emergency Obstetric Care Procedures *(continued)*

Procedure(s)	Surgical attire required/ recommended	Surgical scrub required?	Gloves		Client prep with antiseptic required?	Sterile field required?
			Preferred	Acceptable		
Symphiotomy	Required: Plastic apron Recommended: Eyewear, mask, and footwear	Yes	Sterile surgical	HLD surgical	Yes	Yes
Assisted vaginal delivery: forceps, vacuum extraction	Required: Plastic apron Recommended: Eyewear, mask, and footwear	Yes	Sterile surgical	HLD surgical	Yes	Yes
Manual removal of the placenta	Required: Plastic apron Recommended: Eyewear, mask, footwear, and sterile gown	Yes	Sterile surgical	HLD surgical	Yes	Yes

Appendix A: Aseptic Technique for Specific Emergency Obstetric Care Procedures *(continued)*

Procedure(s)	Surgical attire required/ recommended	Surgical scrub required?	Gloves		Client prep with antiseptic required?	Sterile field required?
			Preferred	Acceptable		
Internal podalic version	Required: Plastic apron Recommended: Eyewear, mask, footwear, and sterile gown	No	Sterile surgical	HLD surgical	Yes	Yes
Bimanual compression of the uterus	Required: Plastic apron Recommended: Eyewear, mask, footwear, and sterile gown	No	Sterile surgical	HLD surgical	Yes	Yes
Correction of uterine inversion	Required: Plastic apron Recommended: Eyewear, mask, footwear, and sterile gown	No	Sterile surgical	HLD surgical	Yes	Yes

Appendix A: Aseptic Technique for Specific Emergency Obstetric Care Procedures *(continued)*

Procedure(s)	Surgical attire required/ recommended	Surgical scrub required?	Gloves		Client prep with antiseptic required?	Sterile field required?
			Preferred	Acceptable		
Craniotomy	Required: Plastic apron Recommended: Eyewear, mask, footwear, and sterile gown	No	Sterile surgical	HLD surgical	Yes	Yes
Manual vacuum aspiration (MVA), dilation and curettage (D&C)	Required: Plastic apron Recommended: Eyewear, mask, and footwear	Yes	Sterile surgical	HLD surgical	Yes	Yes
Cesarean section	Complete surgical attire	Yes	Sterile surgical	HLD surgical	Yes	Yes
Laparotomy, hysterectomy, repair of ruptured uterus, uterine artery ligation	Complete surgical attire	Yes	Sterile surgical	HLD surgical	Yes	Yes

Appendix B: Aseptic Technique for Newborn Care and Procedures

Procedure	Sterile gown required?	Surgical scrub required?	Gloves*		Client prep with antiseptic required?	Sterile field required?	Comments
			Preferred	Acceptable			
Cord cutting and tying	No	No	Sterile surgical	HLD† surgical	No	No	Scissors, blades, clamps, or ties should be clean (sterile, if possible). Many facilities apply an antiseptic solution, such as alcohol, iodine, or gentian violet, to the cord. Keep the cord dry and clean.
Baby drying and wrapping	No	No	Clean, single-use exam	HLD or sterile surgical	No	No	Cloths or blankets used for wrapping babies should be clean and dry.

* Use the “preferred” glove whenever possible, and the “acceptable” glove if the preferred glove is not available.

† High-level disinfectant.

Appendix B: Aseptic Technique for Newborn Care and Procedures *(continued)*

Procedure	Sterile gown required?	Surgical scrub required?	Gloves		Client prep with antiseptic required?	Sterile field required?	Comments
			Preferred	Acceptable			
Ventilatory resuscitation of the newborn	No	No	Clean, single-use exam	HLD or sterile surgical	No	No	When possible, use a bag and mask or mouth-to-mouth resuscitation. Mouth-to-mouth resuscitation should be avoided whenever possible, as it increases the risk of infection to both the infant and provider. Infant ventilation masks, suction catheters, and bulb syringes should be decontaminated and cleaned after each use and before using them on another infant.
Umbilical vein catheterization	No	Yes	Sterile surgical	HLD surgical	Yes	Yes	Use a sterile catheter.