

FOUR

GLOVES

KEY CONCEPTS you will learn in this chapter include:

- When gloves should be worn
- Which type of glove to use
- What the glove requirements for clinical procedures are
- Glove use DOs and DON'Ts

BACKGROUND

Hand hygiene, coupled with the use of protective gloves, is a key component in minimizing the spread of disease and maintaining an infection-free environment (Garner and Favero 1986). In addition, understanding when sterile or high-level disinfected gloves are required and, equally important, *when they are not*, can reduce costs while maintaining safety for both patients and staff.

Until about 15 years ago, healthcare workers wore gloves for three reasons:

1. To reduce the risk of staff acquiring bacterial infections from patients.
2. To prevent staff from transmitting their skin flora to patients.
3. To reduce contamination of the hands of staff by microorganisms that can be transmitted from one patient to another (cross-contamination).

Furthermore, gloves were primarily worn only by staff caring for patients infected with certain pathogens or exposed to patients with high risk of hepatitis B.

Since 1987 and the emergence of the AIDS epidemic, a dramatic increase in glove use by all types of healthcare staff has occurred in an effort to prevent transmission of HIV and other bloodborne and body fluid viruses from patients to staff. As a result, disposable examination and surgical gloves are the item of personal protective equipment most frequently used by healthcare providers today. In the US, for example, glove usage has grown from 1.4 billion pairs in 1988 to 8.3 billion in 1993 (NIOSH 1997).

WHEN TO WEAR GLOVES

Remember: Wash hands or use an antiseptic handrub before putting on gloves and after removing them.

Although the effectiveness of gloves in preventing contamination of healthcare workers' hands has been repeatedly confirmed (Tenorio et al 2001), **wearing gloves does not replace the need for handwashing.** For example, even the best quality latex surgical gloves may have small, inapparent defects, gloves may be torn during use and hands can become contaminated during removal (Bagg, Jenkins and Barker 1990; Davis 2001).

Depending on the situation, clean **examination** or **utility** gloves should be worn by all staff when:

- there is reasonable chance of hand contact with blood or other body fluids, mucous membranes or nonintact skin;
- they perform invasive medical procedures (e.g., inserting vascular devices such as peripheral venous lines); or
- they handle contaminated waste items or touch contaminated surfaces.

Note: Examination gloves should be changed as soon as possible when visibly soiled, torn or punctured.

A separate pair of gloves must be used for each patient to avoid cross-contamination (CDC 1987). Wearing the same pair of gloves and washing gloved hands between patients or between dirty to clean body site care is not a safe practice. Doebbeling and colleagues (1988) recovered significant amounts of bacteria on the hands of staff who were just washing their gloved hands, not changing gloves between patients.

What to Do When Supplies of Gloves Are Limited

Hospital and clinic managers, and supervisors as well, should first check to be sure staff are not wearing gloves when they are not needed (i.e., for activities such as taking a patient's blood pressure, using the telephone or writing in a chart, and that do not involve contact with blood or other potentially infectious materials). In addition, when resources are limited and examination gloves are in short supply, soiled disposable surgical gloves can be reprocessed for reuse if they are:

- decontaminated by soaking in 0.5% chlorine solution for 10 minutes,
- washed and rinsed, and
- sterilized (by autoclaving) or high-level disinfected (by steaming).¹

Do not reprocess gloves that are cracked, peeling or have detectable holes or tears (Bagg, Jenkins and Barker 1990).

¹ In the past, boiling has been recommended as a method for HLD of surgical gloves; however, it is difficult to dry gloves without contaminating them using this method. Because steaming is easier to do and equally effective, it is the recommended method for HLD of surgical gloves (see **Appendix C**).

Where utility gloves are not available, putting on two pairs of examination or reprocessed surgical gloves (double gloving) provides some protection for cleaning staff and for staff handling and disposing of contaminated medical waste.

TYPES OF GLOVES

There are three types of gloves used in healthcare facilities: surgical, examination and utility or heavy-duty household gloves:

1. **Surgical gloves** should be used when performing invasive medical or surgical procedures.
2. **Examination gloves** provide protection to healthcare workers when performing many of their routine duties.
3. **Utility or heavy-duty household gloves** should be worn for processing instruments, equipment and other items; for handling and disposing of contaminated waste; and when cleaning contaminated surfaces.

The best **surgical gloves** are made of latex rubber, because of rubber's natural elasticity, sensitivity and durability and it provides a comfortable fit. Because of the increasing problem of latex allergy, a new synthetic rubber-like material called "nitrile," which has properties similar to latex, has been developed. Nitrile gloves are less likely to cause allergic reactions. In many countries, the only type of **examination gloves** usually available are made of vinyl, a synthetic material that is less expensive than latex rubber. Because vinyl is inelastic (does not stretch like latex), the gloves are loose-fitting and can tear easily. Better quality examination gloves are made from latex or nitrile and can be found in medical supply stores in most countries. Because **utility gloves** are made of thick rubber, which is much less flexible and sensitive, they provide maximum protection as a barrier.

All types of examination gloves are very thin and should not be reprocessed for reuse (Korniewicz et al 1990).

The advantages and disadvantages of different types of gloves are described in **Table 4-1**.

Table 4-1. Advantages and Disadvantages of Different Types of Gloves

TYPE OF GLOVE	ADVANTAGES	DISADVANTAGES
Sterile or High-Level Disinfected Surgical Gloves^a: Use for all procedures involving contact with tissue deep under the skin (e.g., cesarean section or laparotomy).	Gloves are sized to fit, permitting greater movement during surgical procedures.	Expensive; do not use for tasks where other types of gloves can be worn.
Examination Gloves: Use for contact with mucous membranes and nonintact skin (e.g., pelvic examination).	Inexpensive exam gloves are one quarter to one third the cost of surgical gloves and usually are available in most countries.	Usually, only small, medium and large sizes; may not be available in every country. When exam gloves are not available, used latex surgical gloves may be washed and steamed for reuse in patient care tasks requiring exam gloves.
Utility or Heavy-Duty Household Gloves: Use when handling used instruments and equipment that may have come in contact with blood or body fluids and for handling medical waste and linens.	Inexpensive; can be rewashed and reused many times. The thick rubber surface helps to protect cleaning personnel and waste handlers.	Not available in every country. If not available, double gloving using either new examination or reprocessed surgical gloves provides some protection.

^a When surgical gloves are reused, they must be checked carefully for tears or cuts before final processing (Bagg, Jenkins and Barker 1990).

Adapted from: Tietjen, Cronin and McIntosh 1992.

Examination Gloves

Deciding which type of examination glove is best for a task (if a choice is available) should be determined by the degree of risk of exposure (low or high risk) to blood or potentially infected body fluids, the length of the procedure and possibility of allergy to latex or, rarely, nitrile.

- **Vinyl** examination gloves are the least expensive of the three types generally available. They are good for short tasks that involve minimal stress on the glove and low risk of exposure. They are loose-fitting (baggy), have limited elasticity and tear easily. Suggested use would be for briefly suctioning endotracheal secretions, emptying emesis basins and removing an IV line. (If they are the only type of examination glove available and the risk of exposure to blood and body fluids is high, change them frequently and consider double gloving.)
- **Natural rubber latex** examination gloves provide the best protection. They are preferred for surgical procedures and tasks of moderate to high risk such as exposure to blood or potentially contaminated body fluids. They should not be used by staff with known or suspected allergy to latex or for prolonged (>1 hour) contact with high-level disinfectants such as glutaraldehyde (may cause loss of effectiveness due to breakdown of latex).
- **Nitrile** examination gloves are the preferred choice for staff with latex allergy and may be used for activities of moderate to high risk. Nitrile gloves have many of the same characteristics as latex but have better resistance to oil-based products. Staff with known allergy to nitrile compounds should not use nitrile gloves.

Note: When using latex rubber gloves, do not use hand cream or lotions that contain mineral oil, petroleum jelly (Vaseline) or lanolin to protect your hands, because they may cause the gloves to break down within minutes.

GLOVE REQUIREMENTS FOR CLINICAL PROCEDURES

Listed in **Table 4-2** are common medical and surgical procedures that may require the use of protective gloves and the type of glove and or processing required. Sterile disposable surgical gloves always can be used, but because of their high cost should only be used when necessary. If the risk of endospores is not high (e.g., cesarean section or laparotomy), high-level disinfected surgical gloves are an acceptable alternative. (See **Chapter 1** for discussion.)²

Instructions are provided in **Appendix C** for how to process surgical gloves and either sterilize or high-level disinfect them, and how to store them safely.

Table 4-2. Glove Requirements for Common Medical and Surgical Procedures

TASK OR ACTIVITY	ARE GLOVES NEEDED?	PREFERRED GLOVES ^a	ACCEPTABLE GLOVES
Blood pressure check	No		
Temperature check	No		
Injection	No		
Blood drawing	Yes	Exam ^b	HLD Surgical ^d
IV insertion and removal	Yes	Exam ^b	HLD Surgical ^d
Pelvic examination	Yes	Exam	HLD Surgical ^d
IUD insertion (loaded in sterile package and inserted using no-touch technique)	Yes	Exam	HLD Surgical ^d
IUD removal (using no-touch technique)	Yes	Exam	HLD Surgical ^d
Manual vacuum aspiration (using no-touch technique)	Yes	Exam	HLD Surgical ^d
Norplant implants insertion and removal	Yes	Sterile Surgical ^c	HLD Surgical ^d
Vaginal delivery	Yes	Sterile Surgical ^c	HLD Surgical ^d
Cesarean section or laparotomy	Yes	Sterile Surgical ^c	HLD Surgical ^d
Vasectomy or laparoscopy	Yes	Sterile Surgical ^c	HLD Surgical ^d
Handling and cleaning instruments	Yes	Utility	Exam or HLD Surgical ^d
Handling contaminated waste	Yes	Utility	Exam or HLD Surgical ^d
Cleaning blood or body fluid spills	Yes	Utility	Exam or HLD Surgical ^d

^a Although **sterile gloves** may be used for any surgical procedure, they are **not** always required. In some cases, examination or HLD surgical gloves are equally safe and less expensive.

^b This includes new, “never” used individual or bulk-packaged examination gloves (as long as boxes are stored properly).

^c When sterilization equipment (autoclave) is not available, high-level disinfection is the **only** acceptable alternative.

^d Reprocessed surgical gloves.

Adapted from: Tietjen, Cronin and McIntosh 1992.

² Martin et al (1988) has reported that reprocessing surgical gloves more than three times usually is not cost-effective.

ACCIDENTAL CONTAMINATION OF STERILE OR HIGH-LEVEL DISINFECTED SURGICAL GLOVES

There are several ways to contaminate sterile or high-level disinfected surgical gloves:

Remember: Surgical staff wearing sterile or high-level disinfected gloves should be careful **not** to contaminate gloved hands inadvertently by touching nonsterile items and unprepped skin or mucous membranes.

- tearing or puncturing the glove,
- touching any nonsterile or high-level disinfected object with the glove, or
- touching the outside of a glove with an ungloved hand.

Regloving after contamination. To reglove after contaminating a glove during a surgical procedure:

- Remove contaminated glove by the cuff and, if reusing, place it in a 0.5% chlorine solution for decontamination; otherwise, put in waste container.

Sterile Glove

- Have the circulating nurse open the sterile glove pack, laying the glove package on a clean surface.
- Pick up the sterile glove with the gloved hand and put on the replacement glove in the usual manner.

Alternatively:

- Have the circulating nurse open the sterile glove package; then have the surgical assistant or scrub nurse, who is gloved, remove a sterile glove and hold the glove open by the cuff.³ Put hand into the glove without touching the outside of the glove.
- Adjust the glove after the surgical assistant or scrub nurse lets go of the cuff (Sorensen and Luckman 1979).

High-Level Disinfected Glove

- Have the circulating nurse pick up the replacement glove with high-level disinfected forceps.
- Grasp the replacement glove by the turned-down cuff and put on the glove in the usual manner.

Alternatively:

- Have the circulating nurse remove a replacement glove from the high-level disinfected container with forceps. Have the surgical assistant,

³ If the assistant or scrub person's gloves are contaminated with blood or body fluids, have someone with uncontaminated sterile gloves pick up and hold the replacement sterile glove.

who is gloved, take the glove and hold it open by the cuff.⁴ Put hand into the glove without touching the outside of the glove.

- Adjust the glove after the surgical assistant or scrub nurse lets go of the cuff.

SOME DOs AND DON'Ts ABOUT GLOVES

- **Do** wear the correct size glove, particularly surgical gloves. A poorly fitting glove can limit your ability to perform the task and may be damaged (torn or cut) more easily.
- **Do** change surgical gloves periodically during long cases as the protective effect of latex rubber gloves decreases with time and inapparent tears may occur.
- **Do** keep fingernails trimmed moderately short (less than 3 mm or 1/8 inch beyond the finger tip) to reduce the risk of tears.
- **Do** pull gloves up over cuffs of gown (if worn) to protect the wrists.
- **Do** use water-soluble (nonfat-containing) hand lotions and moisturizers often to prevent hands from drying, cracking and chapping due to frequent handwashing and gloving.
- **Don't** use oil-based hand lotions or creams, because they will damage latex rubber surgical and examination gloves.
- **Don't** use hand lotions and moisturizers that are very fragrant (perfumed) as they irritate the skin under gloves.
- **Don't** store gloves in areas where there are extremes in temperature (e.g., in the sun, or near a heater, air conditioner, ultraviolet light, fluorescent light or X-ray machines). These conditions may damage the gloves (cause breakdown of the material they are made of), thus reducing their effectiveness as a barrier.

ALLERGIC REACTIONS TO GLOVES

Allergic reactions to latex rubber gloves are being increasingly reported among healthcare workers of all types, including housekeepers, laboratory workers and dentists. (Allergic reactions to nitriles also occur, but less frequently.) If possible, nonlatex (nitrile) or low-allergen latex gloves should be used if allergy is suspected. In addition, wearing powder-free gloves is recommended. (Powdered gloves may result in more reactions because the powder from the gloves carries the latex particles in the air.) If this is not possible, then wearing cloth or vinyl gloves beneath latex gloves may help to prevent skin sensitization. It will not, however, prevent sensitization of the mucous membranes of the eyes and nose if these gloves are powdered (Garner and HICPAC 1996).

⁴ If the assistant or scrub person's gloves are contaminated with blood or body fluids, have someone with uncontaminated high-level disinfected gloves pick up and hold the replacement sterile glove.

For most sensitized people, the symptoms are skin rashes, runny nose and itchy eyes that may persist or get progressively worse (i.e., cause breathing problems such as asthma). An allergic reaction to latex can develop within 1 month of use. Even in people who are susceptible, however, reactions generally take longer to develop (within 3–5 years) and may not develop for as long as 15 years (Baumann 1992). No therapy or desensitization exists for latex allergy; therefore, the only option is to avoid contact.

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