Infection Prevention

Background
Proper infection prevention practices are critical to the safety of patients, providers, and staff. In addition, instruments represent a large financial investment, and one goal is to prolong the life of each instrument by ensuring that it receives the proper treatment during each step of its reprocessing. Ideally, a written plan should be developed that addresses the instrument’s cleaning requirements in clear, concise, step-by-step directions. The plan should follow the manufacturer’s recommendations for cleaning and should also incorporate basic scientific principles of cleaning and instrument handling.

When considering the process required, the level of application of the instrument must be considered. If the instrument will enter or penetrate into a sterile tissue, cavity, or bloodstream, then sterility is required. If the instrument will have contact with intact non-sterile mucosa or non-intact skin, sterilization is preferred when possible, but high-level chemical disinfection is required. If the instrument is in contact with intact skin, then the instrument only needs to be cleaned.

Antiseptics are used to clean skin and mucosal surfaces. When used, the cervix should be swabbed with a water-based antiseptic solution prior to the abortion. Alcohol-based solutions cause discomfort, and can burn the mucous membranes of the vagina, predisposing it to infection. Common antiseptics include chlorhexidine, hexachlorophine, and iodine compounds.

Instrument processing:
The following are the accepted steps for processing abortion equipment. These ten steps should be followed in the order outlined below.

Step 1
Sort: During the sort process, the clinician or technician should disassemble the instrument and disconnect and dispose of any single-use parts. This phase should also include a separation of items that require special processing. An example of the sort process is the separation of metal versus plastic (since plastic may be disposable or require special processing) or the disassembling of the manual vacuum syringe. When the sort process is complete, the instrument should be reduced to its simplest components and is ready for processing.
Step 2

Soak: The soak process is designed to loosen and remove gross soil that may impede the cleaning process. Internationally, instruments are often immersed immediately after use in 0.5% chlorine disinfectant solution to decrease the risk of infection, however this step does not eliminate the risk. Chlorine is corrosive to metal so this soak should not be longer than 10 minutes. In the U.S., instruments are placed in a detergent or enzymatic detergent for soaking prior to the wash.

Step 3

Wash (Cleaning the instruments): Washing is the physical removal of soil with detergent and water to reduce the bioburden to the lowest level possible.

Step 4

Rinse: The rinse process is designed primarily to flush away solid particles and detergent from the item being cleaned.

Step 5

Dry: The dry phase is often overlooked, but it is an important part of cleaning. Instruments should be air dried or dried with a fan.

Step 6

Inspection: After cleaning and prior to sterilization, instruments should be inspected to insure that they are clean and in functional order.

Step 7

Assembly: After cleaning and prior to sterilization, instruments should be assembled in trays or packs that facilitate the sterilization process.

Step 8

Packaging (Wrapping the instruments): Prior to sterilization, the trays or packs need to be packaged or wrapped correctly to undergo the sterilization.

Step 9

Sterilization or Disinfection: Sterilization refers to a physical or chemical process that completely destroys or removes all forms of viable microorganisms from an object, including spores. In the health care setting, sterility is usually achieved by either steam under pressure, dry heat, or ethylene oxide gas (ETO), although other chemicals may also be used (see below). Steam is the most widely used and most effective agent for sterilization. In steam sterilization, the combination of heat and moisture, maintained at a pre-set temperature-pressure-time relationship in a sterilizer, coagulates cell protein, efficiently killing microorganisms. It is also a very economical and non-toxic process.

Ethylene oxide (ETO) is a gas chemical used when instruments cannot withstand temperatures greater than 60 degrees C. Not all hospitals have an ETO sterilizer. The gas is dangerous and
should only be used where suitable equipment, strict environmental controls, and specifically trained staff are available.

When chemicals, such as glutaraldehyde (Cidex™), are used to achieve sterilization, they are referred to as chemical sterilants, and the process is referred to as cold sterilization. These same agents used for shorter exposure periods may also be used for disinfection, i.e., the process that eliminates many or all pathogenic microorganisms, with the exception of bacterial spores, on inanimate objects.

Disinfection can be accomplished by a number of means that include heat and chemicals.

- High-level disinfectants are chemical sterilants, which when used for a shorter exposure period than would be required for sterilization, kill all microorganisms with the exception of bacterial spores.
- Intermediate-level disinfectants may kill microbacteria, vegetative bacteria, most viruses, and most fungi but do not necessarily kill bacterial spores.

Agents used for chemical (cold) sterilization or disinfection (chemical sterilants):
Unfortunately, the ideal high-level disinfectant does not exist. Oxidizing agents such as peracetic acid and chlorine-based agents are generally better at killing microbes than the alkylating agents but are more corrosive. Alkylating agents such as glutaraldehyde and formaldehyde are generally not as good at killing microbes as the oxidizing agents, but are less corrosive. Age, dilution, and organic stress of chemical sterilants affect their ability to kill microorganisms. It is important to follow the manufacturer’s guidelines.

- Glutaraldehyde, at a 2% concentration, is a saturated dialdehyde that has gained wide acceptance as a high-level disinfectant and chemical sterilant.\(^{1,2,3,4,5}\) It works by its alkylation of sulfadryl, hydroxyl, carboxyl, and amino groups, which alters RNA, DNA, and protein synthesis within microorganisms. Glutaraldehyde is non-corrosive to metals, rubbers and plastics. The use of glutaraldehyde products should be in accordance with the product label. Typically, a 20-minute soak will provide high-level disinfection and a 10-hour soak will provide sterilization.
- Glutaraldehyde (Cidex™) requires ‘activation’ to raise the pH to 7.5 – 8.5 to make the solution sporocidal. The shelf life of activated solutions varies but can be as short as 14 days.
- The major problem associated with glutaraldehyde is that it is a known respiratory and dermal irritant, and adverse health effects may occur in exposed workers. Consequently, there are workplace health and safety requirements relating to its use. Failure to rinse disinfected equipment thoroughly can lead to mucosal damage in patients.

**Step 10**

**Storage and Distribution:** Once sterilized or high-level disinfected, storage and distribution of instruments should be considered. Sterilization and high-level disinfection are time limited.
Note on plastic cannulae and plastic hoses: In the U.S., most plastic cannulae and plastic hoses are approved for single use only. Consult with the manufacturer’s guidelines. Depending on the plastic involved, steam or a 10-hour glutaraldehyde soak will provide sterilization.

In locations where sterilization is not available and bacterial spores are unlikely, high-level disinfection may be used for cannula. Plastic cannulae can be boiled and this may be considered the easiest and least expensive method for high-level disinfection. Liquid high-level disinfection can be obtained with any of the following regimens: a 20 minute soak of glutaraldehyde 2% (Cidex™), chlorine 0.5%, ethanol 70%, or isopropanol. Benzalkonium chloride is acceptable but slightly less effective. Glutaraldehyde should be used only in closed systems or in well-ventilated areas. It is important to rinse off these chemicals, which are irritating to mucous membranes.

Plastic hoses and manual vacuum aspiration syringes that do not come in direct contact with sterile cavities can be processed in any one of three ways: sterilized; high level disinfected; or soaked and cleaned.

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*Eric A. Schaff, MD, lead author


5 [http://www.engenderhealth.org/ip/disease/dtm5.html](http://www.engenderhealth.org/ip/disease/dtm5.html)

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