

2. **HAND HYGIENE**

Hand hygiene (HH) is a general term referring to any action of hand cleaning. Hand hygiene relates to the removal of visible soil and removal or killing of transient microorganisms from the hands while maintaining the good skin integrity resulting from a hand care program. HH includes surgical hand antisepsis.

Hands of HCWs are the most common vehicle for the transmission of microorganisms from client to client, from client to equipment and the environment, and from equipment and the environment to the client. Transmission of organisms by hands of HCWs between clients can result in healthcare-associated infections (HAIs). During the delivery of health care, the HCW's hands continuously touch surfaces and substances including inanimate objects, client's intact or non-intact skin, mucous membranes, food, waste, body fluids and the HCW's own body. With each hand-to-surface exposure a bidirectional exchange of microorganisms between hands and the touched object occurs and the transient hand-carried flora is thus continuously changing.

In healthcare settings, hand hygiene is the single most important way to prevent infections.

Hand hygiene is a core element of client safety for the prevention of infections and the spread of antimicrobial resistance. There are two methods of performing hand hygiene: ABHR and hand washing.

a) **Alcohol-Based Hand Rub (ABHR)**

- Use of alcohol-based hand rub (ABHR) has been shown to reduce healthcare-associated infection rates
- ABHR is the preferred method for decontaminating hands. ABHR is faster and more effective than washing hands (even with an antibacterial soap) when hands are not visibly soiled.
ABHRs:
 - Provide for a rapid kill of most transient microorganisms
 - Are not to be used with water
 - Contain emollients to reduce hand irritation
 - Are less time consuming than washing with soap and water
- Allow hands to dry completely before touching the patient or their environment/equipment for the ABHR to be effective and to eliminate the extremely rare risk of flammability in the presence of an oxygen-enriched environment or static electricity

Efficacy of ABHRs

- The efficacy of the ABHR depends on the quality of the product, the amount of product used, the time spent rubbing, and the hand surface rubbed
- ABHR should not be used with water, as water will dilute the alcohol and reduce its effectiveness
- ABHR should not be used after hand washing with soap and water as it will result in more irritation of the hands

ABHRs available for community settings range in concentration from 60 to 90% alcohol. Concentrations higher than 90% are less effective because proteins are not denatured easily in the absence of water.

Hand wipes impregnated with antimicrobials or soap may be used to remove visible soil and/or organic material, but are not a substitute for alcohol-based hand rub or antimicrobial soap. This is because they are not as effective at reducing bacterial counts on HCWs hands. Hand wipes may ONLY be considered as an alternative to washing hands with plain soap and water (when hands are visibly soiled) in settings where a designated hand washing sink is not available or when the hand washing sink is not satisfactory (e.g., contaminated sink, sink used for other purposes, no running water, no soap). Follow use of wipes in this instance (when hands are visibly soiled) with an ABHR. Hands should be washed once a suitable sink is available.

At the present time, there is no evidence for the efficacy of non-alcoholic, waterless antiseptic agents in the healthcare environment. Non-alcoholic products have a quaternary ammonium compound (QAC) as the active ingredient, which has not been shown to be as effective against most microorganisms as ABHR or soap and water. QACs are prone to contamination by Gram-negative organisms. QACs are also associated with an increase in skin irritancy. Non-alcohol-based waterless antiseptic agents are not recommended for hand hygiene in healthcare settings and should not be used.

b) Hand washing

- Hand washing with soap and running water must be performed when hands are visibly soiled.
- Antimicrobial soap may be considered for use in critical care settings such as intensive care units and burn units but is not required and not recommended in other care areas.
- Bar soaps are not acceptable for HCWs to use to perform Hand Hygiene.
- Only liquid soap or ABHR should be used in a client's home for HCW hand hygiene. Bar soap is allowed for client's personal use.

Efficacy of Soaps

- *Plain soaps* act on hands by emulsifying dirt and organic substances (e.g., blood, mucous), which are then flushed away with rinsing. Antimicrobial agents in plain soaps are only present as a preservative
- *Antimicrobial/Antibacterial soaps* have residual antimicrobial activity and are not affected by the presence of organic material
 - Disadvantages of antimicrobial soap include:
 - Antimicrobial soaps are harsher on hands than plain soaps and frequent use may result in skin breakdown; and
 - Frequent use of antimicrobial soap may lead to antibiotic resistance

Hand hygiene with correctly applied ABHR kills organisms in seconds. Hand hygiene with soap and water done correctly physically removes organisms.

c) Care Environments

The care environment is the space around a patient that may be touched by either the client or the healthcare worker.

Two different environments:

- Healthcare environment/zone
 - Environment beyond the patient's immediate area. In a clinic setting this is outside the clinic room. In a multi-station treatment room this is everything outside the client's treatment area.
 - In Home Care any items brought in and out of the home by the HCW is considered the healthcare environment.



- Client environment/zone: the client's area
 - In a clinic setting, the client environment is the area that may come into contact with the patient within their cubicle/clinic room.
In a multi-station clinic area/treatment room this is everything within the client's clinic area/treatment room.
 - In Home Care it is the home environment.

When hand hygiene is performed in a client's home, avoid contamination of hands with potentially contaminated surfaces and objects.

d) Indications and Moments for Hand Hygiene during Health Care Activities

When should hand hygiene be performed? A hand hygiene indication points to the reason hand hygiene is necessary at a given moment. There may be several indications in a single care sequence or activity. Hand hygiene shall be performed before and after any direct contact with a client or the client's equipment, between procedures on the same client, and before contact with the next client.

The HCW should take into consideration their interaction with the client. Will there be a point of care associated with the interaction? The point of care is defined as "the place where three elements come together: the client, the HCW and the care or treatment potentially involving physical contact with the client".

While all indications for hand hygiene are important, there are some essential moments in healthcare settings where the risk of transmission is greatest and hand hygiene must be performed. Essential HH indications can be simplified into *4 Moments for Hand Hygiene*.

THE 4 MOMENTS FOR HAND HYGIENE:

1. BEFORE INITIAL PATIENT/PATIENT ENVIRONMENT CONTACT

When? Clean your hands when entering a client care environment. For example:

- Before entering the clinic room/treatment area or home
- Before touching a client (e.g., shaking their hand, helping the client move around, holding a baby)
- (After) shifts and breaks

Why? To protect the patient and their environment from harmful microorganisms carried on your hands.

2. BEFORE ASEPTIC/CLEAN PROCEDURES

When? Clean your hands immediately before any aseptic procedure. For example:

- Performing invasive procedures
- Handling dressings or touching open wounds
- Preparing and administering medications
- Preparing, handling, serving or eating food
- Feeding a client

Why? To protect the patient from harmful microorganisms, including his/her own microorganisms, entering his or her body.

3. AFTER BODY FLUID EXPOSURE RISK

When? Clean your hands immediately after an exposure risk to blood and body fluids, non-intact skin, and/or mucous membranes (and after glove removal). For example:

- Contact with blood and body fluids
- Contact with items known or considered to be contaminated
- Procedures on the same client where soiling of hands is likely, to avoid cross-contamination of body sites
- Oral care, wound care, client toileting
- Removal of gloves
- Personal use of toilet or wiping nose/face
- Feeding a client

Why? To protect yourself and the healthcare environment from harmful client microorganisms.

4. AFTER PATIENT/PATIENT ENVIRONMENT CONTACT

When? Clean your hands when leaving the patient/patient environment. For example:

- After touching client (e.g., helping a client mobilize; giving a massage; taking pulse, blood pressure, or physical examination)
- After leaving the clinic room/treatment area or home
- (Before) shifts and breaks

Why? To protect yourself and the healthcare environment from harmful microorganisms.

Risk is important in making decisions of when to clean hands. Immediately after (and immediately before) care requires hand hygiene is possible at point of care. Hand hygiene with point of care alcohol-based hand rub (ABHR) is the standard of care expected of all HCWs, in all healthcare settings. Busy HCWs need access to hand hygiene products where client/client environment contact is taking place. Providing ABHR at the point of care (e.g., within arm's reach) is an important system support to improve hand hygiene. Point of care refers to the place where three elements occur together:

- The patient
- The healthcare worker
- Care potentially involving physical contact is taking place

The point of care (POC) concept refers to a hand hygiene product (e.g., alcohol-based hand rub) which is easily accessible to HCWs by being as close as possible, e.g., within arm's reach (as resources permit) to where client contact is taking place. POC products should be available at the required moment, without leaving the client environment. This enables HCWs to quickly and easily fulfill the 4 Moments for Hand Hygiene. POC can be achieved in a variety of methods. (e.g., ABHR attached to the wall, on a countertop, equipment carried by the HCW).

Focusing on a single client, the healthcare setting is divided into two virtual geographical areas: the patient environment/zone and the healthcare environment/zone. The term "client zone" refers to the space that contains the client, as well as the immediate surroundings and inanimate surfaces in contact with the client (e.g., treatment chairs, bedside tables, exam tables, infusion tubing, and other medical equipment). It further contains surfaces frequently touched by HCWs within the vicinity of the client (e.g., monitors, computers, buttons and knobs, and other 'high frequency' touch surfaces within the patient zone). The client zone and thus the POC extend beyond the client. The model assumes that the client flora rapidly contaminates the entire client zone, but that it is being cleaned between clients. The POC occurs within the client zone.

The healthcare zone contains all surfaces outside the client zone (i.e., all other clients and their client zones, equipment brought in and out of a home by a HCW and the community healthcare facility environment). Conceptually, the healthcare zone is contaminated with microorganisms that might be foreign and potentially harmful to individual clients, either because they are multi-resistant or because their transmission might result in exogenous infection.

Two moments for hand hygiene may sometimes fall together. Typically this occurs when going from one client to another without touching any surface outside the corresponding client zones. Naturally, a single hand hygiene action will cover the two moments for hand hygiene.

e) Techniques

i. Using an Alcohol-Based Hand Rub (ABHR)

- Ensure hands are visibly clean (if soiled, follow hand washing steps)
- Hand and arm jewellery should not be worn by direct care providers; if a watch is worn, it must be worn above the wrist and fit snugly; clothing or other items that impede frequent and effective hand hygiene should be removed; a simple and practical solution allowing effective hand hygiene is for HCWs to wear their rings around their neck on a chain as a pendant
- Apply one to two full pumps of product onto one palm; the volume should be such that 15 seconds of rubbing is required for drying
- Spread product over all surfaces of hands, concentrating on finger tips, between fingers, back of hands, and base of thumbs; these are the most commonly missed areas; and



- Continue rubbing hands until product is dry; this will take a minimum of 15 seconds if sufficient product is used. **Hands must be fully dry** before touching the patient or the care environment/equipment for the ABHR to be effective and to eliminate the extremely rare risk of flammability in the presence of an oxygen-enriched environment.

Using Soap and Water

- Hand and arm jewelry should not be worn by direct care providers; if a watch is worn, it must be worn above the wrist and fit snugly; clothing or other items that impede frequent and effective hand hygiene should be removed or pushed back; a simple and practical solution allowing effective hand hygiene is for HCWs to wear their rings around their neck on a chain as a pendant
- Wet hands with warm (not hot or cold) water; hot or cold water is hard on the hands, and will lead to dryness
- Apply liquid or foam soap
- Vigorously lather all surfaces of hands for a minimum of 15 seconds; removal of transient or acquired bacteria requires a minimum of 15 seconds of mechanical action; pay particular attention to finger tips, between fingers, backs of hands and base of the thumbs; these are the most commonly missed areas
- Using a rubbing motion, thoroughly rinse soap from hands; residual soap can lead to dryness and cracking of skin
- Dry hands thoroughly by blotting hands gently with a paper towel; rubbing vigorously with paper towels can damage the skin
- In the client's home a cloth towel must not be used unless it is freshly laundered for the HCW's use only
- Turn off taps with paper towel to avoid recontamination of the hands. If hand air dryers are used in non-clinical areas, hands-free taps are required
- DO NOT use ABHR immediately after washing hands, as skin irritation will be increased

f) Factors that Reduce Effectiveness of Hand Hygiene

i. Condition of the Hands

- The condition of the hands and the presence of hand adornments can influence the effectiveness of hand hygiene. Intact skin is the body's first line of defence against bacteria; therefore careful attention to hand care is an essential part of the hand hygiene program.
- The presence of dermatitis, cracks, cuts or abrasions can trap bacteria and compromise hand hygiene. Dermatitis also increases shedding of skin squames (cells) and, therefore, shedding of bacteria.

ii. Nails

- Long nails are difficult to clean, can pierce gloves and harbour more microorganisms than short nails. Keep natural nails clean and short.
- The nail should not show past the end of the finger.

iii. Nail Polish

- Studies have shown chipped nail polish or nail polish worn longer than four days can harbour microorganisms that are not removed by hand washing, even with surgical hand scrubs.
- Freshly applied nail polish does not result in increased numbers of bacteria around the nails.
- Fingernail polish, if worn, must be fresh and in good condition.



iv. Artificial Nails or Nail Enhancements

- Artificial nails and nail enhancements are not to be worn by direct care providers (refer to WRHA Policy 20.70.010, Dress Code, and WRHA Policy 90.00.060, Routine Practices for Reducing the Risk of Infection Transmission).
- Acrylic nails harbour more microorganisms and are more difficult to clean than natural nails. Artificial nails and nail enhancements have been implicated in the transfer of microorganisms and in outbreaks, particularly in neonatal nurseries and other critical care areas. Surgical site infections and hemodialysis-related bacteremias have been linked to artificial nails.
- Artificial nails and nail enhancements are also associated with poor hand hygiene practices and result in more tears to gloves.

v. Rings, Hand Jewellery and Bracelets

- Hand and arm jewellery hinder hand hygiene.
- Rings increase the number of microorganisms present on hands and increase the risk of tears in gloves.
- Watches should not interfere with, or become wet when performing hand hygiene. Rings and bracelets should not be worn by direct care providers.
- If watches and other wrist jewellery are present, remove or push up above the wrist before performing hand hygiene.

vi. Other Impediments to Effective Hand Hygiene

- Long sleeves should not interfere with, or become wet when performing hand hygiene.

vii. Hand Drying (towels, air dryers)

Effective hand drying is important for maintaining hand health. Considerations include:

- Disposable paper hand towels provide the lowest risk of cross-contamination and should be used for drying hands
- Cloth drying towels must not be used unless a freshly laundered towel is used for each HCW
- Towel dispensers must be mounted such that access to them is unobstructed and splashing or dripping onto adjacent wall and floor surfaces is minimized
- Towel dispenser design should be such that only the towel is touched during removal of towel for use
 - Towels hanging from the dispenser should not hang directly into a garbage can
- Hot-air dryers, including jet air dryers, must not be used in clinical areas as warm air currents dry hands slowly and can be used by only one individual at a time. This results in lines and the temptation to dry hands on clothing
 - Where hot-air dryers are used in non-clinical areas, hands-free taps are required
 - If hot-air dryers are used in non-clinical areas, there must be a contingency for power interruptions

viii. Lotions and Creams

- HCWs must use facility approved lotions compatible with products and gloves in use
- Hand lotion bottles shall not be reused
- Barrier Creams: unlike hand lotions, which penetrate the skin via pores, barrier creams are adsorbed to the skin and are designed to form a protective layer that is not removed by standard hand washing.
- Barrier creams may actually be harmful as they trap agents beneath them, ultimately increasing risk for either irritant or allergic contact dermatitis. Furthermore, inappropriate barrier cream application on HCW hands may exacerbate irritation rather than provide benefit.



ix. Dispensers

- Products must be dispensed in a disposable pump/squirt container that is not topped-up, to prevent contamination
- Do not add soap or hand rub to a partially empty dispenser
- If reusable dispensers are utilized they must be emptied, washed and air-dried prior to refilling