

Infection control 3: use of disposable gloves and aprons

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Abstract Disposable gloves and aprons are used to protect health professionals and patients from the risks of infection. However, it is important to use them appropriately or they may increase patients' risk of healthcare-associated infections. This article – the third part of a six-part series – discusses when and how to use them.

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Disposable medical gloves and non-sterile aprons are important items of personal protective equipment (PPE) used to protect health professionals from the risk of infection and to reduce opportunities for cross-transmission of micro-organisms (Loveday et al, 2014). This article focuses on their selection and explains the procedures for applying and removing them.

The decision whether to use gloves and aprons in a specific patient care activity or intervention should take account of current health and safety legislation and be based on an assessment of the:

- Risk of transmission of micro-organisms to the patient or health professional;
- Risk of contamination of the health professional's clothing and skin by the patient's blood or bodily fluids.

There is evidence that lack of knowledge and non-adherence to guideline recommendations are common (Loveday et al, 2014). In a literature review that formed part of their study of the impact of errors in putting on and taking off PPE, Okamoto et al (2019) found evidence that these errors

often lead to contamination of unprotected sites on health professionals. Health professionals should therefore receive regular training in risk assessment, selection and use of PPE, and the use of standard infection prevention and control precautions (Loveday et al, 2014).

Principles of glove use

Gloves are not a substitute for hand hygiene and should only be used when appropriate. Their prolonged and unnecessary use may cause adverse reactions and skin sensitivity, and may lead to cross-contamination of the patient environment. Inappropriate use of gloves can also undermine hand-hygiene initiatives (Royal College of Nursing, 2017) and may be distressing to patients (Nicklinson, 2011). Box 1 lists indications of when to wear gloves and when to remove them.

Gloves are single-use items and must be removed and disposed of immediately after the care activity for which they have been worn; they should not be washed or decontaminated with alcohol-based handrub as a substitute for changing them between care activities. Hands must be decontaminated after glove removal as there is evidence that hands become contaminated:

- When clinical gloves are worn – even when the integrity of the glove appears undamaged;
- During glove removal (Loveday et al, 2014).

Risk assessment

The need to wear gloves and the selection of appropriate gloves requires an assessment of the task to be performed and its related risks to patients and healthcare workers. Risk assessment should include consideration of:

- Who is at risk (patient or health professional);
- Whether sterile or non-sterile gloves are required;
- The potential for exposure to blood, bodily fluids, secretions and excretions;
- The potential for contact with non-intact skin or mucous membranes during care and invasive procedures;

Box 1. Indications for glove use

When to wear gloves

- When anticipating contact with blood or another bodily fluid
- As part of transmission-based precautions (contact, airborne or droplet precautions) where local policy requires this
- When anticipating contact with chemical hazards, e.g. disinfectants/preserving agents
- When handling sharps or contaminated devices (Loveday et al, 2014)
- When undertaking an aseptic non-touch technique procedure – sterile/non-sterile gloves chosen in line with procedure and local policy

Any cuts/abrasions on hands should be covered *with a waterproof dressing* before gloves are donned

When to remove gloves

- As soon as gloves are damaged (or non-integrity suspected)
- When contact with blood, another bodily fluid, non-intact skin and mucous membrane has occurred and ended
- When contact with individual patients and their surroundings, or a contaminated body site on a patient has ended
- When there is an indication for hand hygiene
- When contact with chemicals has ended
- After completing an aseptic non-touch technique

Sources: Royal College of Nursing (2018), Loveday et al (2014)

Clinical Practice

Practical procedures

Box 2. Glove selection

Sterile gloves needed

- Any surgical procedure
- Vaginal delivery
- Invasive radiological procedures
- Performing vascular access and procedures
- Preparing total parenteral nutrition and chemotherapeutic procedures

Examination gloves needed

Direct patient exposure

- Contact with blood, mucous membrane and/or non-intact skin
- Potential presence of highly infectious and dangerous organisms
- Epidemic or emergency situations
- Intravenous insertion or removal
- Drawing blood
- Discontinuation of venous line
- Pelvic and vaginal examination
- Suctioning non-closed systems of endotracheal tubes

Indirect patient exposure

- Emptying emesis basins
- Handling/cleaning instruments
- Cleaning spills of bodily fluids

Gloves not indicated (except for contact precautions)

Direct patient exposure

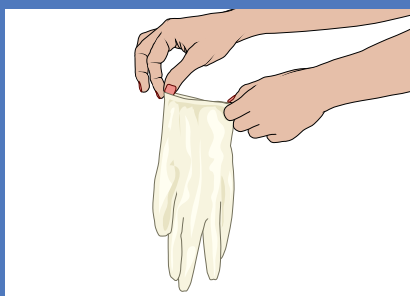
- Taking blood pressure, temperature and pulse
- Performing subcutaneous and intramuscular injections
- Bathing and dressing the patient (unless there is a risk of contact with bodily fluids)
- Transporting the patient
- Caring for eyes and ears (without secretions)
- Vascular line manipulation in absence of blood leakage

Indirect patient exposure

- Using the telephone
- Writing on the patient chart
- Giving oral medication
- Distributing/collecting a patient's food tray
- Removing/replacing a patient's bed linen
- Placing non-invasive ventilation equipment and oxygen cannulas
- Moving patient furniture
- Using an electronic care-recording device

Source: Adapted from World Health Organization (2009)

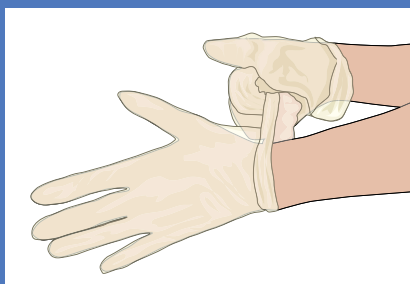
Fig 1.



1a. Take a glove from the dispenser, touching only a restricted surface



1b. Hold the wrist end open with one hand and ease the fingers of the other inside



1c. Repeat for other hand

- Health professional and patient sensitivity to glove materials;
- Glove size required;
- Organisational policies related to a latex-free environment;
- The potential for contact with hazardous substances such as chemicals, for example cytotoxic drugs (RCN, 2018; Loveday et al, 2014).

Selection

Gloves are available in a range of materials. The most commonly used is natural rubber latex (NRL), due to its efficacy in protecting against bloodborne viruses and properties that maintain wearer dexterity (Loveday et al, 2014). However, the proteins found in NRL gloves can cause severe allergic reactions in health professionals and patients with existing allergies, and contact dermatitis and occupational asthma in sensitised individuals. Powdered latex gloves increase this risk and

should never be used; if NRL gloves are used they should be low protein. Neoprene and nitrile gloves have similar barrier performance to NRL and are superior to vinyl as such, they are good alternatives, although nitrile may also lead to sensitivity reactions (RCN, 2017; Loveday et al, 2014). Contact dermatitis is classified as an industrial injury; as such, the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR) requires a referral to occupational health if gloves are causing a skin problem (Health and Safety Executive, 2013).

Medical gloves are categorised as non-sterile examination and sterile procedure gloves; Box 2 lists the indications for glove selection.

The procedure

Applying gloves

Gloves should be donned immediately before the intervention for which they are required.

1. Perform hand hygiene.
2. Take a glove from the dispenser or package, touching only a restricted surface at the wrist end (Fig 1a).
3. Holding the wrist end open with one hand, ease the fingers of the other hand inside.
4. Gently pull the wrist end of the glove while easing the hand into the glove, taking care not to overstretch the material (Fig 1b).

5. Taking a second glove with the bare hand, turn the external surface of this glove onto the gloved fingers at its opening. Ease the glove onto the hand (Fig 1c). This avoids touching the skin with the gloved hand.

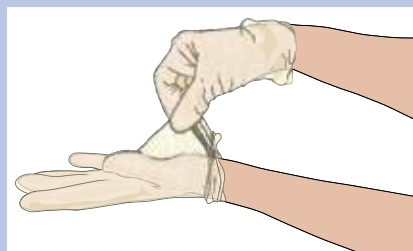
Once gloved, hands should not touch anything that is not defined by indications and conditions for glove use.

Removing gloves

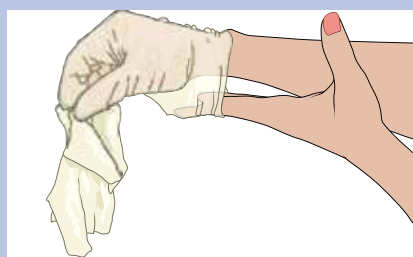
To avoid contaminating the hands or environment, gloves should be removed carefully as soon as the intervention is complete; if a disposable apron is also used gloves should be removed first (Loveday et al, 2014).

1. Pinch one glove at the wrist without touching the skin of the forearm and peel away from the hand (Fig 2a), turning the glove inside out. Hold the removed glove

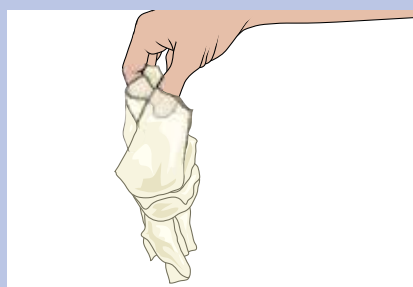
Fig 2. Removing gloves



2a. Hold the glove at the wrist and peel away from the hand



2b. Turn the second glove inside out, with the first glove inside



2c. Dispose of the gloves

in the gloved hand.

2. Hook the index and middle finger of the bare hand inside the remaining glove, taking care not to touch the outside of the glove (Fig 2b). Pull off the glove, turning it inside out with the first glove inside (Fig 2c).

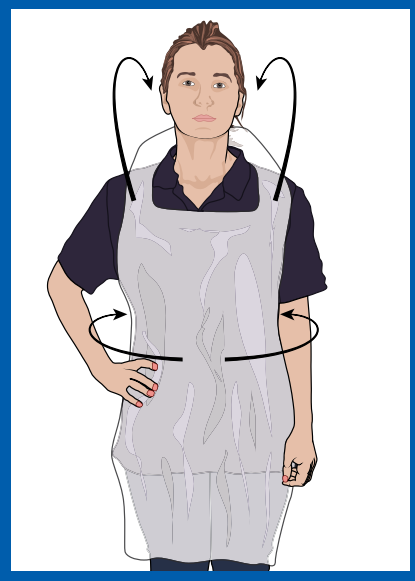
3. Dispose of the gloves in a clinical waste bin or, if contaminated with blood or bodily fluids, into a hazardous waste bin.

4. Perform hand hygiene.

Aprons

Microbial contaminants found on the work clothing of health professionals are a significant factor in cases of healthcare-associated infections (Wilson et al, 2007). Disposable, single-use plastic aprons are therefore recommended for general clinical use when close contact with the patient, materials or equipment may lead

Fig 3. Putting on an apron



to contamination of uniforms or other clothing with microorganisms, or when there is a risk of contamination with blood or bodily fluids. If there is the possibility of extensive splashing of blood or bodily fluids onto the skin or clothes of health professionals, fluid-repellent full-body gowns should be worn (Loveday et al, 2014).

Apron selection

In England, apron selection is to be based on the procedure or task being undertaken. A colour coding system is used:

- Yellow - when cleaning isolation areas;
- Blue - when undertaking general cleaning, including wards and basins in public areas;
- Red - when cleaning bathrooms, washrooms, toilets, basins and bathroom floors;
- Green - when working in catering departments, ward kitchen areas and patient food service at ward level (National Patient Safety Agency, 2007). Local policies should be consulted.

The procedure

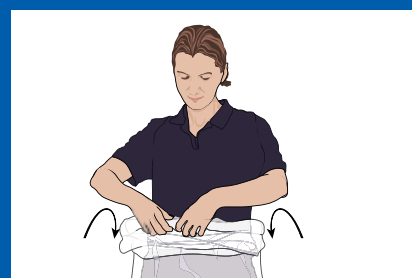
Applying an apron

1. Perform hand hygiene.

2. Remove an apron from the roll or dispenser. Open it outwards ensuring the inner surface faces the patient to prevent any contamination on its outer surface coming into contact with the patient.

3. Place the neck loop over your head (Fig 3).

Fig 4. Removing an apron



Roll the apron downwards

4. Position the apron to cover as much of the front of your body as possible.

5. Fix the apron in place by tying the waist straps behind your back.

Removing an apron

If disposable gloves are being used, they should be removed first (Loveday et al, 2014).

1. Break the neck loop and waist straps.

2. Roll the apron downwards from your chest so the contaminated outer surface is folded inwards. Avoid touching the outer surface of the apron with your hands (Fig 4).

3. Dispose of the apron in a hazardous waste bin.

4. Perform hand hygiene.

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