

Comprehensive  
Reproductive Health and Family Planning  
Training Curriculum

# **MODULE 2: INFECTION PREVENTION**

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## NOTES TO THE TRAINER

### PURPOSE

This training manual is designed for use as part of the comprehensive family planning and reproductive health training of service providers. It is designed to be used to train physicians, nurses and midwives.

This manual is designed to actively involve the participants in the learning process. Sessions include simulation skills practice, discussions, and clinical practice, using objective knowledge, attitude, and skills checklists.

This particular module, *Module 2: Infection Prevention* is designed for use with JHPIEGO's video *Infection Prevention for Family Planning Service Delivery Programs*, and throughout the *Training Methods* sections, the text explains to the trainer when and how to use segments from this video. (To order the video, please see the form at the back of this book.)

### DESIGN

The training curriculum consists of 15 modules:

1. Introduction/Overview
2. Infection Prevention
3. Counseling
4. Combined Oral Contraceptives and Progestin-only Pills
5. Emergency Contraceptive Pills
6. DMPA Injectable Contraceptives
7. Intrauterine Devices
8. Lactational Amenorrhea and Breastfeeding Support
9. Condoms and Spermicides
10. Voluntary Surgical Contraception
11. MVA for Treatment of Incomplete Abortion
12. Reproductive Tract Infections
13. Postpartum/Postabortion Contraception
14. Training of Trainers
15. Quality of Care

Included in each module is a set of knowledge assessment questions, skills checklists, trainer resources, participant materials, training evaluation tools, and a bibliography.

### SUGGESTIONS FOR USE

- The modules are designed to provide flexibility in planning, conducting, and evaluating the training course.
- The curriculum is designed to allow trainers to formulate their own training schedule, based on results from training needs assessments.
- The modules can be used independently of each other.

- The modules can also be lengthened or shortened depending on the level of training and expertise of the participants.
- In order to foster changes in behavior, learning experiences have to be in the areas of knowledge, attitudes, and skills. In each module, the overall objective, general, and specific objectives are presented in terms of achievable changes in these three areas.
- Training references and resource materials for trainers and participants are identified.
- Each module is divided into a *Trainer's Module* and *Appendix* section.
- The *Trainer's Module* presents the information in two columns:
  1. *Content*, which contains the necessary technical information; and
  2. *Training/Learning Methods*, which contains the training methodology (lecture, role play, discussion, etc.) by which the information should be conveyed.
- The training design section includes the content to be covered and the training methodologies.
- The *Appendix* section contains:
  - Participant handouts
  - Transparencies
  - Pre & Post-tests (Participant Copy and Master Copy with Key)
  - Participant Evaluation Form
- The *Participant Handouts* are referred to in the "Training/Learning Methods" sections of the curriculum and include a number of different materials and exercises, ranging from recapitulations of the technical information from the *Content* of the module to role play descriptions, skills checklists, and case studies.
- The *Participant Handouts* should be photocopied for the trainees and distributed to them in a folder or binder to ensure that they are kept together as a technical resource after the training course has ended.
- Transparency masters have been prepared where called for in the text. These should be copied onto clear overhead sheets for display during the training sessions.
- The *Participant Evaluation* form should also be copied to receive the trainees' feedback in order to improve future training courses.
- The *Methodologies* section is a resource for trainers for the effective use of demonstration/return demonstration in training.

To ensure appropriate application of learning from the classroom setting to clinical practice, Clinical Practicum sessions are an important part of this training. For consistency in the philosophy of client's rights, the following should be shared with participants, in preparation for their clinical practicum experiences:

#### **CLIENT'S RIGHTS DURING CLINICAL TRAINING**

The rights of the client to privacy and confidentiality should be considered at all times during a clinical training course. When a client is undergoing a physical examination it should be carried out in an environment in which her/his right to bodily privacy is respected. When receiving counseling, undergoing a physical examination, or receiving surgical contraceptive services, the client should be informed about the role of each individual inside the room (e.g., service provider, individuals undergoing training, supervisors, instructors, researchers, etc.).

The client's permission must be obtained before having a clinician-in-training/ participant observe, assist with or perform any services. The client should understand that s/he has the right to refuse care from a clinician-in-training/ participant. Furthermore, a client's care should not be rescheduled or denied if s/he does not permit a clinician-in-training/participant to be present or provide services. In such cases, the clinical trainer or other staff member should perform the procedure. Finally, the clinical trainer should be present during any client contact in a training situation.

Clinical trainers must be discreet in how coaching and feedback are given during training with clients. Corrective feedback in a client situation should be limited to errors that could harm or cause discomfort to the client. Excessive negative feedback can create anxiety for both the client and clinician-in-training.

It can be difficult to maintain strict client confidentiality in a training situation when specific cases are used in learning exercises such as case studies and clinical conferences. Such discussions always should take place in a private area, out of hearing of other staff and clients, and be conducted without reference to the client by name (AVSC, "Tips for Trainers-8," September 1994; **NSV Trainer's Manual**).

## DEMONSTRATION TECHNIQUE

The Five-Step Method of Demonstration and Return Demonstration is a training technique useful in the transfer of skills. The technique is used to make sure that participants become competent in certain skills. It can be used to develop skills in cleaning soiled instruments, high-level disinfection, IUD insertion, pill dispensing, performing a general physical examination, performing a breast or pelvic examination, etc. In short, it can be used for any skill which requires a demonstration. The following are the "five steps:"

1. **Overall Picture:** Provide participants with an overall picture of the skill you are helping them develop and a skills checklist. The overall picture should include why the skill is necessary, who needs to develop the skill, how the skill is to be performed, etc. Explain to the participants that these necessary skills are to be performed according to the steps in the skills checklist, on models in the classroom and practiced until participants become proficient in each skill and before they perform them in a clinical situation.
2. **Trainer Demonstration:** The trainer should demonstrate the skill while giving verbal instructions. If an anatomical model is used, a participant or co-trainer should sit at the head of the model and play the role of the client. The trainer should explain the procedure and talk to the role playing participant as s/he would to a real client.
3. **Trainer/Participant Talk-Through:** The trainer performs the procedure again while the participant verbally repeats the step-by-step procedure.

**Note:** The trainer does **not** demonstrate the wrong procedure at any time. The remaining participants observe the learning participant and ask questions.

4. **Participant Talk-Through:** The participant performs the procedure while verbalizing the step-by-step procedure. The trainer observes and listens, making corrections when necessary. Other participants in the group observe, listen, and ask questions.
5. **Guided Practice:** In this final step, participants are asked to form pairs. Each participant practices the demonstration with her/his partner. One partner performs the demonstration and talks through the procedure while the other partner observes and critiques using the skills checklist. The partners should exchange roles until both feel competent. When both partners feel competent, they should perform the procedure and talk-through for the

trainer, who will assess their performance using the skills checklist.

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# **TRAINER ' S MODULE**



## **MODULE 2: INFECTION PREVENTION**

### **INTRODUCTION:**

The use of correct infection prevention techniques during the provision of family planning and reproductive health care services is crucial to the safety of both clients and service providers. The purpose of this training module is to train service providers in appropriate infection prevention techniques.

### **MODULE TRAINING OBJECTIVE:**

To prepare providers to practice appropriate infection prevention procedures in order to reduce the risk of disease transmission during the provision of reproductive health services.

### **SPECIFIC LEARNING OBJECTIVES:**

By the end of this module, participants will be able to:

1. Describe the disease transmission cycle.
2. Define asepsis, antisepsis, decontamination, cleaning, high-level disinfection, and sterilization.
3. Select the appropriate infection prevention procedures for different objects, depending on the extent of contact they have with tissue and skin.
4. Identify "barriers" which can be used to protect an individual from infection.
5. Identify situations when handwashing is appropriate and the supplies needed.
6. Demonstrate proper handwashing technique.
7. Identify at least four situations when sterile or high-level disinfected gloves are appropriate and demonstrate proper gloving technique.
8. Describe the use of antiseptics.
9. Demonstrate steps for skin and mucous membrane preparation prior to surgical procedures or IUD insertion.
10. Demonstrate the processing of contaminated instruments, gloves, and other items.
11. Evaluate infection prevention practices which should be observed in a reproductive health setting.
12. Demonstrate how to organize instrument processing in a clinic or ambulatory surgical unit.

### **SIMULATED SKILL PRACTICE:**

Using the Five-Step Method of Demonstration and Return Demonstration, participants (Px) will demonstrate the following:

- Proper handwashing technique

- Proper gloving technique
- Steps for skin and mucous membrane preparation
- Processing contaminated instruments, gloves and other items (including decontamination, cleaning, high-level disinfection, or sterilization and storage)

**CLINICAL PRACTICUM OBJECTIVES:**

Using the "Clinic Infection Prevention Assessment Forms," participants will be able to evaluate the following services performed in a clinic or surgical setting:

- IUD
- Female VSC
- Vasectomy
- MVA

**TRAINING/LEARNING METHODOLOGY:**

- Required Reading
- Trainer Presentations
- Class Discussions
- Demonstration and Return Demonstration
- Clinical Practicum

**MAJOR REFERENCES AND TRAINING MATERIALS:**

- Tietjen, L., Cronin, W., McIntosh, N., Infection Prevention for Family Planning Service Programs, JHPIEGO, 1992.
- JHPIEGO, Infection Prevention Course Handbook.
- JHPIEGO, AVSC, (video), Infection Prevention for Family Planning Service Programs.
- JHPIEGO (slides), Infection Prevention Overview and Processing Reusable Gloves, 1992.
- Institute for Development Training, Training Course in Women's Health: Infection Control, 1993.
- INTRAH, Guidelines for Clinical Procedures in Family Planning, 1992.
- IPAS, Gynecologic Aspiration Kits with Karmen Cannulae and Syringes, August 1992.
- WHO, Guidelines on Sterilization and Disinfection Methods Effective Against Human Immunodeficiency Virus (HIV), WHO, AIDS Series 2, 1989.

**RESOURCE REQUIREMENTS:**

- Whiteboard or newsprint
- Marking pens
- Masking tape
- 6" x 5" index cards
- Video machine
- JHPIEGO/AVSC Video Infection Prevention for Family Planning Service Programs
- All necessary supplies for demonstrations, including: Soap or solution for handwashing; water; gloves; antiseptic; cotton; sponge forceps; plastic or enamel pans; chlorine for decontamination; brushes and protective gloves; basins; boiler; sterilizer or autoclave; and pick-up forceps.

**EVALUATION METHODS:**

- Pre- & Post-tests
- Observation during practicum
- Demonstration and Return Demonstration
- Participant Evaluation Form

**TIME REQUIRED:**

Workshop: approximately 8 hours  
Clinical Practicum: Up to 4 hours

**MATERIALS FOR TRAINERS TO PREPARE IN ADVANCE:**

1. Transparencies on:
  - Overall and Specific Objectives
  - Disease Transmission Cycle
2. Training Video
3. Copies of Pre- & Post-tests and Participant Reaction Form for each participant
4. Arrangements for visits by participants to one or more clinic sites to observe infection prevention procedures



## Introduction

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p><b>Overview</b></p> <p>Microorganisms live everywhere in our environment. We normally carry them on our skin and in our upper respiratory and intestinal tracts. These microorganisms are called "normal flora." Microorganisms are also found in animals, plants, the soil, air and water. Some microorganisms are more pathogenic than others. However, given the right circumstances, <b>all microorganisms may cause infection.</b> In order for bacteria, viruses, and other infectious agents to survive and spread within a clinic or hospital, certain factors or conditions must exist.</p>	<p><b>Introduction:</b> (30 min.)</p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Administer the pre-test.</li> <li>• Upon review of the responses, note the objectives which require specific attention.</li> <li>• Present the module objectives (<i>Transparency #1</i>).</li> </ul> <p><b>Brainstorming:</b> (15 min.)</p> <ul style="list-style-type: none"> <li>• Ask the participants to identify general infection prevention problems they see in their clinics.</li> <li>• List these on a flipchart.</li> </ul> <p><b>Trainer Presentation:</b> (15 min.)</p> <p>(See <i>Px Handout #1</i>.)</p>

**Specific Objective #1: Describe the disease transmission cycle.**

<p>CONTENT Knowledge/Attitudes/Skills</p>	<p>Training/Learning Methods (Time Required)</p>
<p>The drawing of the disease transmission cycle shows the steps in the transmission of hepatitis B (HBV) and AIDS (HIV) viruses.</p>	<p><b>Transparency of the Disease Transmission Cycle:</b> (90 min.)</p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Use <i>Transparency #2</i> to ask a participant to explain how a health worker could become infected with HBV or HIV. (See also <i>Participant Handout #2: Disease Transmission Cycle.</i>) For example: a needlestick injury where the client's infected blood is accidentally injected under the health worker's skin.</li> <li>• Show how and where the disease transmission cycle can be broken (e.g., barriers, decontamination, and proper processing of instruments and gloves, waste disposal, etc.).</li> <li>• Use an example such as malaria or HIV to demonstrate the disease transmission cycle.</li> <li>• Once you are sure the Px understand, divide them into groups. Give each group six cards (about 6" x 8"). Ask each group to choose a disease, write on the cards the different stages of the disease transmission cycle, and then tape the cards onto the appropriate boxes in the disease transmission cycle to show how the disease is transmitted. For example, malaria is the <b>agent</b>; the mosquito is the <b>reservoir</b>. The <b>place of exit</b> would be the mosquito's proboscis (stinger), the mosquito biting a human the <b>method of transmission</b>, <b>place of entry</b> is the human's skin and <b>susceptible host</b> is the human.</li> <li>• Ask Px to show where the disease cycle can be broken as well (give malaria prophylaxis, for example).</li> <li>• Ask each group to present their example.</li> </ul>

**Specific Objective #2: Define asepsis, antisepsis, decontamination, cleaning, high-level disinfection, and sterilization.**

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p><b>Key Definitions</b></p> <p><b>Asepsis</b> or <b>aseptic technique</b> are general terms used in health care settings to describe the combination of efforts made to prevent entry of microorganisms into any area of the body where they are likely to cause infection. <b>The goal of asepsis is to reduce or eliminate the number of microorganisms on both animate (living) surfaces (skin and tissue) and inanimate objects (surgical instruments)</b> to a safe level.</p> <p><b>Antisepsis</b> is the prevention of infection by killing or inhibiting the growth of microorganisms on skin and other body tissues through the use of a chemical agent (antiseptic).</p> <p><b>Decontamination</b> is the process that makes inanimate (non-living) objects safer to be handled by staff (especially cleaning personnel) <b>before cleaning</b>. Such objects include large objects (e.g., examination tables) and surgical instruments and gloves contaminated with blood or body fluids during or following medical procedures.</p> <p><b>Cleaning</b> is the process that physically removes all visible blood, bodily fluids, or any other foreign material such as dust or soil from skin or inanimate objects.</p>	<p><b>Trainer Presentation:</b> (15 min.)</p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Ask the Px to define some of the key words needed to explain infection prevention. Supplement their answers if needed.</li> </ul> <p>(See <i>Participant Handout #1.</i>)</p>

## Specific Objective #2: Continued

CONTENT Knowledge/Attitudes/Skills	Training/Learning Methods (Time Required)
<p><b>Disinfection</b> is the process that eliminates most, but not all disease-causing microorganisms from inanimate objects. <b>High-level disinfection</b> (HLD), through boiling or the use of chemicals, eliminates all microorganisms except some bacterial endospores.</p> <p><b>Sterilization</b> is the process that eliminates <b>all</b> microorganisms (bacteria, viruses, fungi, and parasites), including bacterial endospores from inanimate objects.</p>	

**Specific Objective #3: Select the appropriate infection prevention procedures needed for different objects, depending on the extent of contact they have with tissue and skin.**

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p><b>Key Messages</b></p> <p>1) <b>To create an infection-free environment</b>, it is important that <b>the rationale</b> for each of the recommended infection prevention processes (and its limitations) <b>be clearly understood</b> by clinic staff at all levels--from service providers to cleaning and maintenance staff.</p> <p>2) Because it is not possible to know in advance if a client is infected with hepatitis B or HIV, <b>all items from all clients must be handled as if they are contaminated and all clients treated as if they may be infected.</b></p> <p>3) Microorganisms which cause disease include bacterial endospores, bacteria, parasites, fungi, and viruses. <b>Bacterial endospores can only be killed by sterilization.</b> Other microorganisms can be killed by either sterilization or high-level disinfection.</p>	<p><b>Discussion:</b> (10 min.)</p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Discuss the key messages relating to infection prevention.</li> </ul> <p>(See <i>Participant Handout #1.</i>)</p> <p><b>Participant Exercises:</b> (30 min.)</p> <ul style="list-style-type: none"> <li>• Explain that <i>Participant Handout #3</i> lists contraceptive methods.</li> <li>• During the presentation of the module, Px are expected to write the appropriate infection prevention practices needed for safe delivery of each method.</li> <li>• Discuss the key messages.</li> <li>• While referring to <i>Participant Handouts #4-5</i>, discuss which infection prevention procedures are needed for different objects.</li> </ul>

**Specific Objective #4: Identify "barriers" which can used to protect an individual from infection.**

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p><b>Protective Barriers</b></p> <p>Placing a physical, mechanical or chemical "barrier" between microorganisms and an individual, whether a client, patient, or health worker, is an effective means of preventing the spread of disease. <b>The barrier serves to break the disease transmission cycle.</b></p> <p>Barriers include the following:</p> <ol style="list-style-type: none"> <li>1. Handwashing</li> <li>2. Wearing gloves, either for surgery, pelvic examinations, IUD insertions, or to protect clinic staff when handling contaminated waste materials or used instruments</li> <li>3. Using antiseptic solutions for cleaning wounds or preparing the skin prior to surgery</li> <li>4. Decontamination, cleaning and sterilizing or high-level disinfecting surgical instruments, reusable gloves, and other items</li> </ol> <p><b>Protective barriers are designed to prevent the spread of infection</b> from person to person and/or equipment, instruments, and environmental surfaces to people.</p>	<p><b>Trainer Presentation:</b> (10 min.)</p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Ask the Px which "barriers" can be used in a clinic to break the disease transmission cycle.</li> <li>• Give a short lecturette on barriers that can be used to protect an individual from infection.</li> <li>• Write each of these "barriers" on a card and tape it to the wall or on a chart.</li> </ul> <p>(See <i>Px Handout #6.</i>)</p>

**Specific Objective #5: Identify situations when handwashing is appropriate and supplies are needed.**

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p><b>Handwashing</b></p> <p><b>Handwashing is the simplest and most important infection prevention procedure in any clinic.</b> It removes many microorganisms from the skin, which helps to prevent transmission of infections from person to person.</p> <p><b>1. Handwashing should be done:</b></p> <p><i>Before:</i> The day's work; examining a client; administering injections or drawing blood; performing a procedure (IUD or pelvic exam); handling clean, disinfected, or sterilized supplies for storage; putting on sterile gloves; going home.</p> <p><i>After:</i> Any situation in which the hands may be contaminated, such as handling instruments or touching body secretions or excretions; removing gloves; personal use of toilet; blowing nose, sneezing, or coughing.</p> <p><b>2. Supplies needed for handwashing:</b></p> <ul style="list-style-type: none"> <li>• clean water (water may be running or from a bucket, but it must be clean)</li> <li>• soap</li> <li>• soap dish that drains and keeps the soap dry</li> <li>• clean, dry towel</li> <li>• bucket and dipper; or alcohol, if no running water is available</li> <li>• soft sticks for nail cleaning, if available</li> </ul>	<p><b>Video Demonstration:</b> (15 min.)</p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Ask the Px when handwashing should be done.</li> <li>• Introduce the JHPIEGO Training Video <u>Infection Prevention for Family Planning Service Programs</u>.</li> <li>• Show the first two <i>Training Demonstration Segments (TDS)</i>-#1: <i>Handwashing</i> and #2: <i>Using Gloves</i>.</li> <li>• Following these first two segments, discuss with Px the following questions:             <ol style="list-style-type: none"> <li>1) How can you encourage staff in your clinics to wash their hands at appropriate times in a busy clinic?</li> <li>2) How can you dry your hands in busy clinics or on rounds (air drying, alcohol swabs, personal towels)?</li> </ol> </li> </ul> <p>(See Px Handout #6.)</p>

**Specific Objective #6: Demonstrate proper handwashing techniques.**

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p><b>Handwashing techniques:</b></p> <ul style="list-style-type: none"> <li>• <b>Remove jewelry:</b> no jewelry, except plain wedding bands, or nail polish should be worn. Jewelry and nail polish offer protection to microorganisms.</li> <li>• Turn on the water from the tap. <b>Avoid splashes.</b></li> <li>• If there is no running water, use a dipper to pour water on the hands at the beginning and when rinsing.</li> <li>• Position the hands and wrists downward as you wet them so that the water flows down.</li> <li>• Soap the hands and hold the bar with two fingers to rinse it before placing it back in the soap dish.</li> <li>• Avoid touching the sink as it is probably contaminated.</li> <li>• Wash hands for 15 - 30 seconds.</li> <li>• Use a soft, thick stick to clean nails when grossly contaminated and at the beginning and end of the clinic session.</li> <li>• Point hands down when rinsing them with running water.</li> <li>• Air dry hands or dry them with an unused, dry portion of a <b>clean</b> cotton towel which is not used by others.</li> <li>• Use the towel or a paper towel to turn off the faucet.</li> </ul> <p><b>If water is not available:</b></p> <p>Clean hands with isopropyl or ethyl alcohol 70%. Keep a covered container of alcohol swabs ready for use. Alcohol makes the skin dry, but lotion</p>	<p><b>Surgical Handscrub Demonstration:</b> (30 min.)</p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Discuss handwashing techniques.</li> <li>• Using the five-step demonstration and return demonstration technique, demonstrate surgical handscrub.</li> </ul> <p>(See <i>Px Handout #7.</i>)</p>

**Specific Objective #6: Continued**

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p>can be applied at the end of the session. However, do not use lotion after every cleaning of the hands with alcohol, because it is contaminated with microorganisms.</p> <p><b>Surgical Handscrub</b></p> <p>A three to five minute handscrub with a solution containing chlorhexidine or an iodophor is recommended.</p> <p>Alternatively, surgical staff can wash hands with plain soap, then apply alcohol solution containing an emollient and rub until dry.</p> <p>A non-irritating alcohol solution can be made by adding either glycerine, propyl glycol, or Sorbitol<sup>®</sup> to the alcohol (2ml in 100ml 60-90% alcohol solution).</p> <p>Use 3-5ml for each application and continue rubbing the solution over the hands for about two minutes, using a total of 6 to 10ml per scrub.</p>	

**Specific Objective #7: Identify at least four situations when sterile or HLD gloves are appropriate and demonstrate proper gloving technique.**

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p><b>Gloving for Protection from Infection</b></p> <p><b>Gloves are used to protect the health care provider</b> from contact with potentially infectious substances and <b>to protect the client or patient</b> from infections which might be found on the skin of the health care provider.</p> <p><b>Points of contact where infection can be introduced include:</b></p> <ul style="list-style-type: none"> <li>• pelvic examination</li> <li>• contact with any lesions</li> <li>• when handling contaminated materials</li> <li>• when cleaning instruments, equipment, and contaminated surfaces</li> </ul> <p><b>Observe the following when using sterile gloves:</b></p> <ul style="list-style-type: none"> <li>• Use a separate pair of gloves for each client to avoid cross-contamination.</li> <li>• Do not use gloves from a package that is broken or expired.</li> <li>• Do not use gloves which are cracked, peeling, or have holes or tears.</li> <li>• Never touch the outside of the gloves while putting them on; handle them only by the out-turned inner cuff.</li> </ul> <p><b>Note:</b> <i>Adjusting the cuff of one glove will contaminate the fingers of the other hand.</i></p> <ul style="list-style-type: none"> <li>• If gloves accidentally become contaminated, change them immediately.</li> </ul>	<p><b>Trainer Presentation:</b> (30 min)</p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Briefly describe for Px the points of infectious contact and the points to observe when using sterile gloves.</li> <li>• Using the five-step demonstration and return demonstration technique, demonstrate proper gloving technique.</li> </ul> <p>(See Px Handout #8.)</p>

## Specific Objective #7: Continued

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<ul style="list-style-type: none"> <li>• Wash hands after gloves are removed at the end of client contact.</li> </ul> <p><b>Procedure for Putting on Sterile Gloves</b></p> <p><b>Source:</b> "How to Put on Sterile Gloves to Avoid Contamination," from <i>Guidelines for Clinical Procedures in Family Planning</i>, INTRAH, 1992.</p> <ol style="list-style-type: none"> <li>1. Prepare a large, clean, dry area to open gloves.</li> <li>2. Obtain correct size of sterile gloves.</li> <li>3. Wash hands and dry well. Lightly powder hands (not gloves) if inside of gloves are not powdered.</li> </ol> <p><b>Note:</b> <i>Do not use powder for insertions of Norplant<sup>®</sup> or other silastic implants, because the powder will adhere to the silastic capsule, causing a foreign body reaction.</i></p> <ol style="list-style-type: none"> <li>4. Open other sterile supplies (e.g., open end of IUD package).</li> <li>5. Open outer glove wrapper and lay the glove package out on a clean surface, with cuffs facing you. (This should be the bottom edge of the packet.) Take care not to touch the inner surface of the wrapper if you intend to use it as a sterile field.</li> <li>6. Pick up a glove by the folded-back cuff. Be careful to touch only the inside portion of the cuff (i.e., the side which will be touching your skin when the glove is on).</li> <li>7. While holding the glove, slip the other hand into the glove. Pointing the fingers of the glove to the floor will keep the fingers open by force of gravity. Be careful not to touch anything; holding the gloves above waist level will help.</li> </ol>	

## Specific Objective #7: Continued

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<ol style="list-style-type: none"> <li>8. If the first glove is not fitting correctly, <b>wait to make any adjustments until the second glove is on.</b> (Then you can use the sterile fingers of one glove to adjust the sterile portion of the other.)</li> <li>9. To pick up the second glove, <b>slide the fingers of the gloved hand between the folded cuff and the sterile portion of the second glove. This is very important, in order to avoid contaminating the gloved hand with the ungloved hand.</b></li> <li>10. Place the second glove on the ungloved hand by maintaining a steady pull through the folded cuff.</li> <li>11. Do not attempt to adjust cuffs once the gloves are on, since this may cause the gloves to become contaminated.</li> <li>12. Adjust the position of the glove fingers until the gloves fit comfortably.</li> <li>13. Always keep gloved hands above the waist level and in sight to avoid accidental contamination.</li> <li>14. If a glove becomes contaminated, <b>stop</b> and ask yourself if the glove will touch a sterile or disinfected instrument, the client's mucous membranes or sterile tissue. If yes, either remove that glove and reglove, or put another sterile glove over the contaminated glove.</li> <li>15. When removing gloves, avoid allowing the surface that was sterile to come into contact with your hands (the exterior of the gloves is now contaminated).</li> <li>16. First decontaminate by immersing both gloved hands fully in 0.5% chlorine solution, then remove by turning them inside out. Either dispose of gloves in a waste container or allow the gloves to soak for 10 minutes.</li> </ol>	

**Specific Objective #8: Describe the use of antiseptics.**

CONTENT Knowledge/Attitudes/Skills	Training/Learning Methods (Time Required)
<p><b>Antiseptics</b></p> <p>Antiseptics are chemicals which kill or inhibit many, though not all, microorganisms while causing little damage to tissue. <b>Cleaning the client's skin with antiseptic solution is an important infection prevention measure.</b></p> <p>Antiseptic solutions should be used in the following situations:</p> <ul style="list-style-type: none"> <li>• Surgical scrub</li> <li>• Skin or vaginal preparations for procedures such as minilaparotomy, laparoscopy, vasectomy, Norplant implants insertion or removal, IUD insertion and injections.</li> <li>• Handwashing before touching clients who are unusually susceptible to infection, such as newborns or immunosuppressed persons.</li> </ul> <p><b>Note:</b> <i>Alcohol should never be used on mucous membranes because it burns the membranes.</i></p> <p><b>Note:</b> <i>Zephiran™ (benzalkonium chloride) should not be used as an antiseptic, because it takes at least 10 minutes to kill HIV. Solutions of benzalkonium chloride have repeatedly been shown to become contaminated by pseudomonas and other bacteria. Solutions of benzalkonium chloride are easily inactivated by gauze and other organic material.</i></p> <p><b>Note:</b> <b>Antiseptics are for skin or mucous membranes only.</b> <i>They are not designed for use on inanimate objects such as operating tables or equipment.</i></p>	<p><b>Trainer Presentation:</b> (15 min.)</p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Give a brief mini-lecture on the use and effectiveness of antiseptics.</li> <li>• Discuss <i>Participant Handout #9: Antiseptic Effectiveness</i> and the antiseptic solutions commonly available in the country.</li> </ul> <p>(See <i>Px Handout #10.</i>)</p> <p><b>Game:</b> (30 min.)</p> <p>The trainer should write the names of antiseptics from <i>Participant Handout #9</i> on slips of paper and place them in a box. On a flip chart, draw a large chart like the one in <i>Participant Handout #9</i>, listing only the antiseptics in the left-hand column and activities and uses at the top. Split the Px into 5 groups. In turns, each group should draw a slip of paper from the box with the name of an antiseptic. They should then fill in the information about the antiseptic into the blank chart. In case of errors, the other team may correct the error. Award each team one point for each box correctly filled in to determine the winner.</p>

## Specific Objective #8: Continued

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p><b>Dangers of Mercury-Containing Compounds:</b></p> <p>Although frequently sold for antiseptis, <b>mercury-containing chemicals</b>, such as mercury laurel, <b>should be avoided due to their toxicity.</b></p> <ul style="list-style-type: none"> <li>• Skin exposure to low levels of mercury causes blister formation (contact dermatitis).</li> <li>• Inhalation or ingestion of low levels of mercury can cause central nervous system effects (numbness, speech impairment, deafness), and higher levels (200mg) can be fatal.</li> <li>• Skin contact alone can result in absorption of measurable amounts of mercury.</li> <li>• Pregnant women exposed to small doses may not show toxic effects themselves, but their fetuses may be harmed. Mercury is a potent teratogen (causes birth defects, including cleft palate, cerebral palsy, and other central nervous system abnormalities).</li> </ul>	<p>Alternatively, if a dart board and darts are available, the Px can throw darts at a board with all the antiseptic names written on it to determine which antiseptic on the chart they must fill in.</p> <p><b>Video Demonstration:</b> (5 min.)</p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Show <i>TDS 3 "Recommended Practice for Cleaning the Cervix and Vagina."</i></li> <li>• Stress that the Px should not use alcohols or iodine tinctures or aqueous (Lugol's) vaginal preparation, because they burn and/or irritate mucous membranes.</li> <li>• Discuss with the Px what they should do if the client's genital area is dirty (wash genital area with soap and water prior to prepping with an antiseptic, either before entering or while in the procedure room).</li> </ul>

**Specific Objective #9: Demonstrate steps for skin and mucous membrane preparation prior to surgical procedures or IUD insertion.**

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p><b>Steps for Skin and Mucous Membrane Preparation</b></p> <p><b><i>Prior to Surgical Procedures or IUD Insertion</i></b></p> <ol style="list-style-type: none"> <li>1. <b>Do not remove hair from the operative site unless absolutely necessary.</b> If hair removal must be done, trim the hair close to the skin surface immediately before surgery. <b>Shaving increases the risk of wound infection,</b> since the tiny nicks in the skin provide an ideal setting for microorganisms to grow and multiply.</li> <li>2. Ask the client about known allergic reactions before selecting an antiseptic solution.</li> <li>3. If visibly soiled, thoroughly clean the client's skin or external genital area with soap and water or have her clean it before applying antiseptic.</li> <li>4. Apply antiseptic. Select an antiseptic solution from the chart in <i>Participant Handout #9</i>.</li> <li>5. Using dry, disinfected forceps and cotton dipped in antiseptic, thoroughly cleanse the skin by gently scrubbing. Work from the operative site outward for several inches. (A circular motion from the center out helps to prevent recontamination of the operative site with local skin bacteria.)</li> <li>6. <b>Do not allow the antiseptic to pool</b> beneath the client's body. (This reduces skin irritation.)</li> </ol>	<p><b>Trainer Demonstration:</b> (30 min.)</p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Demonstrate the steps for skin and mucous membrane preparation or IUD insertion, using a pelvic model and the five-step demonstration and return demonstration technique.</li> </ul> <p><b>Note:</b> <i>Do not use iodine on pelvic models.</i></p> <p>(See <i>Px Handout #11</i>.)</p>

## Specific Objective #9: Continued

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p>7. Allow the antiseptic to dry before beginning the procedure. If using an iodophor, wait one to two minutes before proceeding to allow time for the iodine to be released.</p> <p><b>Vaginal Preps</b></p> <p>For vaginal preps, prior to IUD insertion or removal, select a water-based antiseptic such as an iodophor or chlorhexidine gluconate (Hibiclens™ or Savlon™). <b>Do not use alcohols;</b> they burn and irritate mucous membranes, promoting the growth of microorganisms.</p> <ol style="list-style-type: none"> <li>1. Ask the client about known allergic reactions before selecting an antiseptic solution.</li> <li>2. If visibly soiled, thoroughly clean the client's skin or external genital area with soap and water or have her clean it before applying antiseptic solution.</li> <li>3. Apply an antiseptic solution to the perineum. Select the antiseptic solution from the chart found in <i>Participant Handout #9: Antiseptic Effectiveness</i>. Allow the antiseptic to dry before beginning the procedure.</li> <li>4. After inserting the speculum, apply the antiseptic solution liberally to the vagina and cervix (two or three times) using dry, disinfected forceps and cotton soaked in the antiseptic.</li> <li>5. If iodophors are used, allow one to two minutes before proceeding (iodophors require up to two minutes contact time to release free iodine).</li> </ol>	<p><b>Participant Dramatization:</b> (40 min.)</p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Select two or three Px to act as judges.</li> <li>• Divide the remaining Px into two or three groups, with all professionals (doctors, midwives, etc.) represented in each group.</li> <li>• Ask each group to plan a dramatization of the IP procedures required in the provision of the contraceptive methods, using pelvic models, gloves, needles, syringes, etc.</li> <li>• Ask the groups to present their dramatization of IP procedures.</li> <li>• The purpose of the game is to require the Px to exchange roles in order to learn the role each professional plays in maintaining protection from infections.</li> </ul>

**Specific Objective #9: Continued**

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p><b><i>Skin Preparation for Injections</i></b></p> <ol style="list-style-type: none"> <li>1. Cleanse skin with 60-90% ethyl or isopropyl alcohol, removing all visible soil.</li> <li>2. With a fresh cotton swab and alcohol solution, wipe the injection site thoroughly in a circular, overlapping motion starting at center.</li> <li>3. Allow the area to dry before giving the injection. <b>For alcohol to be effective, it must be allowed to air dry.</b></li> </ol>	

**Specific Objective #10: Demonstrate the processing of contaminated instruments, gloves, and other items.**

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p><b>Steps Involved in Processing Instruments, Gloves and Other Items:</b></p> <p><b>1. Decontamination</b></p> <p>Decontamination is the first step in handling used (soiled) instruments and gloves. <b>Instruments with secretions or blood from a client must be decontaminated before being cleaned and high-level disinfected or sterilized.</b> These include uterine sounds, tenaculum, specula, etc. Decontamination is done to protect personnel who must handle the instruments.</p> <p>Supplies needed for decontamination include: water; a plastic or enamel pail; and chlorine. Refer to <i>Px Handouts #14 - 15: Recommended Dilutions of Chlorine-Releasing Compounds and Sodium Hypochlorite</i> to determine the type of chlorine available in the country and the concentration required.</p> <p><i>Procedures for decontamination</i></p> <ol style="list-style-type: none"> <li>a. Wear protective gloves. (Keep a separate set of gloves for decontamination.)</li> <li>b. Submerge items in chlorine bleach solution for 10 minutes. <b>Do not submerge metal for more than 20 minutes.</b></li> <li>c. Remove the item(s), rinse immediately with cool water to prevent corrosion, and clean in routine manner.</li> </ol>	<p><b>Trainer Presentation: (1 hr.)</b></p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Show <i>TDS 4, 5, 6, 7, 8, 9, 10, 11, and 12</i> of the JHPIEGO video <u><i>Infection Prevention for Family Planning Service Programs</i></u>.</li> <li>• Introduce each topic (such as decontamination), and show the appropriate TDS.</li> <li>• Use the Questions for Discussion in the book that accompanies the video.</li> <li>• Use the five-step demonstration and return demonstration technique, and review the steps involved in processing instruments, gloves, and other items, including how to make a decontamination solution.</li> </ul> <p><i>(See Px Handouts #12 and 13: Steps in Processing Instruments and Equipment.)</i></p>

**Specific Objective #10: Continued**

CONTENT Knowledge/Attitudes/Skills	Training/Learning Methods (Time Required)
<p><b>2. Cleaning</b></p> <p>Cleaning instruments is necessary before disinfection or sterilization to remove all visible Foreign material and some microorganisms. <b>Dried organic materials can entrap microorganisms in a residue that shields them against sterilization or chemical disinfection.</b> It also reduces the load of bacteria. Supplies needed for cleaning are: detergents or soap; brushes of various sizes and types; protective gloves; and basins or sinks for detergent solution and rinsing.</p> <p><i>Procedures for cleaning</i></p> <ol style="list-style-type: none"> <li>Wear protective gloves.</li> <li>Rinse the items in cool water, opening or disassembling them when possible.</li> <li>Submerge them in a basin with detergent and water prepared according to the manufacturer's directions. Make suds as you would for dishes.</li> <li>Use brushes (toothbrushes work well) to remove soiled matter, paying attention to interior and hinged areas.</li> <li>Rinse thoroughly in clean water.</li> <li>Dry by air or clean towels before further processing.</li> <li>Maintain cleaning supplies and equipment in dry, clean condition.</li> </ol> <p><b>3. High-Level Disinfection</b></p> <p><b>HLD kills most or many disease-producing microorganisms</b>, including viruses which may cause hepatitis B or AIDS, except for</p>	<p>The trainer should:</p> <ul style="list-style-type: none"> <li>• See <i>Px Handouts #14-15: Recommended Dilutions of Chlorine-Releasing Compounds and Sodium Hypochlorite.</i></li> <li>• Distribute <i>Px Handout #16-17: Instruments, Gloves and Equipment Processing Checklist and Syringe and Needle Processing Checklist</i> for Px reference.</li> <li>• This checklist should also be used as a basis for assessing the Px's competence in performing the procedures.</li> </ul>

## Specific Objective #10: Continued

CONTENT Knowledge/Attitudes/Skills	Training/Learning Methods (Time Required)
<p>endospores. It is used on inanimate objects and can be achieved by boiling or by chemical disinfectants of varying strengths.</p> <p><b>3.1 HLD by Boiling</b></p> <p>HLD by boiling is easy to do and relatively safe and inexpensive. Boiling will kill some endospores but not all, but the level of disinfection is acceptable for IUDs, IUD inserters, specula, tenacula, forceps, scissors, uterine sounds, and IUD removal hooks. Any large covered cooking container and heat source can be used, although commercial boilers may be more convenient. Refer to <i>Px Handout #13: Steps in Processing Instruments and Equipment</i> to determine which process to choose for specific instruments and pieces of equipment.</p> <p><i>Procedures for Boiling</i></p> <ol style="list-style-type: none"> <li>a. Decontaminate and clean the items thoroughly. Disassemble as applicable and remove air bubbles trapped in needles and syringes.</li> <li>b. Place the cleaned items in the boiler and completely cover them with clean water. Consider boiling the same kinds of items together for easier handling.</li> <li>c. Boil for 20 minutes. <b>Begin timing when boiling action starts.</b></li> <li>d. If an additional item is put in after boiling has begun, start timing again.</li> <li>e. Remove items from boiler and put in covered, sterile, or high-level disinfected containers using dry sterile or high-level disinfected handling forceps.</li> </ol>	

**Specific Objective #10: Continued**

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p>f. Never let boiled items remain in water once it has cooled. Microorganisms can begin to grow in the cool water, and it is possible that instruments will start to rust in the water after this length of time.</p> <p>g. Store for up to one week in a high-level disinfected, covered container if dry. If instruments are wet, they must be used the same day.</p> <p><b>3.2 HLD Using Chemicals</b></p> <p>Chemical disinfection can also be used in certain situations, such as when the item to be high-level disinfected cannot withstand heat. When doing chemical HLD, soak the items in a high-level disinfectant for 20 minutes and then rinse well in boiled water. A variety of chemical disinfectants are available. These are listed in the chart found in the <i>Participant Handout #18: Preparing and Using Chemical Disinfectants</i>.</p> <p><i>Procedures for Chemical HLD</i></p> <p>a. Decontaminate and clean all instruments.</p> <p>b. Cover all items completely with the correct dilution of disinfectant.</p> <p>c. Soak for 20 minutes.</p> <p>d. Remove items with HLD large pickup forceps.</p> <p>e. Rinse well with boiled water and allow to air dry.</p> <p>f. Store for up to one week in a HLD covered container or use immediately.</p> <p><b>Note:</b> <i>To prepare an HLD container, boil or fill with 0.5% chlorine solution and soak for 20 minutes. Rinse the inside with boiled water and allow to air dry before use.</i></p>	<p>(See <i>Px Handout #18: Preparing and Using Chemical Disinfectants</i>.)</p>

## Specific Objective #10: Continued

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p><b>4. Sterilization</b></p> <p><b>The sterilization process ensures that all microorganisms, including bacterial endospores, are destroyed.</b> Decontamination through cleaning, rinsing and drying must precede sterilization of instruments and other items that come into direct contact with the bloodstream or tissues under the skin. Heat (moist or dry) and chemical sterilization are the two types of sterilization usually available in hospitals. These methods should be used on items made of material that can withstand these processes.</p> <p><b>4.1 Heat Sterilization</b></p> <p>Either an autoclave (steam under pressure) or an oven (dry heat) is necessary for heat sterilization. <i>Procedures for Operating an Autoclave or Pressure Cooker</i></p> <ol style="list-style-type: none"> <li>a. Decontaminate, clean, and dry the instruments to be sterilized.</li> <li>b. Disassemble the items as much as possible for best steam penetration.</li> <li>c. Wrap needles and sharp edges in gauze to prevent dulling them.</li> <li>d. Strictly follow the directions supplied by the manufacturer for operation of the autoclave or pressure cooker.</li> <li>e. Loosely wrap instruments in a double layer of muslin or newsprint to allow steam to penetrate. <b>Don't tie the instruments tightly together with rubber bands or by other means.</b></li> </ol>	

**Specific Objective #10: Continued**

CONTENT Knowledge/Attitudes/Skills	Training/Learning Methods (Time Required)
<p>f. Arrange the packs so air can circulate and steam can penetrate all surfaces.</p> <p>g. Heat water until steam escapes from the pressure valve only, and then turn down the heat enough to keep steam coming out of the pressure valve only. Don't allow it to boil dry.</p> <p>h. The temperature should be at 121°C (250°F); the pressure should be at 106 kPa or 15 lbs/in<sup>2</sup>; sterilize wrapped objects for 30 minutes or unwrapped objects for 20 minutes.</p> <p>i. After turning off the heat source, wait 20 - 30 minutes until the pressure gauge reads zero. Open the lid and let the packs dry completely (about 30 minutes) before removing. (Damp packs act like a wick to draw in bacteria, viruses, and fungi.)</p> <p>j. Remove packs and store on sterile trays padded with paper or linen.</p> <p>k. Packs may be stored up to one week if kept dry. They may be stored up to a month if sealed in a plastic bag (date the bag). Unwrapped objects must be used the same day.</p> <p><b>Problem Solving for Autoclaving</b></p> <ul style="list-style-type: none"> <li>• If steam escapes from the safety valve instead of the pressure valve, clean and inspect the pressure valve.</li> <li>• If steam escapes from under the lid, clean and dry or replace the rubber ring.</li> </ul> <p><i>Procedures for Operating a Dry Heat Oven</i></p> <p>a. Decontaminate, clean, and dry instruments.</p>	

## Specific Objective #10: Continued

CONTENT Knowledge/Attitudes/Skills	Training/Learning Methods (Time Required)
<p>b. Wrap instruments in cotton or foil, or place in a lidded container. Wrapping is not absolutely necessary, but it prevents recontamination before use.</p> <p>c. Place instruments in oven and heat.</p> <p>d. Begin timing <b>only after the desired temperature is reached.</b></p> <p>e. Operate the dry heat oven according to the manufacturers directions. Appropriate times and temperatures should be one of the following:</p> <ul style="list-style-type: none"> <li>• 170° C (340° F): 60 minutes</li> <li>• 160° C (320° F): 120 minutes</li> <li>• 150° C (300° F): 150 minutes</li> <li>• 140° C (285° F): 180 minutes</li> <li>• 121° C (250° F): overnight</li> </ul> <p>f. After cooling, remove loose items with dry sterile forceps/pickups and store in sterile covered containers up to one week. If instruments are not sterilized often, sterilize before use.</p> <p><b>Note:</b> <i>Cotton cloth can only be heated up to 204° C (399° F). Never put plastic, rubber or latex gloves in a dry heat oven.</i></p> <p><b>4.2 Chemical Sterilization</b></p> <p>This method of sterilization uses glutaraldehyde 2% (Cidex).</p> <p><i>Procedures for Chemical Sterilization</i></p> <p>a. Decontaminate, clean and dry instruments.</p> <p>b. Wear good-quality protective utility gloves and goggles and open the windows.</p> <p>c. Prepare and use the solution in a ventilated area.</p>	

**Specific Objective #10: Continued**

CONTENT Knowledge/Attitudes/Skills	Training/Learning Methods (Time Required)
<p>d. Follow manufacturer's directions in preparing solution, using a covered basin that is deep enough to submerge items.</p> <p>e. Prepare another covered sterile basin with sterile water for rinsing.</p> <p>f. Disassemble needles and syringes to remove air bubbles trapped inside. This allows liquid to reach all areas.</p> <p>g. Submerge items in disinfectant for 10 hours for sterilization.</p> <p>h. Handle items with sterile handling forceps or high-level disinfected forceps.</p> <p>i. Rinse the items in sterile water.</p> <p>j. Air dry instruments and store in sterile or high-level disinfected containers.</p> <p>k. <b>Discard the rinse water.</b> If the solution will be reused, mark the disinfectant solution with the preparation and expiration dates recommended by the manufacturer.</p> <p><b>5. Decontaminating and Cleaning Gloves</b></p> <p>a. Before removing reusable gloves soiled with blood or body fluids, immerse hands briefly in a bucket of 0.5% chlorine solution or other locally available and approved disinfectant.</p> <p>b. To remove gloves, invert them and soak in chlorine solution for 10 minutes before handling. This ensures that both surfaces of gloves are decontaminated. <b>Do not leave gloves in chlorine solution longer than 10 minutes.</b></p>	

## Specific Objective #10: Continued

CONTENT Knowledge/Attitudes/Skills	Training/Learning Methods (Time Required)
<p>c. Wash the gloves inside and out with soapy water.</p> <p>d. Rinse in clean water until no detergent remains, since it can interfere with disinfection.</p> <p>e. Test the gloves for holes; inflate them by flapping them to fill them with air and holding them under water. Air bubbles will appear if holes are present.</p> <p>f. Gently dry the gloves inside and out before high-level disinfecting or sterilizing. This can be done by hanging them on a line. <b>Gloves which remain wet for a long time will absorb water and become tacky.</b></p> <p><b>Note: Reusable gloves should not be reprocessed more than three times, since invisible tears may occur.</b></p> <p><b>5.1 High-Level Disinfecting Gloves by Steaming</b></p> <p>After gloves have been decontaminated and thoroughly washed and dried, they are ready for HLD by steaming.</p> <p>a. Fold up the cuffs so that gloves can be put on easily and without contamination after HLD.</p> <p>b. Place gloves in a pan with holes in the bottom. To make removal from the pan easier, cuffs should be facing outward toward the edge of the pan. Five to 15 pairs can be put in each pan, depending on the size (diameter) of the pans.</p>	

**Specific Objective #10: Continued**

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
<p>c. Repeat this process until up to three steamer pans have been filled with gloves. Stack the filled steamer pans on top of a pan containing water for boiling. A second empty pan without holes should be placed on the counter next to heat source (see step i).</p> <p>d. Place a lid on the top pan and <b>bring the water to a full rolling boil</b>. (When water only simmers, very little steam is formed, and the temperature may not get high enough to kill microorganisms. Steam needs to be coming out of the top pan at all times.)</p> <p>e. Reduce the heat so that the water continues to boil at a rolling boil. (When water boils too violently, it evaporates quickly and wastes fuel.)</p> <p><b>Note:</b> <i>Be sure there is <b>sufficient water</b> in the bottom pan <b>for the entire 20 minutes of steaming</b>.</i></p> <p>f. When steam begins coming out between the pans, start a timer or note the time on a clock and record the time in a HLD log.</p> <p>g. Steam the gloves for 20 minutes.</p> <p>h. Remove the top steamer pan and place a cover on the top pan remaining on the stack. Gently shake excess water from the gloves in the pan just removed.</p> <p>i. Place the pan containing the gloves on the second (empty) pan (see step c).</p> <p><b>Note:</b> <i>Do not place pans containing gloves on a table top, counter, or other surface which can contaminate it.</i></p>	

## Specific Objective #10: Continued

CONTENT Knowledge/Attitudes/Skills	Training/Learning Methods (Time Required)
<p>j. Allow the gloves to air dry in the steamer pans (four to six hours) before using. Gloves which were removed from steamer pan(s) to be used "wet" or "damp," but were not used during the clinic session, should be reprocessed before using.</p> <p>k. Using a high-level disinfected forceps, transfer the dry gloves to a dry, high-level disinfected container with a tight-fitting lid. <b>Store for up to one week.</b> (Gloves can also be stored in the stacked and covered steamer pans.)</p> <p><b>Note:</b> <i>If only a boiler/steamer with a single tray is available, the same process may be used. The gloves will have to be air dried on the single steamer tray.</i></p> <p><b>5.2 Sterilizing Gloves</b></p> <p>a. Gloves to be steam-sterilized should be packaged before the procedure.</p> <p>b. When packaging gloves, roll up the cuff so gloves can be put on without contamination.</p> <p>c. Put gauze or paper inside the glove and under the fold of the cuff. This will ensure optimum steam penetration.</p> <p>d. Place the packaged gloves in a wire basket on their sides with thumbs up in a rack to allow steam to penetrate the lower piles, not piled on top of each other, in order to allow optimum steam penetration.</p> <p>e. Autoclave at 121°C (250°F) for 30 minutes.</p> <p>f. <b>After autoclaving, do not use the gloves for at least 24 hours.</b></p>	

**Specific Objective #11: Evaluate infection prevention practices in a reproductive health setting.**

<p style="text-align: center;">CONTENT Knowledge/Attitudes/Skills</p>	<p style="text-align: center;">Training/Learning Methods (Time Required)</p>
	<p><b>Clinic Practicum:</b> (4 hrs.)</p> <p>The trainer should:</p> <ul style="list-style-type: none"> <li>• Hand out <i>Px Handout #19: Infection Prevention Assessment Form</i>.</li> <li>• Review the form with Px.</li> <li>• Ask the Px to conduct the assessment in a clinic setting.</li> <li>• The Px should not work together in filling out the forms.</li> <li>• Encourage the Px to take notes on the things that they observed.</li> <li>• When the Px return from the clinic, divide them into small groups.</li> <li>• Ask them to discuss their findings and have one person from each group present to the plenary.</li> </ul>



# **APPENDIX**

## Participant Handout #1: Introduction to Infection Prevention, Key Definitions, and Key Messages

### Overview

Microorganisms live everywhere in our environment. We normally carry them on our skin and in our upper respiratory and intestinal tracts. These microorganisms are called "normal flora." Microorganisms are also found in animals, plants, the soil, air, and water. Some microorganisms are more pathogenic than others. However, given the right circumstances, **all microorganisms may cause infection.** In order for bacteria, viruses, and other infectious agents to survive and spread within a clinic or hospital, certain factors or conditions must exist.

### Key Definitions:

**Asepsis** or **aseptic technique** are general terms used in health care settings to describe the combination of efforts made to prevent entry of microorganisms into any area of the body where they are likely to cause infection. **The goal of asepsis is to reduce or eliminate the number of microorganisms on both animate (living) surfaces (skin and tissue) and inanimate objects (surgical instruments)** to a safe level.

**Antisepsis** is the prevention of infection by killing or inhibiting the growth of microorganisms on skin and other body tissues through the use of a chemical agent (antiseptic).

**Decontamination** is the process that makes inanimate (non-living) objects safer to be handled by staff (especially cleaning personnel) **before cleaning.** Such objects include large objects (e.g., examination tables) and surgical instruments and gloves contaminated with blood or body fluids during or following medical procedures.

**Cleaning** is the process that physically removes all visible blood, bodily fluids, or any other foreign material such as dust or soil from skin or inanimate objects.

**Disinfection** is the process that eliminates most, but not all disease-causing microorganisms from inanimate objects. **High-level disinfection** (HLD), through boiling or the use of chemicals, eliminates all microorganisms except some bacterial endospores.

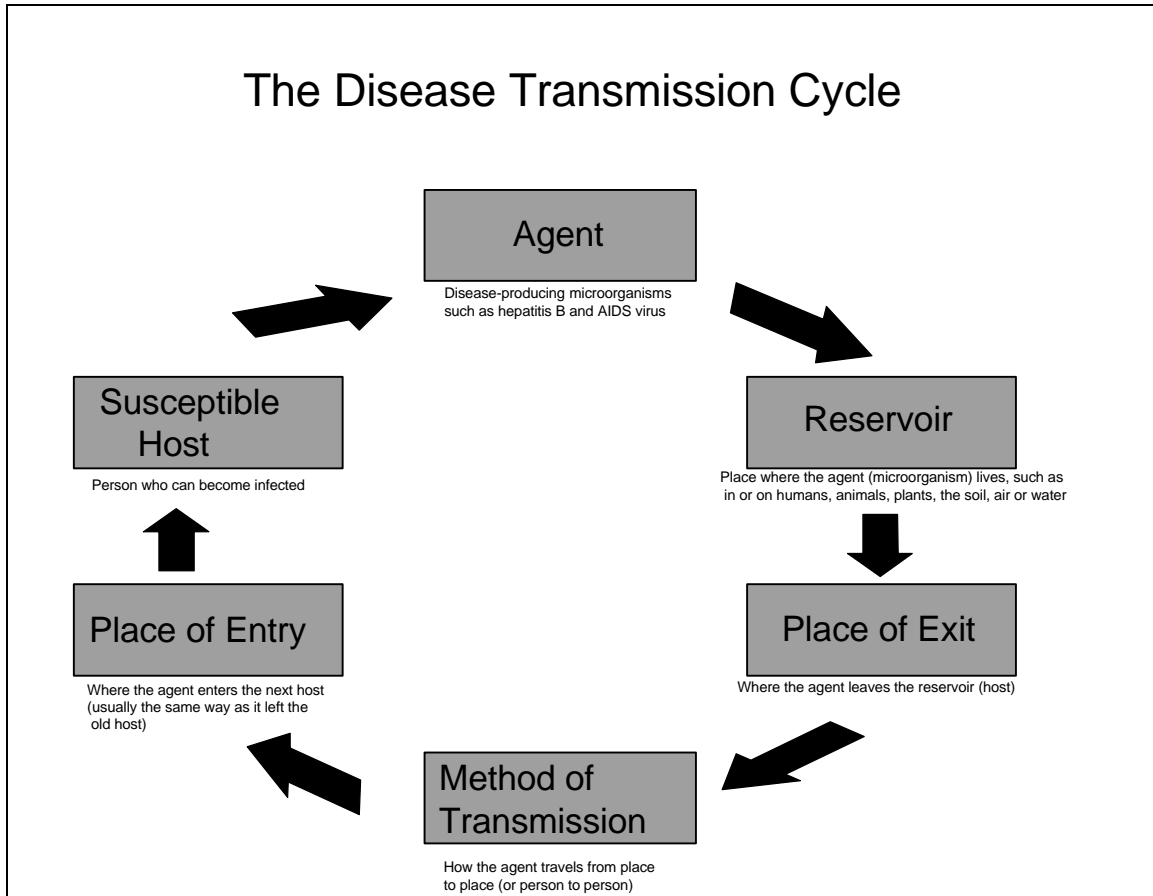
**Sterilization** is the process that eliminates **all** microorganisms (bacteria, viruses, fungi, and parasites), including bacterial endospores from inanimate objects.

**Participant Handout #1: Introduction to Infection  
Prevention,  
Key Definitions, and Key Messages (cont.)**

**Key Messages**

- 1) **To create an infection-free environment**, it is important that **the rationale** for each of the recommended infection prevention processes (and its limitations) **be clearly understood** by clinic staff at all levels—from service providers to cleaning and maintenance staff.
- 2) Because it is not possible to know in advance if a client is infected with hepatitis B or HIV, **all items from all clients must be handled as if they are contaminated and all clients treated as if they may be infected.**
- 3) Microorganisms which cause disease include bacterial endospores, bacteria, parasites, fungi, and viruses. **Bacterial endospores can only be killed by sterilization.** Other microorganisms can be killed by either sterilization or high-level disinfection.

## Participant Handout #2: Disease Transmission Cycle



Source: Tietjen, L., Cronin, W., McIntosh, N., Infection Prevention for Family Planning Service Programs, JHPIEGO, Baltimore, MD, 1992.

**Participant Handout #3: Infection Prevention Procedures by Contraceptive Methods**

Method	Infection Prevention Procedures Necessary
Male Sterilization	
Female Sterilization	
Norplant® Implants	
Intrauterine Device	
Oral Contraceptives	
Condoms	
Natural Family Planning	
Injectable Contraceptives	

**Participant Handout #4: Infection Prevention Procedures for Instruments Exercise**

**Instructions:** For each of the instruments below, list the appropriate infection prevention procedures to be performed following the use of the instrument in providing reproductive health services.

<b>Instrument</b>	<b>Infection Prevention Procedures</b>
pelvic exam table top	
re-usable gloves	
re-usable syringe and needle	
forceps (for IUD insertion)	
uterine sound	
scalpel	
vaginal speculum	
Norplant trochar	
uterine tenaculum	
stethoscope	

**Participant Handout #5: Infection Prevention Procedures for Instruments**

Human Tissues the Instrument or Object Will Touch	Examples of Instruments and Objects	Appropriate Infection Prevention Procedure
intact (unbroken) skin	pelvic exam table top or other surfaces contaminated by body fluids	<b>decontamination</b> to destroy easily killed viruses (such as HIV) and other microorganisms
mucous membranes or broken skin	uterine sounds, specula, IUDs, gloves for pelvic exam	<b>high-level disinfection</b> to destroy all microorganisms <i>except bacterial endospores</i> <sup>1</sup>
all tissue beneath skin or bloodstream	invasive instruments such as needles and syringes, scalpels, and trochars for Norplant implants	<b>sterilization</b> to destroy all live microorganisms <i>including bacterial endospores</i>

Source: Tietjen, L., Cronin, W., McIntosh, N., Infection Prevention for Family Planning Service Programs, JHPIEGO, Baltimore, MD, 1992.

<sup>1</sup> Bacterial spores (endospores) are forms of bacteria which are very difficult to kill due to their casing or coating; types of bacteria which can make endospores include the bacteria *Clostridia*, which causes tetanus and gangrene. Bacterial endospores can only be killed reliably by **sterilization**.

## **Participant Handout #6: Protective Barriers and Handwashing**

### **Protective Barriers**

Placing a physical, mechanical or chemical "barrier" between microorganisms and an individual, whether a client, patient, or health worker, is an effective means of preventing the spread of disease. **The barrier serves to break the disease transmission cycle.**

Barriers include the following:

1. Handwashing
2. Wearing gloves, either for surgery, pelvic examinations, IUD insertions, or to protect clinic staff when handling contaminated waste materials or used instruments
3. Using antiseptic solutions for cleaning wounds or preparing the skin prior to surgery
4. Decontamination, cleaning and high-level disinfecting or sterilizing surgical instruments, reusable gloves, and other items

**Protective barriers are designed to prevent the spread of infection from person to person and/or equipment, instruments, and environmental surfaces to people.**

### **Handwashing**

**Handwashing is the simplest and most important infection prevention procedure in any clinic.** It removes many microorganisms from the skin, which helps to prevent transmission of infections from person to person.

#### **1. Handwashing should be done:**

*Before:* The day's work; examining a client; administering injections or drawing blood; handling clean, disinfected, or sterilized supplies for storage; putting on sterile gloves; going home.

*After:* Any situation in which the hands may be contaminated, such as handling instruments or touching body secretions or excretions; removing gloves; personal use of toilet; blowing nose, sneezing, or coughing.

#### **2. Supplies needed for handwashing:**

- clean water (water may be running or from a bucket, but it must be clean)
- soap
- soap dish that drains and keeps the soap dry
- clean, dry towel
- bucket and dipper; or alcohol, if no running water is

- available
- soft sticks for nail cleaning, if available

## Participant Handout #7: Handwashing Techniques

### Handwashing techniques:

- **Remove jewelry:** no jewelry, except plain wedding bands, or nail polish should be worn. Jewelry and nail polish offer protection to microorganisms.
- Turn on the water from the tap. **Avoid splashes.**
- If there is no running water, use a dipper to pour water on the hands at the beginning and when rinsing.
- Position the hands and wrists downward as you wet them so that the water flows down.
- Soap the hands and hold the bar with two fingers to rinse it before placing it back in the soap dish.
- Avoid touching the sink as it is probably contaminated.
- Wash hands for 15 - 30 seconds.
- Use a soft, thick stick to clean nails when grossly contaminated and at the beginning and end of the clinic session.
- Point hands down when rinsing them with running water.
- Air dry hands or dry them with an unused, dry portion of a **clean** cotton towel which is not used by others.
- Use the towel or a paper towel to turn off the faucet.

### If water is not available:

Clean hands with isopropyl or ethyl alcohol 70%. Keep a covered container of alcohol swabs ready for use. Alcohol makes the skin dry, but lotion can be applied at the end of the session. However, do not use lotion after every cleaning of the hands with alcohol, because it is contaminated with microorganisms.

### Surgical Handscrub

A three to five minute handscrub with a solution containing chlorhexidine or an iodophor is recommended.

Alternatively, surgical staff can wash hands with plain soap, then apply alcohol solution containing an emollient and rub until dry.

A non-irritating alcohol solution can be made by adding either glycerine, propyl glycol, or Sorbitol to the alcohol (2ml in 100ml 60-90% alcohol solution).

Use 3-5ml for each application and continue rubbing the solution over the hands for about two minutes, using a total of 6 to 10ml per scrub.

## **Participant Handout #8: Gloving for Protection from Infection**

**Gloves are used to protect the health care provider** from contact with potentially infectious substances and **to protect the client or patient** from infections which might be found on the skin of the health care provider.

**Points of contact where infection can be introduced include:**

- pelvic examination
- contact with any lesions
- when handling contaminated materials
- when cleaning instruments, equipment and contaminated surfaces

**Observe the following when using sterile gloves:**

- Use a separate pair of gloves for each client to avoid cross-contamination.
- Do not use gloves from a package that is broken or expired.
- Do not use gloves which are cracked, peeling or have holes or tears.
- Never touch the outside of the gloves while putting them on; handle them only by the out-turned inner cuff.

**Note:** *Adjusting the cuff of one glove will contaminate the fingers of the other hand.*

- If gloves accidentally become contaminated, change them immediately.
- Wash hands after gloves are removed at the end of client contact.

**Procedure for Putting on Sterile Gloves:**

"How to Put on Sterile Gloves to Avoid Contamination," from Guidelines for Clinical Procedures in Family Planning, INTRAH, 1992.

1. Prepare a large, clean, dry area to open gloves.
2. Obtain correct size of sterile gloves.
3. Wash hands and dry well. Lightly powder hands (not gloves) if inside of gloves are not powdered.

**Note:** *Do not use powder for insertions of Norplant or other silastic implants, because the powder will adhere to the silastic capsule, causing a foreign body reaction.*

4. Open other sterile supplies (e.g., open end of IUD package).
5. Open outer glove wrapper and lay the glove package out on a clean surface, with cuffs facing you. (This should be the bottom edge of the packet.) Take care not to touch the inner surface of the wrapper if you intend to use it as a sterile field.

*Module 2/Participant Handouts*

6. Pick up a glove by the folded-back cuff. Be careful to touch only the inside portion of the cuff (i.e., the side which will be touching your skin when the glove is on).

## Participant Handout #8: Gloving for Protection from Infection (cont.)

### Procedure for Putting on Sterile Gloves

7. While holding the glove, slip the other hand into the glove. Pointing the fingers of the glove to the floor will keep the fingers open by force of gravity. Be careful not to touch anything; holding the gloves above waist level will help.
8. If the first glove is not fitting correctly, **wait to make any adjustments until the second glove is on.** (Then you can use the sterile fingers of one glove to adjust the sterile portion of the other.)
9. To pick up the second glove, **slide the fingers of the gloved hand between the folded cuff and the sterile portion of the second glove. This is very important, in order to avoid contaminating the gloved hand with the ungloved hand.**
10. Place the second glove on the ungloved hand by maintaining a steady pull through the folded cuff.
11. Do not attempt to adjust cuffs once the gloves are on, since this may cause the gloves to become contaminated.
12. Adjust the position of the glove fingers until the gloves fit comfortably.
13. Always keep gloved hands above the waist level and in sight to avoid accidental contamination.
14. If a glove becomes contaminated, **stop** and ask yourself if the glove will touch a sterile or disinfected instrument, the client's mucous membranes or sterile tissue. If yes, either remove that glove and reglove, or put another sterile glove over the contaminated glove.
15. When removing gloves, avoid allowing the surface that was sterile to come into contact with your hands (the exterior of the gloves is now contaminated).
16. First decontaminate by immersing both gloved hands fully in a 0.5% chlorine solution, then remove by turning them inside out. Either dispose of gloves in a waste container or allow the gloves to soak for 10 minutes.

**Participant Handout #9: Antiseptic Effectiveness**

Group	Activity Against Bacteria										Recommended
	Gram Positive	Most Gram Negative	TB	Viruses	Fungi	Endospores	Relative Speed of Action	Affected by Organic Matter	Surgical Scrub	Skin Preparation	
Alcohols (60-90% ethyl or isopropyl)	Very good	Very good	Good	Good	Good	None	Fast	Data varies	Yes	Yes	Not for use on mucous membranes
Chlorhexidine <sup>1</sup> (4%) (Hibitane, Hibiscrub)	Very good	Good	Poor	Fair	Fair	None	Slow	Slight	Yes	Yes	Has good persistent effect
Hexachlorophene (3%) (pHisoHex)	Good	Poor	None	Fair	Poor	None	Slow	Slight	Yes	No	Rebound growth of bacteria may occur
Iodine preparations (3%). Iodine and alcohol (tincture of iodine)	Very good	Very good	Good	Good	Good	Poor	Intermediate	Slight	No	Yes	Not for use on mucous membranes
Iodophors (1:2,500) (Betadine)	Very good	Good	Good	Good	Good	None	Slow	Yes	Yes	Yes	Can be used on mucous membranes

<sup>1</sup> **Note:** Savlon, which contains chlorhexidine, is not listed because the concentration of chlorhexidine varies from country to country from as little as 1% to as much as 4%.

**Source:** Adapted from Tietjen, L., Cronin, W., McIntosh, N., Infection Prevention for Family Planning Service Programs, JHPIEGO, Baltimore, MD, 1992.

## Participant Handout #10: Antiseptics

Antiseptics are chemicals which kill or inhibit many, though not all, microorganisms while causing little damage to tissue. **Cleaning the client's skin with antiseptic solution is an important infection prevention measure.**

Antiseptic solutions should be used in the following situations:

- Surgical scrub
- Skin or vaginal preparations for procedures such as minilaparotomy, laparoscopy, vasectomy, Norplant implant insertion or removal, IUD insertion and injections.
- Handwashing before touching clients who are unusually susceptible to infection, such as newborns or immunosuppressed persons.

**Note:** *Alcohol should never be used on mucous membranes because it burns the membranes.*

**Note:** *Zephiran (benzalkonium chloride) should not be used as an antiseptic, because it takes at least 10 minutes to kill HIV. Solutions of benzalkonium chloride have repeatedly been shown to become contaminated by pseudomonas and other bacteria. Solutions of benzalkonium chloride are easily inactivated by gauze and other organic material.*

**Note:** *Antiseptics are for skin or mucous membranes only. They are not designed for use on inanimate objects such as operating tables or equipment.*

### Dangers of Mercury-Containing Compounds

Although frequently sold for antiseptics, **mercury-containing chemicals**, such as mercury laurel, **should be avoided due to their toxicity.**

- Skin exposure to low levels of mercury causes blister formation (contact dermatitis).
- Inhalation or ingestion of low levels of mercury can cause central nervous system effects (numbness, speech impairment, deafness), and higher levels (200mg) can be fatal.
- Skin contact alone can result in absorption of measurable amounts of mercury.
- Pregnant women exposed to small doses may not show toxic effects themselves, but their fetuses may be harmed. Mercury is a potent teratogen (causes birth defects, including cleft palate, cerebral palsy, and other central nervous system abnormalities).

## **Participant Handout #11: Steps for Skin and Mucous Membrane Preparation**

### **Prior to Surgical Procedures or IUD Insertion**

1. **Do not remove hair from the operative site unless absolutely necessary.** If hair removal must be done, trim the hair close to the skin surface immediately before surgery. **Shaving increases the risk of wound infection,** since the tiny nicks in the skin provide an ideal setting for microorganisms to grow and multiply.
2. Ask the client about known allergic reactions before selecting an antiseptic solution.
3. If visibly soiled, thoroughly clean the client's skin or external genital area with soap and water or have her clean it before applying antiseptic.
4. Apply antiseptic. Select an antiseptic solution from the chart found in *Px Handout #9*.
5. Using dry, disinfected forceps and cotton dipped in antiseptic, thoroughly cleanse the skin by gently scrubbing. Work from the operative site outward for several inches. (A circular motion from the center out helps to prevent recontamination of the operative site with local skin bacteria.)
6. **Do not allow the antiseptic to pool** beneath the client's body. (This reduces skin irritation.)
7. Allow the antiseptic to dry before beginning the procedure. If using an iodophor, wait one to two minutes before proceeding to allow time for the iodine to be released.

### **Vaginal Preps**

For vaginal preps, prior to IUD insertion or removal, select a water-based antiseptic such as an iodophor or chlorhexidine gluconate (Hibiclens or Savlon). Do not use alcohols; they burn and irritate mucous membranes, promoting the growth of microorganisms.

1. Ask the client about known allergic reactions before selecting an antiseptic solution.
2. If visibly soiled, thoroughly clean the client's skin or external genital area with soap and water or have her clean it before applying antiseptic solution.
3. Apply an antiseptic solution to the perineum. Select the antiseptic solution from the chart found in *Participant Handout #9: Antiseptic Effectiveness*. Allow the antiseptic to dry before beginning the procedure.
4. After inserting the speculum, apply the antiseptic solution liberally to the vagina and cervix (two or three times) using dry, disinfected forceps and cotton soaked in the antiseptic.
5. If iodophors are used, allow one to two minutes before proceeding (iodophors require up to two minutes contact time to release free iodine).

### **Skin Preparation for Injections**

1. Cleanse skin with 60-90% ethyl or isopropyl alcohol, removing all visible soil.

2. With a fresh cotton swab and alcohol solution, wipe the injection site thoroughly in a circular, overlapping motion starting at center.
3. Allow the area to dry before giving the injection. **For alcohol to be effective, it must be allowed to air dry.**

## **Participant Handout #12: Steps Involved in Processing Instruments, Gloves, and Other Items**

### **1. Decontamination**

Decontamination is the first step in handling used (soiled) instruments and gloves. **Instruments with secretions or blood from a client must be decontaminated before being cleaned and high-level disinfected or sterilized.** These include uterine sounds, tenaculum, specula, etc. Decontamination is done to protect personnel who must handle the instruments.

Supplies needed for decontamination include: water; a plastic or enamel pail; and chlorine. Refer to *Participant Handouts #14 - 15: Recommended Dilutions of Chlorine-Releasing Compounds and Sodium Hypochlorite* to determine the type of chlorine available in the country and the concentration required.

#### ***Procedures for decontamination***

- a. Wear protective gloves. (Keep a separate set of gloves for decontamination.)
- b. Submerge items in chlorine bleach solution for 10 minutes. **Do not submerge metal for more than 20 minutes.**
- c. Remove the item(s), rinse immediately with cool water to prevent corrosion, and clean in routine manner.

### **2. Cleaning**

Cleaning instruments is necessary before high-level disinfection or sterilization to remove all visible foreign material and some microorganisms. **Dried organic materials can entrap microorganisms in a residue that shields them against sterilization or chemical disinfection.** It also reduces the load of bacteria. Supplies needed for cleaning are: detergents or soap; brushes of various sizes and types; protective gloves; and basins or sinks for detergent solution and rinsing.

#### ***Procedures for cleaning***

- a. Wear protective gloves.
- b. Rinse the items in cool water, opening or disassembling them when possible.
- c. Submerge them in a basin with detergent and water prepared according to the manufacturer's directions. Make suds as you would for dishes.
- d. Use brushes (a tooth brush works well) to remove soiled matter, paying attention to interior and hinged areas.
- e. Rinse thoroughly in clean water.
- f. Dry by air or clean towels before further processing.
- g. Maintain cleaning supplies and equipment in dry, clean condition.

## **Participant Handout #12: Steps Involved in Processing Instruments, Gloves, and Other Items (cont.)**

### **3. High-Level Disinfection**

**HLD kills most or many disease-producing microorganisms**, including viruses which may cause hepatitis B or AIDS, except for endospores.

It is used on inanimate objects and can be achieved by boiling or by chemical disinfectants of varying strengths.

#### **3.1HLD by Boiling**

High-level disinfection by boiling is easy to do and relatively safe and inexpensive. Boiling will kill some endospores but not all, but the level of disinfection is acceptable for IUDs, IUD inserters, specula, tenacula, forceps, scissors, uterine sounds and IUD removal hooks. Any large covered cooking container and heat source can be used, although commercial boilers may be more convenient. Refer to *Participant Handout #13: Steps in Processing Instruments and Equipment* to determine which process to choose for specific instruments and pieces of equipment.

#### ***Procedures for Boiling***

- a. Decontaminate and clean the items thoroughly. Disassemble as applicable and remove air bubbles trapped in needles and syringes.
- b. Place the cleaned items in the boiler and completely cover them with clean water. Consider boiling the same kinds of items together for easier handling.
- c. Boil for 20 minutes. **Begin timing when boiling action starts.**
- d. If an additional item is put in after boiling has begun, start timing again.
- e. Remove items from boiler and put in covered, high-level disinfected, or sterile containers using dry sterile or HLD handling forceps.
- f. Never let boiled items remain in water once it has cooled. Microorganisms can begin to grow in the cool water, and it is possible that instruments will start to rust in the water after this length of time.
- g. Store for up to one week in a high-level disinfected, covered container if dry. If instruments are wet, they must be used the same day.

#### **3.2HLD Using Chemicals**

Chemical disinfection can also be used in certain situations, such as when the item to be high-level disinfected cannot withstand heat. When doing chemical HLD, soak the items in a high-level disinfectant for 20 minutes and then rinse well in boiled water. A variety of chemical disinfectants are available. These are listed in the chart found in the *Participant Handout #18: Preparing and Using Chemical Disinfectants*.

## **Participant Handout #12: Steps Involved in Processing Instruments, Gloves, and Other Items (cont.)**

### ***Procedures for Chemical High-Level Disinfection***

- a. Decontaminate and clean all instruments.
- b. Cover all items completely with the correct dilution of disinfectant.
- c. Soak for 20 minutes.
- d. Remove the items with high-level disinfected large pickup forceps.
- e. Rinse well with boiled water and allow to air dry.
- f. Store for up to one week in a HLD covered container or use immediately.

**Note:** *To prepare an HLD container, boil or fill with 0.5% chlorine solution and soak for 20 minutes. Rinse the inside with boiled water and allow to air dry before use.*

## **4. Sterilization**

**The sterilization process ensures that all microorganisms, including bacterial endospores, are destroyed.** Decontamination through cleaning, rinsing and drying must precede sterilization of instruments and other items that come into direct contact with the bloodstream or tissues under the skin. Heat (moist or dry) and chemical sterilization are the two types of sterilization usually available in hospitals. These methods should be used on items made of material that can withstand these processes.

### **4.1 Heat Sterilization**

Either an autoclave (steam under pressure) or an oven (dry heat) is necessary for heat sterilization.

### ***Procedures for Operating an Autoclave or Pressure Cooker***

- a. Decontaminate, clean and dry the instruments to be sterilized.
- b. Disassemble the items as much as possible for best steam penetration.
- c. Wrap needles and sharp edges in gauze to prevent dulling them.
- d. Strictly follow the directions supplied by the manufacturer for operation of the autoclave or pressure cooker.
- e. Loosely wrap instruments in a double layer of muslin or newsprint to allow steam to penetrate. **Don't tie the instruments tightly together with rubber bands or by other means.**
- f. Arrange the packs so air can circulate and steam can penetrate all surfaces.
- g. Heat water until steam escapes from the pressure valve only,

and then turn down the heat enough to keep steam coming out of the pressure valve only. Don't allow it to boil dry.

- h. The temperature should be at 121°C (250°F); the pressure should be at 106 kPa or 15 lbs/in<sup>2</sup>; sterilize wrapped objects for 30 min. or unwrapped objects for 20 min.

## **Participant Handout #12: Steps Involved in Processing Instruments, Gloves, and Other Items (cont.)**

### ***Procedures for Operating an Autoclave or Pressure Cooker, continued***

- i. After turning off the heat source, wait 20 - 30 minutes until the pressure gauge reads zero. Open the lid and let the packs dry completely (about 30 minutes) before removing. (Damp packs act like a wick to draw in bacteria, viruses and fungi.)
- j. Remove packs and store on sterile trays padded with paper or linen.
- k. Packs may be stored up to one week if kept dry. They may be stored up to a month if sealed in a plastic bag (date bag). Unwrapped objects must be used the same day.

### ***Problem Solving for Autoclaving***

- If steam escapes from the safety valve instead of the pressure valve, clean and inspect the pressure valve.
- If steam escapes from under the lid, clean and dry or replace the rubber ring.

### ***Procedures for Operating a Dry Heat Oven***

- a. Decontaminate, clean, and dry instruments.
- b. Wrap instruments in cotton or foil, or place in a lidded container. Wrapping is not absolutely necessary, but it prevents recontamination before use.
- c. Place instruments in oven and heat.
- d. Begin timing **only after the desired temperature is reached.**
- e. Operate the dry heat oven according to the manufacturers directions. Appropriate times and temperatures should be one of the following:
  - 170° C (340° F): 60 minutes
  - 160° C (320° F): 120 minutes
  - 150° C (300° F): 150 minutes
  - 140° C (285° F): 180 minutes
  - 121° C (250° F): overnight
- f. After cooling, remove loose items with dry sterile forceps/pickups and store in sterile covered containers up to one week. If instruments are not used often, sterilize just before use.

**Note:** Cotton cloth can only be heated up to 204° C (399° F). Never put plastic, rubber or latex gloves in a dry heat oven.

## Participant Handout #12: Steps Involved in Processing Instruments, Gloves, and Other Items, continued

### 4.2 Chemical Sterilization

This method of sterilization uses glutaraldehyde 2% (Cidex).

#### **Procedures for Chemical Sterilization**

- a. Decontaminate, clean and dry instruments.
- b. Wear good-quality protective utility gloves and goggles and open the windows.
- c. Prepare and use the solution in a ventilated area.
- d. Follow manufacturer's directions in preparing solution, using a covered basin that is deep enough to submerge items.
- e. Prepare another covered sterile basin with sterile water for rinsing.
- f. Disassemble needles and syringes to remove air bubbles trapped inside. This allows liquid to reach all areas.
- g. Submerge items in disinfectant for 10 hours for sterilization.
- h. Handle items with sterile handling forceps or HLD forceps.
- i. Rinse the items in sterile water.
- j. Air dry instruments and store in sterile or disinfected containers.
- k. **Discard the rinse water.** If the solution will be reused, mark the disinfectant solution with the preparation and expiration dates recommended by the manufacturer.

### 5. Decontamination and Cleaning of Gloves

- a. Before removing reusable gloves soiled with blood or body fluids, immerse hands briefly in a bucket of 0.5% chlorine solution or other locally available and approved disinfectant.
- b. To remove the gloves, invert them and soak them in chlorine solution for 10 minutes before handling. This ensures that both surfaces of the gloves are decontaminated. **Do not leave the gloves in chlorine solution longer than 10 minutes.**
- c. Wash the gloves inside and out with soapy water.
- d. Rinse in clean water until no detergent remains, since it can interfere with disinfection.
- e. Test the gloves for holes; inflate them by flapping them to fill them with air and holding them under water. Air bubbles will appear if holes are present.
- f. Gently dry the gloves inside and out before high-level disinfecting or sterilizing. This can be done by hanging them on a line. **Gloves which remain wet for a long time will absorb water and become tacky.**

**Note:** *Reusable gloves should not be reprocessed more than three times, since invisible tears may occur.*

## Participant Handout #12: Steps Involved in Processing Instruments, Gloves, and Other Items (cont.)

### 5.1 High-Level Disinfection of Gloves by Steaming

After gloves have been decontaminated and thoroughly washed and dried, they are ready for HLD by steaming.

- a. Fold up cuffs so that gloves can be put on easily and without contamination after HLD.
- b. Place gloves in a pan with holes in the bottom. To make removal from the pan easier, cuffs should be facing outward toward the edge of the pan. Five to 15 pairs can be put in each pan, depending on the size (diameter) of the pans.
- c. Repeat this process until up to three steamer pans have been filled with gloves. Stack the filled steamer pans on top of a pan containing water for boiling. A second empty pan without holes should be placed on the counter next to heat source (see step i).
- d. Place a lid on the top pan and **bring the water to a full rolling boil**. (When water only simmers, very little steam is formed, and the temperature may not get high enough to kill microorganisms. Steam needs to be coming out of the top pan at all times.)
- e. Reduce the heat so that the water continues to boil at a rolling boil. (When water boils too violently, it evaporates quickly and wastes fuel.)

**Note:** Be sure there is **sufficient water** in the bottom pan **for the entire 20 minutes of steaming**.

- f. When steam begins coming out between the pans, start a timer or note the time on a clock and record the time in an HLD log.
- g. Steam the gloves for 20 minutes.
- h. Remove the top steamer pan and place a cover on the top pan remaining on the stack. Gently shake excess water from the gloves in the pan just removed.
- i. Place the pan containing the gloves on the second (empty) pan (see step c).

**Note:** Do not place pans containing gloves on a table top, counter, or other surface which can contaminate it.

- j. Allow the gloves to air dry in the steamer pans (four to six hours) before using. Gloves which were removed from steamer pan(s) to be used "wet" or "damp," but were not used during the clinic session should be reprocessed before using.
- k. Using a high-level disinfected forceps, transfer the dry gloves to a dry, high-level disinfected container with a tight-fitting lid. **Store for up to one week**. (Gloves can also be stored in the stacked and covered steamer pans.)

**Note:** If only a boiler/steamer with a single tray is available, the

*same process may be used. The gloves will have to be air dried on the single steamer tray.*

**Participant Handout #12: Steps Involved in Processing  
Instruments, Gloves, and Other Items (cont.)**

**5.2 Sterilizing Gloves**

- a. Gloves to be steam-sterilized should be packaged before the procedure.
- b. When packaging gloves, roll up the cuff so the gloves can be put on without contamination.
- c. Put gauze or paper inside the glove and under the fold of the cuff. This will ensure optimum steam penetration.
- d. Place the packaged gloves in a wire basket on their sides with thumbs up in a rack to allow steam to penetrate the lower piles, not piled on top of each other, in order to allow optimum steam penetration.
- e. Autoclave at 121°C (250°F) for 30 minutes.
- f. **After autoclaving, do not use the gloves for at least 24 hours.**

**Participant Handout #13: Steps in Processing Instruments and Equipment**

Process	Decontamination is the first step in handling dirty instruments; reduces risk of hepatitis B and AIDS.	Cleaning removes particulate matter and improves the quality of subsequent high-level disinfection or sterilization.	High-level disinfection destroys all viruses, bacteria, parasites, fungi, and some endospores.	Sterilization destroys all microorganisms, including endospores.
Instruments/Equipment	Decontamination	Cleaning	High-Level Disinfection	Sterilization <sup>1</sup>
<p>Pelvic exam table top or other large surface area</p> <p>Linens (caps, gowns, masks and surgical drapes)</p> <p>Gloves (rubber or plastic)</p> <p>Diaphragms and/or fitting rings</p>	<p>Wipe off with 0.5% chlorine solution; rinse.</p> <p>Soak in 0.5% chlorine solution for 10 minutes if contaminated with blood or bodily fluids prior to cleaning. (Rinse and wash immediately.<sup>2</sup>)</p> <p>Soak in 0.5% chlorine solution for 10 minutes prior to cleaning. (Rinse or wash immediately.<sup>2</sup>)</p> <p>Soak in 0.5% chlorine solution for 10 minutes prior to cleaning. Rinse or wash immediately.<sup>2</sup>)</p>	<p>Wash with detergent and water if organic material remains after decontamination procedure daily or as necessary.</p> <p>Wash with detergent and water, removing all particles. Rinse with clean water, air or machine dry.</p> <p>Wash with detergent and water, removing all particles. Rinse with clean water and check for holes. If to be sterilized, dry inside and out (air or towel dry).</p> <p>Wash with detergent and water, removing all particles. Rinse with clean water and check for holes. If to be sterilized, dry inside and out (air or towel dry).</p>	<p>Not necessary</p> <p>Not necessary for caps, gowns and masks. Surgical drapes<sup>3</sup>:</p> <ul style="list-style-type: none"> <li>· Boil or chemically HLD as below.</li> <li>· Air-dried surgical drapes should be ironed before use.</li> </ul> <p>If touching only mucous membranes or broken skin (e.g. pelvic exam or IUD insertion):</p> <ul style="list-style-type: none"> <li>· Steam for 20 minutes in a pot with a lid (start timing when water begins to boil).</li> <li>· Steam must penetrate all gloves.</li> <li>· Air dry before use or storage.</li> </ul> <p>Boil as above or chemically disinfect with:</p> <ul style="list-style-type: none"> <li>· 8% formaldehyde, or</li> <li>· a glutaraldehyde and rinse well in water that has been boiled for 20 minutes.</li> </ul>	<p>Not necessary</p> <p>Not necessary for caps, gowns and masks. Surgical drapes:</p> <ul style="list-style-type: none"> <li>· Autoclave at 121°C (250°F) and 106 kPa (15 lbs/in<sup>2</sup>) for 20 minutes.</li> </ul> <p>If used for surgery:</p> <ul style="list-style-type: none"> <li>· Autoclave at 121°C (250°F) and 106 kPa (15 lbs/in<sup>2</sup>) for 30 minutes.</li> <li>· Do not use for 24-48 hours.</li> </ul> <p>Not necessary, but can be autoclaved at 121°C (250°F) and 106 kPa (15 lbs/in<sup>2</sup>) for 20 minutes.</p>

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Instruments/Equipment	Decontamination	Cleaning	High-Level Disinfection	Sterilization <sup>1</sup>
Instruments for pelvic exam and IUD insertion (e.g., specula, tenacula, forceps, and uterine sounds.)	Soak in 0.5% chlorine solution for 10 minutes prior to cleaning. Rinse or wash immediately. <sup>2)</sup>	Using a brush, wash with detergent and water, removing all particles. Rinse with clean water. If to be sterilized, air or towel dry.	<p><b>Boiling:</b></p> <ul style="list-style-type: none"> <li>Boil for 20 minutes in a pot with a lid (start timing when water begins to boil).</li> <li>Instruments must be covered completely by water during boiling.</li> <li>Do not add anything to pot after water begins to boil.</li> <li>Air dry before use or storage.</li> </ul> <p><b>Chemical:</b> Soak for 20 minutes in:</p> <ul style="list-style-type: none"> <li>8% formaldehyde, or</li> <li>a glutaraldehyde</li> </ul> <p>and rinse well in water that has been boiled for 20 minutes.</p>	<ul style="list-style-type: none"> <li>Dry heat for 1 hour after reaching 170°C (340°F)</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>autoclave at 121°C (250°F) and 106 kPa (15 lbs/in<sup>2</sup>) for 20 minutes (30 minutes if wrapped).</li> </ul>
Instruments for voluntary sterilization and Norplant	Soak in 0.5% chlorine solution for 10 minutes prior to cleaning. (Rinse or wash immediately. <sup>2)</sup>	Using a brush, wash with detergent and water, removing all particles. Rinse with clean water, air or towel dry.	<p>Acceptable<sup>3</sup>:</p> <ul style="list-style-type: none"> <li>Boil or chemically HLD as above.</li> </ul>	<p>Preferable:</p> <ul style="list-style-type: none"> <li>Dry heat for 1 hour after reaching 170°C (340°F)<sup>4)</sup></li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>autoclave at 121°C (250°F) and 106 kPa (15 lbs/in<sup>2</sup>) for 20 minutes (30 minutes if wrapped).</li> </ul>
Needles and syringes	Soak in 0.5% chlorine solution for 10 minutes prior to cleaning. (Rinse or wash immediately. <sup>2)</sup>	Disassemble, then wash with detergent and water, removing all particles. Rinse with clean water, air or towel dry syringes (only air dry needles).	<p>Acceptable<sup>3</sup>:</p> <ul style="list-style-type: none"> <li>Boil or chemically HLD as above.</li> <li>Place items that float in a weighted, porous bag.</li> </ul>	<p>Preferable:</p> <ul style="list-style-type: none"> <li>Dry heat for 2 hours after reaching 160°C (320°F)<sup>4)</sup></li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>autoclave at 121°C (250°F) and 106 kPa (15 lbs/in<sup>2</sup>) for 20 minutes (30 minutes if wrapped).</li> </ul>

Instruments/Equipment	Decontamination	Cleaning	High-Level Disinfection	Sterilization <sup>1</sup>
Storage containers for instruments	Soak in 0.5% chlorine solution for 10 minutes prior to cleaning. (Rinse or wash immediately. <sup>2</sup> )	Wash with detergent and water, removing all particles. Rinse with clean water, air or towel dry.	Boil container and lid as above. If container is too large, then: <ul style="list-style-type: none"> <li>· Fill container with 0.5% chlorine solution and soak for 20 minutes.</li> <li>· Rinse with water which has been boiled for 20 minutes and air dry before use.</li> </ul> Re-disinfect weekly, when empty or contaminated.	<ul style="list-style-type: none"> <li>· Dry heat for 2 hours after reaching 170°C (340°F)<sup>4</sup></li> <li>or</li> <li>· autoclave at 121°C (250°F) and 106 kPa (15 lbs/in<sup>2</sup>) for 20 minutes (30 minutes if wrapped).</li> </ul> Re-sterilize weekly, when empty or contaminated.
IUDs and inserters (never reuse)	Not necessary	Not necessary	Not recommended. (If bulk packaged, before insertion chemically disinfect with: <ul style="list-style-type: none"> <li>· 8% formaldehyde, or</li> <li>· a glutaraldehyde, and rinse well in water which has been boiled for 20 minutes.)</li> </ul>	Most IUDs come in sterile packages. Discard if package seal is broken.
Norplant implants (never reuse)	Not necessary	Not necessary	Never acceptable	Implants come in sterile packages. Discard if package seal is broken.
Endoscopes (laparoscopes)	Wipe exposed surfaces with gauze pad soaked with 60-90% alcohol; rinse immediately.	Disassemble, then wash with detergent and water removing all particles. Rinse with clean water, towel dry.	Soak for 20 minutes in: <ul style="list-style-type: none"> <li>· 8% formaldehyde, or</li> <li>· a glutaraldehyde,</li> </ul> and rinse in water which has been boiled for 20 minutes.	Sterilize daily if possible, using chemical sterilization. Soak in: <ul style="list-style-type: none"> <li>· 8% formaldehyde for 24 hours</li> <li>or</li> <li>· a glutaraldehyde for 10 hours.</li> </ul> Rinse with sterile water or water which has been boiled for 20 minutes.

<sup>1</sup> If item to be sterilized is unwrapped, use immediately; if wrapped, may be stored up to 1 week prior to use.  
<sup>2</sup> Avoid prolonged exposure to chlorine solution in order to minimize corrosion of instruments and deterioration of rubber or cloth products.  
<sup>3</sup> If sterilization (dry heat or autoclave) not available, these items can be HLD either by boiling or soaking in a chemical disinfectant.  
<sup>4</sup> Instruments with cutting edges or needles should not be sterilized at temperatures above 160°C, in order to prevent

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dulling.

Source: Tietjen, L., Cronin, W., McIntosh, N., Infection Prevention for Family Planning Service Programs, JHPIEGO, Baltimore, MD, 1992.

**Participant Handout #14: Recommended Dilutions of Chlorine-Releasing Compounds**

	<b>Dirty condition</b> (e.g., blood spills, soiled equipment), <b>or dilution made with contaminated water</b>	<b>Clean condition</b> (e.g., cleaned medical equipment)
<b>Available chlorine required</b>	<b>0.5% (5g/litre, 5000 ppm)</b>	<b>0.1% (1 g/litre, 1000 ppm)</b>
Sodium hypochlorite solution	<b>see table on next page</b>	20 ml/litre, if starting with 5% available chlorine
Calcium hypochlorite (70% available chlorine)	<b>7.0 g/litre</b>	1.4 g/litre
NaDCC (60% available chlorine)	<b>8.5 g/litre</b>	1.7 g/litre
NaDCC-based tablets (1.5 g of available chlorine per tablet)	<b>4 tablets/litre</b>	1 tablet/litre
Chloramine (25% available chlorine)	<b>20 g/litre*</b>	20 g/litre*

\* Chloramine releases chlorine at a slower rate than do hypochlorites. Therefore, a higher available chlorine concentration is required of chloramine solutions for the same effectiveness. On the other hand, chloramine solutions are not inactivated by biological materials (e.g., protein and blood) to the same extent as hypochlorites. Therefore, a concentration of 20 g/litre (0.5% available chlorine) is recommended for both clean and dirty conditions.

Source: Guidelines on Sterilization and Disinfection Methods Effective Against Human Immunodeficiency Virus (HIV), 2nd. ed., Geneva, WHO AIDS Series 2, 1989.

**Participant Handout #15: Recommended Dilutions of Sodium Hypochlorite (Bleach)**

Dilution is necessary when using a pre-made bleach solution, because bleach sold by commercial brands is more concentrated than 0.5%. The following chart shows how to mix 0.5% solution from pre-made solutions.

Brand of Bleach (Country)	Percent Available Chlorine	Dilution Necessary to Achieve 5000 Ppm = 0.5% = 5 g/l Concentration (for blood spills, soiled equipment)
JIK (Africa)	3.5%	1 part bleach to 6 parts water
Household bleach (USA, Canada), Eau de Javel (France, Viet Nam) (15° chlorum**)	5%	1 part bleach to 9 parts water
Blanqueador, cloro (Mexico)	6%	1 part bleach to 11 parts water
Lavandina (Bolivia)	8%	1 part bleach to 15 parts water
Chloros (UK), Lejia (Peru)	10%	1 part bleach to 19 parts water
Extrait de Javel (France) (48° chlorum**), Chloros (UK)	15%	1 part bleach to 29 parts water

\*\* In some countries, the concentration of sodium hypochlorite is expressed in chlorometric degrees (° chlorum); 1° chlorum is approximately equivalent to 0.3% available chlorine.

**Source:** Tietjen, L., Cronin, W., McIntosh, N., Infection Prevention for Family Planning Service Programs, JHPIEGO, Baltimore, MD, 1992.

**Participant Handout #16: Instruments, Gloves,  
and Equipment Processing Checklist**

**Instructions:** Place a  $\checkmark$  in case box if step/task is performed **satisfactorily**, an **X** if it is **not** performed **satisfactorily**, or **N/O** if not observed.

**Satisfactory:** Performs the step or task according to standard procedure or guidelines.

**Unsatisfactory:** Does not perform the step or task according to standard procedure or guidelines.

**Not Observed:** Step or task not performed by participant during evaluation by trainer.

**Participant:** \_\_\_\_\_

**Course Dates:**

STEP/TASK	CASES		
<b>Decontamination</b>			
1. Puts on utility gloves or leaves on surgical gloves post-procedure.			
2. Places all instruments in chlorine solution for 10 minutes immediately after completing the procedure.			
3. Disposes of waste material in leak-proof container, following guidelines.			
4. Decontaminates exam or table or other surfaces contaminated during the procedure by wiping them with 0.5% chlorine solution.			
5. Removes instruments/gloves from chlorine solution after 10 minutes and places them in water.			
6. Cleans instruments/gloves immediately ( <b>GO TO CLEANING SECTION</b> ) or continues to soak in water until cleaning can be done.			
7. Removes reusable gloves by inverting and soaking in 0.5% chlorine solution for 10 minutes. (If wearing utility gloves, does not remove until instrument cleaning is finished.)			

STEP/TASK	CASES		
<b>Cleaning (Instruments)</b>			
1. Places instruments in a basin with clean water and mild, non-abrasive detergent.			
2. Completely disassembles instruments and/or opens jaws of jointed items.			
3. Washes all instrument surfaces with a brush or cloth until visibly clean (holds instruments under water while cleaning).			

STEP/TASK	CASES		
4. Thoroughly cleans serrated edges (e.g., jaws of hemostat) of instruments, using small brush.			
5. Rinses all surfaces thoroughly with clean water.			
6. Towel-dries instruments or allows them to air dry.			
7. Towel-dries reusable gloves or allows them to air dry.			
8. Removes utility gloves and allows them to air dry.			
<b>High-Level Disinfection by Boiling</b>			
1. Completely submerges pre-cleaned items in water.			
2. Places items that float in a netted bag with a weight to submerge.			
3. Places lid over boiling pot and brings water to a gentle, rolling boil.			
4. Starts timing when rolling boil begins.			
5. Keeps at rolling boil for 20 minutes.			
6. Removes items with HLD forceps/pickups.			
7. Uses immediately after air drying or places in covered, dry HLD container.			
<b>High-Level Chemical Disinfection</b>			

1. Prepares fresh solution of chemical sterilizant or checks to be sure solution is not out of date.			
2. Covers container and soaks for 20 minutes (2% glutaraldehyde or 8% formaldehyde).			
3. Removes items from chemical solution using HLD gloves or HLD forceps/pickups.			
4. Rinses items thoroughly with HLD (boiled) water to remove <b>all</b> traces of chemical disinfectant.			
5. Uses items immediately or places in HLD, covered container.			
<b>Packaging of Equipment for Sterilization</b>			
1. Arranges instruments in trays or on cloth wrap, using appropriately cleaned material.			
2. Wraps items using envelope or square wrap technique.			
3. Places packs in drums or trays for autoclaving.			

STEP/TASK	CASES		
4. Places items in metal container with lid for dry heat.			
<b>Sterilization by Autoclave</b>			
1. Arranges packs and loose items in autoclave chamber to allow free circulation and penetration of steam to all surfaces.			
2. Sterilizes for 30 minutes for wrapped items, 20 minutes for unwrapped items (times with clock) at 121°C (250°F) and 106 kPa (15 lbs/in <sup>2</sup> ).			
3. Waits 20-30 minutes (or until pressure gauge reads zero) to open lid to allow steam to escape. Allows packs to dry completely before removal.			
4. Places sterile drums or packs on a surface padded with paper or fabric to prevent condensation.			

5. Allows drums or packs to reach room temperature before storing.			
6. Records sterilization conditions (time, temperature, and pressure) in logbook.			
<b>Sterilization by Dry Heat (Oven)</b>			
1. Puts loose instruments in metal containers and packs on trays; then places items in oven and heats to desired temperature.			
2. Begins timing after desired temperature is reached and keeps this temperature for the recommended time.			
3. After cooling, removes packs and loose items with sterile forceps or pickups and stores in sterile covered containers.			
<b>Chemical Sterilization</b>			
1. Prepares fresh solution of chemical sterilizant or checks to be sure solution is not out of date.			
2. Immerses cleaned and dried items in 2% glutaraldehyde or 8% formaldehyde solution, completely covering all items.			
3. Covers container and soaks for appropriate time (8-10 hours for glutaraldehyde or at least 24 hours for formaldehyde).			
4. Removes items from the chemical solution using sterile gloves or a sterile forceps or pickups.			
5. Rinses items thoroughly with <b>sterile</b> water to remove <b>all</b> traces of chemical sterilizant.			
6. Uses the item immediately or places it in a sterile, covered container.			



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Trainer's Signature \_\_\_\_\_

Date \_\_\_\_\_

## Participant Handout #17: Syringe and Needle Processing Checklist

<p><b>Instructions:</b> Place a <math>\checkmark</math> in case box if step/task is performed <b>satisfactorily</b>, an <b>X</b> if it is <b>not</b> performed <b>satisfactorily</b>, or <b>N/O</b> if not observed.</p>	
<p><b>Satisfactory:</b></p>	<p>Performs the step or task according to standard procedure or guidelines.</p>
<p><b>Unsatisfactory:</b></p>	<p>Does not perform the step or task according to standard procedure or guidelines.</p>
<p><b>Not Observed:</b></p>	<p>Step or task not performed by participant during evaluation by trainer.</p>

Participant: \_\_\_\_\_ Course Dates: \_\_\_\_\_

TASK/ACTIVITY	CASES		
<b>Decontamination</b>			
1. Leaves on gloves after surgical procedure.			
2. Leaves needle attached to syringe.			
3. Fills syringe with 0.5% chlorine solution by drawing up through needle.			
4. Covers syringe and needle with chlorine solution and soaks for 10 minutes.			
<b>Cleaning</b>			
1. Puts on utility gloves and expels chlorine solution from syringe and needle.			
2. Checks to be sure needle is not blocked, then disassembles and cleans with soapy water.			
3. Re-assembles and rinses syringe and needle by filling and expelling clean water 3 times.			
4. Checks to be sure that needle and/or syringe are not damaged.			
5. Detaches needle from syringe.			

**Comments (summary):**

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**Recommendations:**  **Certified** If not, why:

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Trainer's Signature \_\_\_\_\_ Date \_\_\_\_\_

## Participant Handout #18: Preparing and Using Chemical Disinfectants

Disinfectant (Common Solution or Brand)	Effective Concentration	How to Dilute	Skin Irritant	Eye Irritant	Respiratory Irritant	Corrosive	Leaves Residue	Time Needed for HLD	Time Needed for Sterilization	Activated Shelf Life <sup>1</sup>
<b>Alcohol:</b> Ethyl/isopropyl/ "Methylated spirit"	60-90%	Use full strength	Yes (can dry skin)	Yes	No	No	No	Do not use <sup>2</sup>	Do not use	Change weekly; daily if heavily used; sooner if cloudy
<b>Chlorine</b>	0.5%	Dilution procedures vary <sup>3</sup>	Yes (with prolonged contact)	Yes	Yes	Yes	Yes	20 minutes	Do not use	Change daily; sooner if cloudy
<b>Formaldehyde</b> (35-40%)	8%	1 part 35-40% solution to 4 parts boiled water	Yes	Yes	Yes	No	Yes	20 minutes	24 hours	Change every 14 days
<b>Glutaraldehyde</b> : Cidex®	Varies	varies: read instructions on container	Yes	Yes; vapor	Yes	No	Yes	20 mins. at or above 25°C	10 hours for Cidex	Change every 14 days <sup>4</sup> ; sooner if cloudy
<b>Hydrogen Peroxide</b> (30%)	6%	1 part 30% solution to 4 parts boiled water	Yes	Yes	No	Yes	No	20 minutes	Do not use	Change daily; sooner if cloudy
<b>Iodophors</b> (10% povidone iodine--PVI)	Approximately 2.5%	1 part 10% PVI to 3 parts water	No <sup>5</sup>	Yes	No	Yes	Yes	Do not use <sup>2</sup>	Do not use	Change daily

- <sup>1</sup> All chemical disinfectants are heat- and light-sensitive and must be stored appropriately.
- <sup>2</sup> Alcohols and iodophors are not HLDs; however, they can be used as intermediate-level disinfectants. For this purpose, soak for 20 minutes.
- <sup>3</sup> See *Participant Handouts #14-15* for instructions on preparing chlorine solutions.
- <sup>4</sup> Different commercial preparations of Cidex and other glutaraldehydes (e.g., Wavicide) are effective at lower temperatures (20°C) and have a longer activated shelf life (always check manufacturer's instructions).
- <sup>5</sup> Except in people with allergies to iodophors.

**Source:** Tietjen, L., Cronin, W., McIntosh, N., *Infection Prevention for Family Planning Service Programs*, JHPIEGO, 1992.

**Participant Handout #19: Infection Prevention Assessment Form**

**Instructions:** Please fill in the general information below. In each table, fill in the required information.

Country: \_\_\_\_\_

Province/State: \_\_\_\_\_

City/Town: \_\_\_\_\_

Name of Service Delivery Site: \_\_\_\_\_

Date of Visit: \_\_\_\_\_

Name of Observer: \_\_\_\_\_

Staff Interviewed: \_\_\_\_\_

The service site is located in a: ( ) urban ( ) rural ( ) periurban area.

Organizational affiliation: ( ) MOH ( ) NGO/PVO ( ) Private sector

General Observations: \_\_\_\_\_

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\_\_\_\_\_

**Clinical Reproductive Health Activities Requiring Infection Prevention Practices**

FP/MCH Services	Service Provided (Yes/No)	Monthly Case Load
IUD Insertion/Removal		

Injectables		
Female Sterilization		
Male Sterilization		
Norplant Implants		
Incomplete Abortion Services		
Deliveries		

**Observation of the Facility**

Does the clinic have dedicated spaces or rooms or the facility required for each of the following purposes? Fill in "Yes" or "No" in the **Answer** column. If any rooms require renovations, or if you have additional comments, use the **Comments** column.

Room/Facility	Answer	Comments
Separate room for processing equipment		
Electricity		
Continuously available water		
Running water (faucet) or pump		
Other supply of water (hand carried from well, river, storage tank)		
Functioning sink in procedure room		
Toilet for clients		
Room/area for examining clients		
Multi-purpose operating room		
Operating room set aside for VSC procedures		
Scrub facilities with immediate access to operating room		
Hot air oven, autoclave, or boiler available and functioning		
IUD insertion/removal kits available		
VSC equipment available		
Norplant insertion/removal equipment available		
MVA equipment available		
Covered container for storing equipment available		

### Infection Prevention Skills of Service Providers

Observe the IP skills of service providers at the site. In the **Rating** column, note the skill level of the provider using the rating system below. Make any additional comments in the **Comments** column.

- 0 Not competent/adequate
- 1 Competent/adequate
- NA Not applicable or observed

Infection Prevention Task	Rating	Comments
<i>Decontamination</i>		
0.5% chlorine solution available		
Buckets available for chlorine solution		
Mixes chlorine solution correctly		
Places all instruments in chlorine solution for only 10 minutes immediately following the procedure		
Reusable gloves are decontaminated in 0.5% chlorine for 10 minutes		
Disposable gloves are rinsed in 0.5% chlorine and inverted before disposal		
Wipes down exam table with chlorine between clients		
MVA equipment is decontaminated by drawing chlorine solution in and out of syringe and cannula		
<i>Cleaning Instruments</i>		
Large brush available		
Small brush available		
Detergent available		
Completely disassembles instruments and/or opens jaws of jointed items		

Module 6/Participant Handouts

Washes all surfaces with a brush or cloth until visibly clean		
Thoroughly cleans serrated edges		
Rinses all surfaces with clean water		
Wears utility gloves		

<b>Infection Prevention Task</b>	<b>Rating</b>	<b>Comments</b>
Dries by air or towels before further processing		
<i>High-Level Disinfection by Boiling</i>		
Decontaminates and cleans items		
Completely submerges items in water		
Starts timing when boiling begins		
Keeps at rolling boil for 20 minutes		
Air dries equipment		
Boiled items removed using HLD forceps		
<i>High-Level Chemical Disinfection</i>		
Decontaminates and cleans instruments		
Uses one of the following: <ul style="list-style-type: none"> <li>• Chlorine 0.5% for 20 minutes</li> <li>• Formaldehyde (one part 35-40% to four parts water) for 20 minutes</li> <li>• Glutaraldehyde (Cidex) for 20 minutes</li> <li>• Hydrogen peroxide 6% (one part 30% to four parts water) for 20 minutes</li> </ul>		
Prepares fresh solution		
Immerses items completely		

Rinses items with boiling water and allows to air dry		
Stores items in HLD container		
<i>Sterilization by Autoclave</i>		
Decontaminates, cleans, and dries instruments		
Disassembles items		
Wraps instruments		
Arranges packs loosely in autoclave		
Puts holes in drums in open position		
Heats water until steam escapes from pressure valve only		
Follows directions for operating autoclave		
Sterilizes for 30 minutes for wrapped items and 20 minutes for unwrapped items at 121° C (250° F) and 106 kPa (15 lbs/in <sup>2</sup> )		

<b>Infection Prevention Task</b>	<b>Rating</b>	<b>Comments</b>
After autoclaving, opens the lid and lets instruments dry for 30 minutes before removing		
<i>Sterilization by Dry Heat</i>		
Decontaminates, cleans, and dries instruments		
Puts instruments on traps or wraps loosely		
Begins timing after temperature has been reached		
Uses standard time/temperature <ul style="list-style-type: none"> <li>• 170° C (340° F): 60 minutes</li> <li>• 160° C (320° F): 120 minutes</li> <li>• 150° C (300° F): 150 minutes</li> <li>• 140° C (285° F): 180 minutes</li> <li>• 121° C (250° F): over night</li> </ul>		
Follows manufacturer's directions		
After cooling, removes instruments with HLD forceps		
<i>Chemical Sterilization</i>		
Has 2% glutaraldehyde freshly made		
Soaks in covered container eight to ten hours		
Rinses items with sterile water		
Air dries instruments		
Stores items in a sterile covered container		
Handles items with HLD forceps		
<i>Handwashing</i>		

<p>Is done BEFORE:</p> <ul style="list-style-type: none"><li>• a day's work</li><li>• examining a client</li><li>• administering injections or drawing blood</li><li>• performing a procedure (IUD or pelvic exam)</li><li>• putting on gloves</li><li>• handling clean, disinfected or sterile equipment</li><li>• going home</li></ul>		
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Infection Prevention Task	Rating	Comments
Is done AFTER: <ul style="list-style-type: none"> <li>• examining each client</li> <li>• performing an IUD insertion</li> <li>• removing gloves</li> <li>• each injection</li> <li>• touching any body fluids, secretions, or mucous membranes</li> <li>• touching wounds or open sores</li> <li>• touching any instruments used on clients</li> <li>• blowing nose, sneezing, coughing or personal use of toilet</li> </ul>		
Has hand soap available		
Soap dish which drains is available		
If no soap is available, alcohol is used		
Surgical hand scrub is done for three to five minutes only		
<i>Barriers</i>		
Linen is clean		
Changes paper or linen between clients		
Wears sterile gloves between procedures		
Gloves are decontaminated after use		
Pick-up forceps are HLD daily		
Pick-up forceps are stored dry in a HLD or sterile container		
Uses clean or HLD gloves for: <ul style="list-style-type: none"> <li>• vaginal exam or contact with vaginal excretions</li> <li>• performing IUD insertion or removal</li> </ul>		

<ul style="list-style-type: none"> <li>handling and cleaning dirty instruments</li> </ul>		
Uses sterile gloves for: <ul style="list-style-type: none"> <li>postpartum (postplacental) IUD insertion</li> <li>Norplant implant insertion/removal</li> <li>VSC</li> </ul>		
Uses clean towels		
Puts on gloves without contaminating them		

<b>Infection Prevention Task</b>	<b>Rating</b>	<b>Comments</b>
<i>Antisepsis</i>		
Wipes skin or mucous membranes with an antiseptic solution before: <ul style="list-style-type: none"> <li>injecting injectable contraceptives</li> <li>taking blood samples</li> <li>cervical swab before IUD insertion (no alcohol)</li> <li>Norplant implants insertion/removal</li> </ul>		
Uses only the following antiseptic solutions for skin and mucous membranes: <ul style="list-style-type: none"> <li>alcohols 60 - 90% (not for mucous membranes)</li> <li>chlorhexidine</li> <li>iodine and alcohol preparations (not for mucous membranes)</li> <li>iodophors (betadine)</li> </ul>		
<i>Handling Specimens</i>		
Wears clean gloves when obtaining or handling specimens		
Cleans spills of blood or other bodily products up		

Module 6/Participant Handouts

with 0.5% chlorine		
<i>Waste Disposal</i>		
Needles are disposed of in a separate container filled with 0.5% chlorine		
Medical waste is removed daily		
Medical waste is destroyed by burning		

## **Transparency #1: Module Objectives**

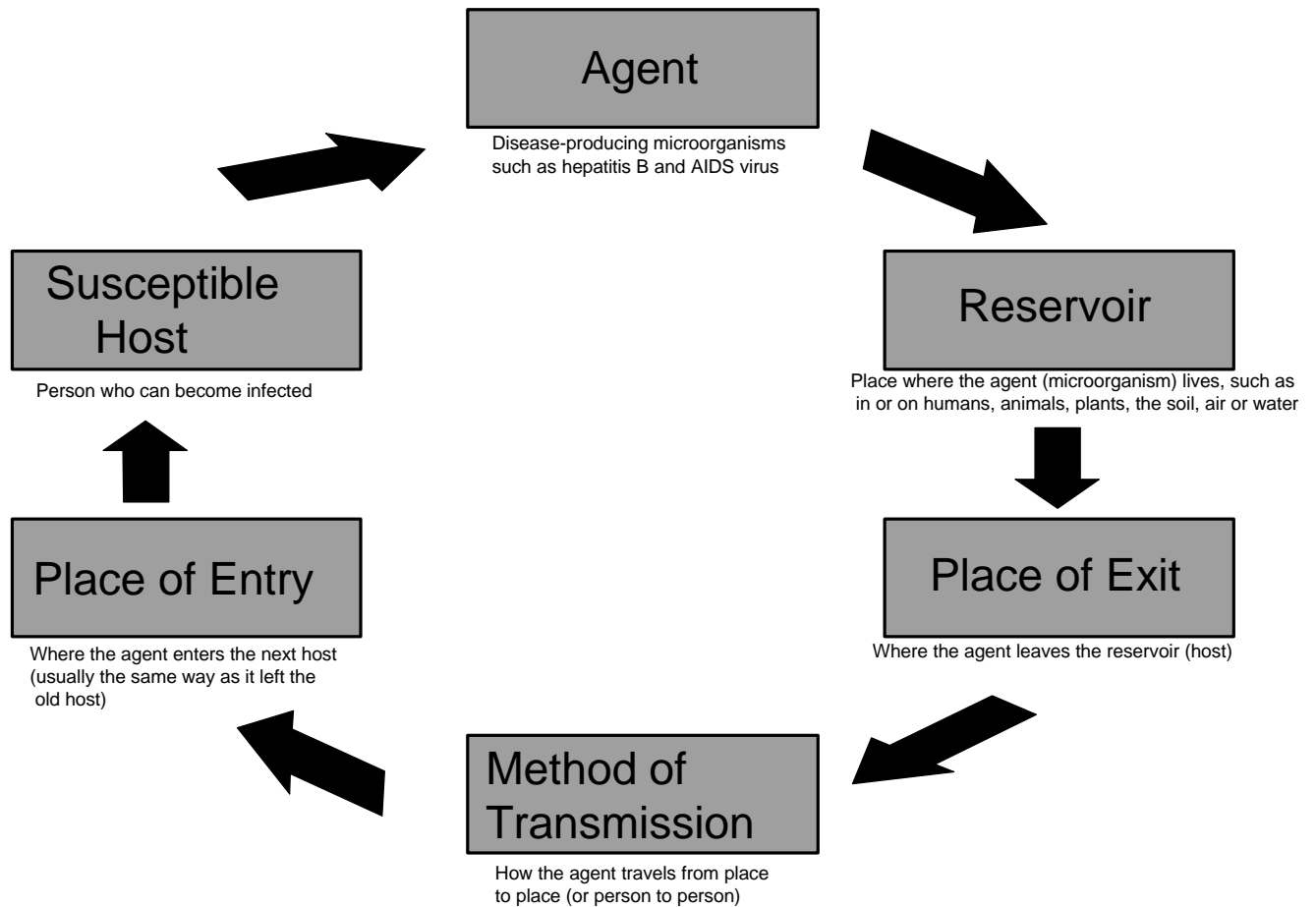
By the end of this module, participants will be able to:

1. Describe the disease transmission cycle.
2. Define asepsis, antisepsis, decontamination, cleaning, high-level disinfection, and sterilization.
3. Select the appropriate infection prevention procedures for different objects, depending on the extent of contact they have with tissue and skin.
4. Identify "barriers" which can be used to protect an individual from infection.
5. Identify situations when handwashing is appropriate and the supplies needed.
6. Demonstrate proper handwashing technique.
7. Identify at least four situations when sterile or high-level disinfected gloves are appropriate and demonstrate proper gloving technique.
8. Describe the use of antiseptics.
9. Demonstrate steps for skin and mucous membrane preparation prior to surgical procedures or IUD insertion.
10. Demonstrate the processing of contaminated instruments, gloves, and other items.
11. Evaluate infection prevention practices which should be observed in a reproductive health setting.
12. Demonstrate how to organize instrument processing in a clinic or ambulatory surgical

*Module 2/Transparencies*

unit.

## Transparency #2: Disease Transmission Cycle



Source: Tietjen, L., Cronin, W., McIntosh, N., Infection Prevention for Family Planning Service Programs, JHPIEGO, Baltimore, MD, 1992.

## INFECTION PREVENTION PRE/POST-TEST

Participant Name: \_\_\_\_\_

**Instructions:** Circle the letter(s) of the answer(s) you consider correct.

1. Bacterial endospores which cause tetanus and gangrene are:
  - a. reliably killed by soaking in Savlon
  - b. reliably killed by fumigation
  - c. reliably killed by boiling (high level disinfection)
  - d. reliably killed by sterilization (steam or dry heat)
  
2. Decontamination of used (soiled) surgical instruments by soaking in 0.5% chlorine for 10 minutes prior to cleaning:
  - a. completely kills all microorganisms including bacterial endospores
  - b. rapidly kills viruses causing hepatitis B (HBV) or AIDS (HIV)
  - c. can replace high-level disinfection (boiling or chemical) or sterilization (dry heat)
  - d. does not need to be done if items are thoroughly washed and rinsed
  
3. To minimize the risk of transmitting hepatitis B or AIDS viruses to staff during the cleaning process, all used (soiled) instruments and reusable gloves **first** should be:
  - a. rinsed in water and scrubbed with a brush before high-level disinfection by boiling
  - b. soaked in a fresh solution of 0.5% chlorine for 10 minutes before cleaning
  - c. rinsed in water and scrubbed with a brush before sterilizing
  - d. soaked overnight in 8% formaldehyde
  
4. Surgical (metal) instruments which have been thoroughly decontaminated and cleaned can be sterilized by:
  - a. heat (steam dry heat sterilizer)
  - b. soaking them for 30 minutes in iodine solution
  - c. boiling them for 20 minutes
  - d. exposure to ultraviolet light for one hour
  
5. To make a 0.5% solution of chlorine from chlorine bleach which contains 5% available chlorine, add one part chlorine bleach to:
  - a. three parts water

- b. six parts water
- c. seven parts water
- d. nine parts water

Module 2/Pre & Post-test  
Participant Copy

6. The metal instruments used for IUD insertion (i.e., the vaginal speculum, uterine sound, and tenaculum) **can** be safely used if, after thorough cleaning and rinsing, they are:
  - a. dried and stored in a sterile or HLD container
  - b. high-level disinfected
  - c. soaked in Savlon or Zephiran for 30 minutes
  - d. used immediately
7. If sterile gloves are **not** available, high-level disinfected gloves are acceptable for which of the following procedures:
  - a. performing a pelvic examination
  - b. removing an IUD
  - c. performing an IUD insertion
  - d. all of the above
8. Cleaning instruments by scrubbing with detergent and water until visibly clean and then thoroughly rinsing them:
  - a. is an effective way to reduce most organisms
  - b. is not necessary provided items are soaked in Savlon for 20 minutes before sterilization
  - c. is not necessary provided the instruments are sterilized or high-level disinfected before reusing
  - d. decreases the effectiveness of high-level disinfection by boiling or sterilization (autoclave or dry heat)
9. After completing a surgical procedure such as a minilaparotomy, the surgeon and/or assistant should:
  - a. dispose of contaminated waste items such as blood-soaked cotton or gauze pads before removing his/her gloves
  - b. place contaminated (soiled) instruments and other reusable items in 0.5% chlorine solution before removing his/her gloves
  - c. remove his/her gloves, mask, and gown before leaving the operating room
  - d. all of the above

**Instructions:** In the space provided, print a capital **T** if the statement is **true** or a capital **F** if the statement is **false**.

**Fundamentals of Infection Prevention**

- \_\_\_\_ 10. The goal of asepsis is to reduce or eliminate the number of microorganisms on both animate surfaces and inanimate objects to a safe level.

- \_\_\_ 11. Decontamination of used surgical instruments by soaking in 0.5% chlorine solution for 10 minutes rapidly kills viruses causing hepatitis B (HBV) or AIDS (HIV).
- \_\_\_ 12. Handwashing is indicated **before** putting on sterile or high-level disinfected gloves to insert an IUD.
- \_\_\_ 13. Handwashing is indicated **after** removing gloves.
- \_\_\_ 14. Antiseptics are chemicals which can be used safely on skin to kill or reduce the number of microorganisms.

### **Instrument/Equipment Processing**

- \_\_\_ 15. To minimize the risk of transmitting hepatitis B or AIDS viruses to staff during the cleaning process, all used (soiled) instruments and reusable gloves **first** should be soaked overnight in 8% formaldehyde solution.
- \_\_\_ 16. High-level disinfection of surgical (metal) instruments can be done by soaking them in a 2% glutaraldehyde or an 8% formaldehyde solution for 20 minutes.
- \_\_\_ 17. The type of chlorine available for decontamination may vary, but can be used to make the required 0.5% chlorine solution.
- \_\_\_ 18. Cleaning instruments by scrubbing with detergent and water until visibly clean and then thoroughly rinsing them is not necessary provided the instruments are sterilized before reusing.
- \_\_\_ 19. During steam sterilization using an autoclave, items that have been wrapped in paper and autoclaved should be stored in the autoclave.
- \_\_\_ 20. The metal instruments used for IUD insertion (e.g., vaginal speculum, uterine sound, and tenaculum) **can** be safely used again, if after thorough cleaning and rinsing, they are dried and stored in a sterile or high-level disinfected container.



**INFECTION PREVENTION  
PRE/POST-TEST**

Participant Name: \_\_\_\_\_  
\_\_\_\_\_

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*Module 2/Pre & Post-test*  
*Master Copy with Key*

- b. six parts water
- c. seven parts water
- d. nine parts water**

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  - remove his/her gloves, mask, and gown before leaving the operating room
  - all of the above**

**Instructions:** In the space provided, print a capital **T** if the statement is **true** or a capital **F** if the statement is **false**.

#### **Fundamentals of Infection Prevention**

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- F 18. Cleaning instruments by scrubbing with detergent and water until visibly clean and then thoroughly rinsing them is not necessary provided the instruments are sterilized before reusing.
- F 19. During steam sterilization using an autoclave, items that have been wrapped in paper and autoclaved should be stored in the autoclave.
- F 20. The metal instruments used for IUD insertion (e.g., vaginal speculum, uterine sound, and tenaculum) **can** be safely used again, if after thorough cleaning and rinsing, they are dried and stored in a sterile or high-level disinfected container.







Module 2

**Training Location & Schedule**

The training site and schedule were convenient.	5	4	3	2	1
The necessary materials were available.	5	4	3	2	1

**Suggestions**

What was the most useful part of this training? \_\_\_\_\_

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What was the least useful part of this training? \_\_\_\_\_

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What suggestions do you have to improve the module? Please feel free to reference any of the topics above. \_\_\_\_\_

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