

1 Standard Precautions and Hand Hygiene in Health Care Settings

Why a Clinical Practice Guideline?

Over the years health care workers have become increasingly concerned about the risk to both themselves and their patients from infections transmitted in the health care setting. While the substantial risk to health care workers for occupational infection with Hepatitis B has been known for many decades, the HIV pandemic and the recent SARS epidemic have brought these risks into the spotlight. The risk to patients of nosocomial infections with multi-drug resistant 'hospital' pathogens, reported widely in the media, has had a major influence on health policy in many countries.

In response to these concerns, much debate has taken place about the appropriate isolation and management of these patients in health care settings, resulting in the evolution of a series of isolation policies and practices ranging from the concept of separate infectious disease hospitals through category-based precautions and universal precautions to the current concept of a combination of standard precautions and transmission-based precautions.

Therefore, it is timely to produce an up to date set of uniform, easy to use guidelines for infection control that can be used at all levels of patient care in Sri Lanka. These guidelines will contribute to improve the quality of care available to patients in this country.

Who has developed this guideline?

This guideline has been developed by the Sri Lanka College of Microbiologists (SLCM), which is a professional body comprising Consultant Microbiologists from all parts of the country.

For whom is this guideline intended?

The guidelines are intended to be used by all health care providers in Sri Lankan health care institutions from primary to tertiary care level. Although they are designed to target the institutions under the Ministry of Health, the guidelines are encouraged to be used in any public or private health facility providing out-patient or in-patient care.

Objective

The objective of this guideline is to provide evidence based recommendations to all categories of healthcare workers, on the infection control precautions that need to be taken to prevent the spread of hospital acquired infections.

How are the guidelines structured?

This guideline is divided into two sections. In the first section Standard Precautions are described. In the second section Hand Hygiene is described in more detail.

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1.1 Standard Precautions in Health Care Settings

Hospital acquired infections (HAI) or health care associated infections are increasing in prevalence and are responsible for high morbidity and mortality. These infections are often caused by antibiotic resistant pathogens and the management of patients with these infections imposes a great burden on already stretched hospital resources. Many of these infections could be prevented by following a set of relatively simple, cost effective, practical guidelines known as Standard Precautions.

1.1.1 What are Standard Precautions?

Hospital acquired infections (HAI) are infections that are acquired by patients during their stay in hospital. Infections may be transmitted from health care worker to patient, patient to health care worker or patient to patient directly or through a health care worker.

Standard Precautions are a set of guidelines which should be followed to reduce the transmission of HAI within hospitals. Standard Precautions should be used by ALL health care workers at ALL times when attending to ALL patients, regardless of their diagnosis or presumed infectious status. They are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection in hospitals.

1.1.2 Do they replace Universal Precautions and Body Substance Isolation?

Standard precautions combine universal precautions (UP) (which were developed to reduce the risk of blood borne infections) and body substance isolation (BSI) (which was developed to reduce the risk of transmission of resistant pathogens from moist body substances) into a set of simple, standardized guidelines to prevent transmission of all types of pathogens in the hospital setting.

1.1.3 How are they different from Aseptic Precautions?

Aseptic precautions are steps taken when entering a sterile body site, to prevent contamination of the sterile site or of the specimens taken from that site. Eg. During surgery, during aspiration of pleural and peritoneal fluids and when collecting CSF or blood for culture.

*For Aseptic Precautions sterile gloves are used.
Clean gloves are adequate for standard precautions.*

Standard precautions apply to blood, all body fluids, secretions and excretions (except sweat), non-intact skin and mucous membranes. Body fluids include CSF, pleural fluid, peritoneal fluid and amniotic fluid etc. Secretions include nasal, vaginal and seminal secretions, sputum, tears and saliva. Excretions include faeces, urine and vomitus.

1.2 Protocols for Standard Precautions (1, 2)

1.2.1 HAND -WASHING

The hands of health care workers are often contaminated with hospital pathogens from patients and from environmental surfaces. Transfer of pathogens from patients to other patients or to environmental surfaces occurs most commonly via the contaminated hands of health care workers.

These bacteria are transient and can be greatly reduced in numbers by effective hand-washing with soap and water. To prevent the transfer of microorganisms it is essential to wash hands before contact with any patient and after hands have become contaminated with microorganisms.

Hand-washing breaks the chain of infection transmission.

A. Indications for hand washing

- i. Wash your hands before doing any invasive procedures and before handling any invasive devices. **X**
- ii. Wash your hands after contact with blood, body fluids, secretions or excretions and contaminated items (irrespective of whether gloves were worn). **X**
- iii. Wash your hands immediately after gloves are removed. **X**

- iv. Wash your hands between patient contacts.
X
- v. Wash your hands between contact with 'dirty' and 'clean' sites on the same patient.
X

B. Hand-washing procedure

- i. Soap and water is used for routine hand washing to remove transient microorganisms.
- ii. Nails must be clean and short.
- iii. Remove watches, bangles and rings.
- iv. Wet hands and apply soap on all surfaces of the hands.
- v. Rub hands systematically for 10-15 seconds covering all surfaces especially the tips of the fingers, the thumbs and the finger webs. (Refer Figure 2).
- vi. Rinse hands thoroughly.
- vii. Dry hands thoroughly using a single-use clean towel which is then sent to the laundry for washing.

Hand washing is the single most important procedure for preventing the transmission of nosocomial infections

1.2.2 GLOVES

To prevent contamination of hands with microorganisms, gloves should be worn when indicated. Wearing gloves will also protect the patient from possible contamination with microorganisms from the hands of the health care worker.

A. Precautions when using gloves

- i. Wear clean gloves (sterile gloves are not necessary) when handling blood, body fluids, secretions or excretions and contaminated items. **X**
- ii. Clean gloves should be worn immediately before touching mucous membranes and non-intact skin. **X**
- iii. Change gloves between contact with 'dirty' and 'clean' sites on the same patient. **X**
- iv. Remove gloves promptly after use and discard as clinical waste. Wash hands immediately, before touching non-contaminated items and environmental surfaces. **X**
- v. Remove gloves promptly after use and wash your hands, before going to another patient. **X**
- vi. Disposable latex gloves should not be washed and reused.
- vii. Use rubber heavy duty gloves for housekeeping chores involving potential blood contact and for instrument cleaning and decontamination procedures.

Wearing gloves is not a substitute for hand-washing

Wear sterile gloves when performing aseptic techniques such as catheterisation, lumbar puncture, blood culture and inserting in IV lines.

1.2.3 Personal Protective Equipment (PPE)

PPE provides a protective physical barrier that reduces contamination of clothes, skin and the mucous membranes of the eyes, nose and mouth. PPE includes gloves, mask, gown, apron, goggles, boots and caps. The mask should be a standard surgical splash proof mask and not a gauze mask. Items of PPE should be selected by the health care worker according to the risk of exposure.

A. Precautions when using PPE

- i. Wear a gown (a clean, non-sterile gown is adequate) and a plastic apron to protect the skin and to prevent soiling of clothing during procedures and patient care activities that are likely to generate splashes or sprays of blood, body fluids, secretions or excretions. Select a gown that is appropriate for the activity and the amount of fluid likely to be encountered.
- ii. Wear a gown when caring for a patient with antibiotic resistant pathogens such as methicillin-resistant *Staphylococcus aureus* (MRSA) or glycopeptide resistant enterococci (GRE) to prevent contamination of clothing.
- iii. Remove a soiled gown as promptly as possible, before leaving the patient's cubicle, and discard into a bin lined with a yellow bag (which is designated for soiled linen) and wash hands to avoid transfer of

microorganisms to other patients or environments.

- iv. During procedures and patient care activities that are likely to generate splashes or sprays of blood, body fluids, secretions and excretions wear a mask and eye protection or a face shield to protect the mucous membranes of the eyes, nose and mouth.
- v. Discard or decontaminate used PPE appropriately and wash hands.

1.2.4 PATIENT-CARE EQUIPMENT

HAI may be transmitted by indirect contact. Hospital equipment contaminated by the patient or health care worker can be a source for transmission of infections to other patients. The aim of decontaminating patient care equipment is to prevent pathogenic microorganisms reaching the next patient in sufficient numbers to cause infection.

A. Precautions when using patient-care equipment

- i. Patient care equipment soiled with blood, body fluids, secretions and excretions should be handled in a manner that prevents skin and mucous membrane exposures, contamination of clothing and transfer of microorganisms to the handler, other patients or the environment. **X**
- ii. Ensure that disposable (single-use) items are discarded properly and never re-used. However, if such items have to be reused,

cleaning and high level disinfection is recommended. X

- iii. Ensure that reusable equipment is not used for the care of another patient until it has been cleaned and disinfected or sterilized appropriately. X

B. Cleaning of instruments

Cleaning is the first step in the decontamination process. It must be carried out before disinfection and sterilization to make these processes effective. Follow the manufacturer's instructions for cleaning / decontamination of equipment.

C. Procedure for cleaning instruments

- i. Thorough cleaning with a General Purpose Detergent (GPD), such as "Teepol" or "Care", and water will remove most microorganisms.
- ii. Wear PPE (plastic apron, heavy duty gloves etc.) during cleaning.
- iii. The sink that is used for cleaning /decontamination should be deep enough to completely immerse the equipment.
- iv. Remove any gross soiling on the instrument by rinsing in tap water.
- v. Take the instrument fully apart and immerse all parts in warm water with detergent.
- vi. The instrument should remain below the surface of the water while brushing and cleaning. Take precautions to prevent splashing and injury.

- vii. Ensure all visible soiling is removed from the instrument.
- viii. Rinse in hot water (45°C) unless contraindicated.
- ix. Dry the instrument. Inspect to ensure the instrument is clean.
- x. Keep cleaning equipment (brushes) clean and dry between uses.

1.2.5 Environmental Control

The environment plays a relatively minor role in transmitting infection but dust, dirt and liquid residues will increase the risk. Minimize dust build-up by regular cleaning and inspection. The hospital environment should be visibly clean, free from dust and dirt and acceptable to patients, their visitors and staff.

A. Precautions for environmental control

- i. Ensure that the hospital has protocols for the routine care, cleaning and disinfection of environmental surfaces, beds, bedrails, bedside equipment and other frequently touched surfaces and that these protocols are being followed.
- ii. Wet cleaning and damp dusting is preferable to prevent pathogens from being airborne from the surfaces that are being cleaned.
- iii. Use a general purpose detergent (GPD) such as "Teepol" or "Care" for environmental cleaning. Keep the environment dry, clean, well ventilated and exposed to sunlight. Do

- not use disinfectants unless indicated eg. spills, isolation rooms.
- iv. Keep mops hung and buckets clean, dry and inverted.
- v. Use different cleaning equipment for clinical areas, toilets and kitchens.
- vi. Dishes, glasses, cups and eating utensils do not need special precautions. Washing with soap and water is adequate.
- vii. *Routine culturing of environment and air is not useful*

B. Management of spills

Blood and body fluid spills

- i. Wear heavy duty gloves.
- ii. Soak up fluid using absorbent material (paper towels, gauze, wadding).
- iii. Pour 1% hypochlorite solution (10,000 ppm of available chlorine) till it is well soaked. Leave for at least 10 minutes.
- iv. Remove the absorbent material and discard as clinical waste.
- v. Clean area with detergent and water and dry.
- vi. Discard gloves as clinical waste.
- vii. Wash hands.

Low risk body fluid spills eg. faeces, vomit, urine

- i. Wear heavy duty gloves.
- ii. Soak up fluid using absorbent material (paper towels, gauze, wadding).

- iii. Remove the soiled absorbent material and discard as clinical waste.
- iv. Clean area with detergent and water and dry thoroughly.
- v. Discard gloves as clinical waste.
- vi. Wash hands.

1.2.6 LINEN

A. Precautions for linen

- i. Soiled linen should be handled, transported and processed in a manner that prevents skin and mucous membrane exposures and contamination of clothing.
- ii. Ideally blood and body fluid stained linen and linen from patients in contact isolation should be washed in a washing machine with a hot cycle (71°C) using detergent. Alternatively they should be soaked in 0.5% hypochlorite solution for 30 minutes in the wards/operation theatre before sending to the laundry.
- iii. Bedlinen should be changed on discharge of a patient or if it becomes soiled or contaminated. Every patient should have clean bedlinen. **X**
- iv. Curtains should be washed on a scheduled basis.

1.2.7 OCCUPATIONAL HEALTH AND BLOOD-BORNE PATHOGENS

Health care workers may be at risk of acquiring infections during their work. Work practices should be adopted to minimize the risk of getting infected.

A. Staff immunization

Staff should be immunized against Hepatitis B.

B. Precautions to prevent blood-borne infections

Handling of sharps

- i. Avoid using sharps unnecessarily. **X**
- ii. Sharps such as scalpels, lancets, intravascular needles and syringes should be disposable (single use) only. **X**
- iii. Take care to prevent injuries while using, handling after procedures, cleaning and disposing of sharps. **X**
- iv. Avoid recapping used needles. If this is necessary use a one-handed “scoop” technique. (See figure 1)
- v. As far as possible avoid removal of used needles from disposable syringes by hand.
- vi. Do not bend, break or otherwise manipulate used needles by hand.
- vii. Discard sharps directly into a ‘sharps bin’ which is located as close as practical to the area in which the items were used. Discard used sharps immediately and never leave them lying around.

- viii. Whenever used sharps need to be carried from one place to another use a suitable tray.
- ix. Dispose the sharps bin when it is $\frac{3}{4}$ full. Never let the sharp bin fill up more than $\frac{3}{4}$ full.
- x. Sharps must not be passed directly from hand to hand.
- xi. Place reusable glass syringes and needles in a puncture resistant container for transport to the decontamination area.
- xii. Use clean gloves during phlebotomy to reduce contamination of hands with blood. **X**

Prevention of mucous membrane exposures

- i. Whenever possible use mouthpieces, resuscitation bags or other ventilation devices as an alternative to mouth to mouth resuscitation methods in areas where the need for resuscitation is predictable.
- ii. During procedures and patient care activities that are likely to generate splashes or sprays of blood, body fluids, secretions and excretions wear a mask and eye protection or a face shield to protect the mucous membranes of the eyes, nose and mouth.

C. Procedure for management of a needlestick accident or mucous membrane exposure

- i. Encourage bleeding from the wound.
- ii. Wash wound with soap and water or irrigate the mucous membranes with copious amounts of water or normal saline.
- iii. Report all exposures to the Infection Control Team through the ward sister.
- iv. Further management should be according to the hospital infection control policy or as indicated in the Hospital Infection Control Manual (Sri Lanka College of Microbiologists 2005).

D. Procedure for collection and transport of specimens

- i. Place specimens in a leak-proof container.
- ii. The outside of the container should not be contaminated.
- iii. Place the request form in a plastic bag or separately from the specimen to prevent contamination.
- iv. Store specimens away from food and drink.
- v. Transport securely to prevent spillage.

1.2.8 PATIENT ISOLATION

A. Precautions for patient isolation

- i. A patient who could transmit infection should ideally be placed in a private room or cohorted with other patients infected with the same microorganism.
- ii. Clean gowns should be worn when entering the room and removed before leaving the room. Wear masks and gloves on entry if necessary.
- iii. Wash hands before leaving the room.
- iv. Such patients should not be transported to other areas of the hospital unless absolutely necessary.
- v. The isolation room should have designated patient care equipment for the use of the patients in the isolation room only.

Figure 1: One-Handed Needle Recapping Method



Step 1

Place the cap on a flat surface like the table or counter.



Step 2

Holding the syringe with the needle attached in one hand, slip the needle into the cap without using the other hand.

(Hint: some put a piece of double sided tape on a corner of the table/ trolley to help keep the cap from sliding. Change the tape regularly for sanitation.)



Step 3

Now you may use both hands to "seat" the cap onto the needle firmly.

1.3 Hand Hygiene

Hand hygiene is the single most important Standard Precaution for infection control. The first description of the impact of handwashing on reducing sepsis in health care settings was made by Holmes in 1843 (3) and Semmelweiss in 1846 (4) and hand washing gradually became accepted as one of the most important measures for preventing transmission of pathogens in health-care facilities. Systematic reviews on handwashing show that hand antisepsis reduces the incidence of HAI (5, 6).

1.3.1 Hand Hygiene Products

Plain soap: Hand washing with plain soap and water for 15 seconds reduces bacterial counts of the skin by 0.6 – 1.1 log₁₀ and washing for 30 seconds reduces counts by 1.8 – 2.8 log₁₀.

Alcohols: Alcohol based hand antiseptics containing 60% - 95% alcohol are the most effective. The application should last for 20 seconds after rubbing hands together. Alcohol based hand rubs are not appropriate for use when hands are visibly contaminated. In such instances hands should be washed with soap and water. Frequent use of alcohol based formulations for hand antisepsis can cause drying of the skin unless emollients are added to the formulations. The drying effect of alcohol can be reduced by adding 1% – 3% glycerol. Because alcohols are volatile, containers should be designed to minimize evaporation.

Chlorhexidine: The effective percentage of chlorhexidine gluconate is 2- 4%. It has good activity against Gram positive bacteria, somewhat less activity against Gram negative bacteria, fungi and enveloped viruses, and minimal activity against tubercle bacilli and non enveloped viruses.

Iodine and iodophors: The formulations used for hand hygiene should contain 7.5% - 10% povidone-iodine.

1.3.2 Recommendations for Hand Hygiene

These recommendations are designed to improve hand-hygiene practices of health care workers and to reduce transmission of pathogenic microorganisms to patients and personnel in health-care settings. Each recommendation is categorized on the basis of existing scientific data, theoretical rationale, applicability, and economic impact.

A. Indications for hand washing and hand antisepsis

- i. When hands are visibly dirty or contaminated with blood or other body fluids, wash hands with soap and water (Ia). **X**
- ii. If hands are not visibly soiled either wash hands with soap and water or use an alcohol hand rub. **X**
- iii. Decontaminate hands
 - before having direct contact with patients (Ib) **X**

- before wearing sterile gloves, when inserting a central intravascular catheter, indwelling urinary catheters, peripheral vascular catheters, or other invasive devices that do not require a surgical procedure (Ib). **X**
- after contact with body fluids or excretions, mucous membranes, non-intact skin and wound dressings even if hands are not visibly soiled (Ia). **X**
- even after contact with a patient's intact skin (e.g., when examining a patient, taking pulse or blood pressure, lifting a patient) (Ib). **X**
- when moving from a contaminated-body site to a clean-body site of the same patient during patient care (II). **X**
- after contact with inanimate objects (including medical equipment) in the immediate vicinity of the patient (II). **X**
- after removing gloves (Ib). **X**

B. Hand-hygiene technique

Soap and water hand washing

When washing hands with soap and water the following steps should be meticulously observed.

- i. Wet hands first with running water
- ii. Apply soap on all surfaces of the hand
- iii. Rub hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers as described in Figure 2.

- iv. Rinse hands with water and dry thoroughly with a single use towel (that is then sent to the laundry for washing).
- v. Use towel to turn off the tap if it is not elbow operated (Ib).

Alcohol-based hand rub

When decontaminating hands with an alcohol-based hand rub, apply product to palm of one hand and rub hands together, covering all surfaces of hands and fingers as described in Figure 2 until hands are dry (Ib). Follow the manufacturer's recommendations regarding the volume of product to use.

C. Hand hygiene facilities

- i. Liquid and bar forms of soap are acceptable. When bar soap is used, place on soap racks that facilitate drainage and provide small bars of soap that are replaced daily (II) X
- ii. Do not add soap to a partially empty soap dispenser. This practice of "topping up" dispensers can lead to bacterial contamination of soap (Ia). X
- iii. Multiple-use cloth towels are not recommended for use in health-care settings (II). Use single use towels that are then sent to the laundry for washing. X

D. Skin care

Whenever possible provide or encourage use of hand lotions or creams to minimize the occurrence of

irritant contact dermatitis associated with hand antiseptics or handwashing (Ia).

E. Other Aspects of Hand Hygiene

- i. Keep nails short and clean. X
- ii. Wear gloves when contact with blood or other potentially infectious material, mucous membranes, and non-intact skin could occur (Ic). X
- iii. Remove rings, watches, bracelets and bangles before washing hands for procedures.

STATEMENTS OF EVIDENCE

- Ia Evidence obtained from meta-analysis of randomized controlled trials.
- Ib Evidence obtained from at least one randomized controlled trial.
- IIa Evidence obtained from at least one well-designed controlled study without randomization.
- IIb Evidence obtained from at least one other type of well-designed quasi-experimental study.
- III Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.
- IV Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

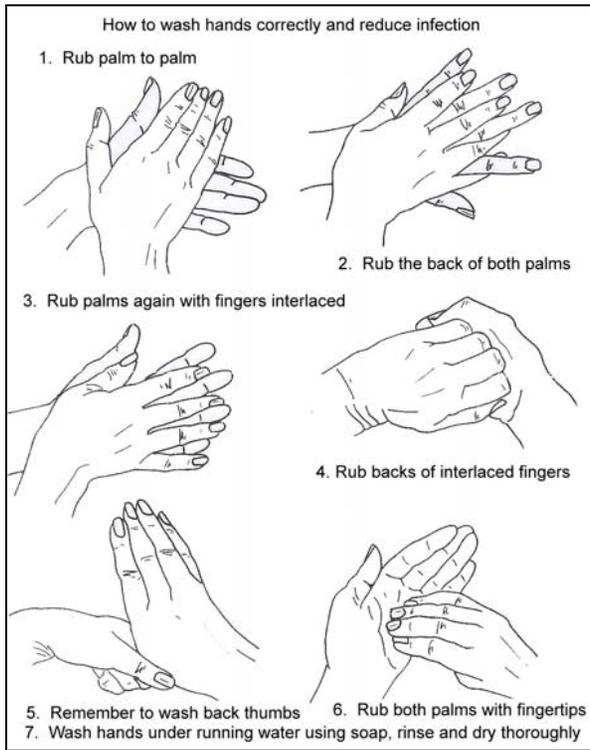


Figure 2.

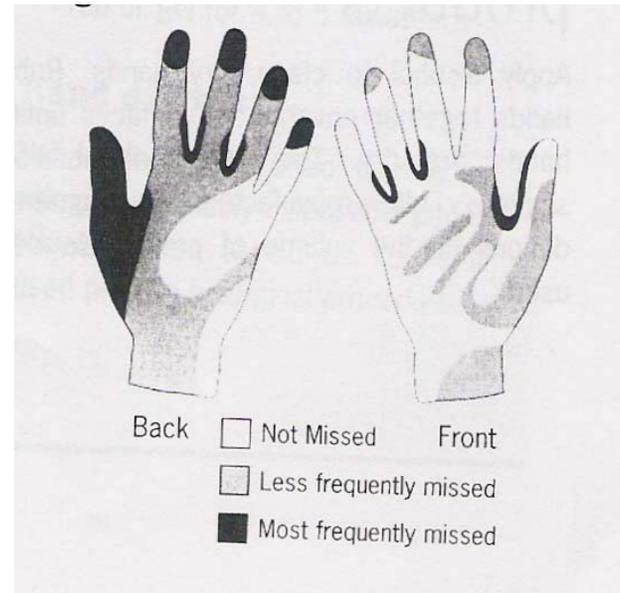


Figure 3.

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