

Handwashing: Breaking the Chain of Infection

Many people consider handwashing to be a common sense way to remove dirt and germs from the hands. In fact, handwashing is more than simple common sense. According to the U.S. Centers for Disease Control (CDC), “handwashing is the single most important procedure for preventing the spread of infection.”

The Association for Professionals in Infection Control and Epidemiology (APIC) concurs, stating that “handwashing causes a significant reduction in the carriage of potential pathogens on the hands,” and [in healthcare settings it] “can result in reductions in patient morbidity and mortality from nosocomial infection.”

APIC Guidelines

The “APIC Guideline for Handwashing and Hand Antisepsis in Health Care Settings” was published in 1995 and supplements guides published by the Association of Operating Room Nurses (AORN), the CDC and the Food and Drug Administration (FDA). It provides information on skin flora of hands, characteristics of selected antimicrobial agents used on hands, handwashing and surgical scrub techniques, and related aspects of hand care and protection. In addition, recommendations are made regarding healthcare personnel handwashing, personnel hand preparation for operative procedures, and other aspects of hand care and protection.¹

While the purpose of this article is not to exhaustively review the entire Guideline, there are several highlights that bear repeating, including recommendations on when and how to wash hands and how to choose the best soap for the job.

The decision regarding when handwashing should occur depends on:

- The intensity of contact with patients.
- The degree of contamination that is likely to occur with that contact.
- The susceptibility of patients to infection.
- The procedure to be performed.

Healthcare workers come into frequent hand-contact with body secretions that can carry bacteria, viruses and fungi, which may be potentially infectious. That's one of the reasons APIC recommends handwashing when there is prolonged and intense contact with *any* patient. APIC further recommends that handwashing be considered necessary *before* and *after* situations in which hands are likely to become contaminated, especially when hands have had contact with mucous membranes, blood and body fluids, and secretions or excretions and *after* touching contaminated items such as urine-measuring devices.

According to APIC, the choice of plain or antiseptic soap, or of alcohol-based hand rinses, should depend on whether it is important to reduce and maintain minimal counts of colonizing flora (those microorganisms that are considered permanent residents of the skin and are not readily removed by mechanical friction) as well as to mechanically remove the contaminating flora (microorganisms that can be transmitted via skin-to-skin contact unless removed by mechanical friction and soap and water washing or destroyed by the application of an antiseptic handrub).

For general patient care, APIC and the CDC recommend the use of plain, non-antimicrobial soap. However, APIC goes on to note that antiseptic agents are necessary to kill or inhibit microorganisms and reduce the level of microbes still further. Moreover, APIC adds that certain antiseptic agents have the ability to bind to the stratum corneum, resulting in a persistent activity on the skin, which may be desirable to enhance continued antimicrobial activity when it is not possible to wash the hands during prolonged surgical procedures or when continued chemical activity on the skin is advantageous in other settings.

The choice of plain soap, antiseptic soap or antiseptic handrubs should therefore be based on the degree of hand contamination and whether it is important to reduce and maintain minimal counts of resident flora, as well as to mechanically remove the transient flora on the hands of healthcare personnel, according to APIC.

Handwashing Techniques

APIC offers the following handwashing techniques for healthcare workers:

- Wet hands with warm running water.
- Apply handwashing agent (soap) and thoroughly distribute over hands.
- Vigorously rub hands together for 10 to 15 seconds, generating friction on all surfaces of the hands and fingers, including thumbs, backs of fingers, backs of the hands and beneath the fingernails.
- Rinse hands thoroughly to remove residual soap, then dry using paper towels dispensed from holders that require the user to remove them one at a time.
- If the sink does not have foot controls or an automatic shutoff, a paper towel may be used to shut off the faucet to avoid recontaminating the hands.

While there is little evidence to recommend a specific ideal water temperature for effective handwashing, it seems logical to use warm water. Excessively hot water is harder on the skin, dries the skin and is too uncomfortable to wash for the recommended amount of time. In addition, cold water inhibits the proper lathering of soap.

When using an alcohol-based antimicrobial cleaner, APIC recommends that a vigorous, one-minute rubbing with enough alcohol (3-5ml is generally recommended) to wet the hands completely is the most effective method for hand antisepsis. Failure to cover all surfaces of the hands because of poor technique or use of insufficient amounts of alcohol handrub solution can leave surfaces contaminated. Also, keep in mind that these alcohol handrubs are not designed to remove *physical* dirt, and therefore should be used with another cleaning agents in the presence of physical dirt.

The Role of Gloves

Protective gloves are routinely worn in healthcare settings as a safety barrier between skin-borne microorganisms and patients. The U.S. Occupational Safety & Health Administration (OSHA), in standards published in 1991, requires that gloves be worn whenever there is a reasonable likelihood that hands will be in contact with blood or other potentially infectious material, mucous membranes,

or non-intact skin, when performing any vascular access procedure, or when handling contaminated items or surfaces.

Microbial contamination of hands and possible transmission of infection have been reported even when gloves are worn, and studies have shown that handwashing is an important complement to glove use. In fact, APIC and the CDC recommend a soap and water handwash or an antiseptic handrub after gloves are removed.

While gloves offer important protection, constant use of gloves may cause irritant dermatitis due to mechanical irritation from the glove or glove powder, or from chemical agents such as residual soap trapped between the glove and the skin. (The problem of dermatitis is discussed in more detail below.) Some healthcare workers choose powder-free gloves to decrease irritation and the risk of allergies.²

It is important to keep in mind that no glove is 100 percent resistant to all pathogens.

Barriers to Proper Handwashing

According to APIC, handwashing associated with general patient care occurs in approximately half of the instances in which it is indicated and usually is of shorter duration than recommended. A recent study supports that figure, finding that average handwashing compliance was 48 percent in a teaching hospital.³ The study concluded that the primary problem with handwashing is laxity of practice and that high workload among healthcare workers was associated with low compliance.

Other factors influencing handwashing behavior include placement of sinks, unacceptable handwashing products, the effect of handwashing on skin condition and awareness of the importance of handwashing in preventing infection.

The convenient placement of sinks, handwashing products and paper towels is often suggested as a means of encouraging frequent and appropriate handwashing. Sinks with faucets that can be turned off by means other than the

hands (e.g., foot pedals) and sinks that minimize splash can help personnel avoid immediate recontamination of washed hands.⁴

(See sidebar for additional tips.)

The Dermatitis Dilemma

Dry skin and dermatitis are two conditions linked to frequent handwashing that may affect handwashing compliance among healthcare personnel. In fact, the National Institute for Occupational Safety & Health (NIOSH) states that skin injuries and diseases account for a large proportion of all occupational injuries and diseases. In 1998, dermatological diseases accounted for approximately 19 percent of all chronic occupational diseases in the United States, according to NIOSH. And, that of workers who developed a dermatological disease in 1997, more than 28 percent lost three to five working days, according to the Bureau of Labor Statistics. In the service industries, which include the health service industry, nearly 18,000 cases of dermatological diseases were reported to the Bureau of Labor Statistics in 1998. Dermatitis is such an important (and until recently, overlooked) issue that NIOSH has made it a top priority in the National Occupational Research Agenda (NORA).

Dermatitis is an inflammation that occurs when an irritating substance comes into contact with the skin, causing an abnormal reaction. Areas of irritated skin may be red, swollen, tender, hot, painful or itchy. In addition, there may be some scaling as the skin heals. Skin affected for several weeks by dermatitis tends to thicken and change to a deeper color. As well as causing pain or discomfort, dermatitis in severe cases can result in long periods away from work.

The APIC Guideline notes that dermatitis in healthcare personnel may place patients at risk because handwashing will not decrease bacterial counts on dermatitic skin, and dermatitic skin contains high numbers of microorganisms. Moreover, the Guideline states that healthcare personnel with dermatitis may be at increased risk of exposure to blood-borne pathogens during skin contact with blood or body fluids because the integrity of the skin is compromised.

Dermatitis may be considered the “Catch-22” of handwashing compliance as it can be caused by the excessive handwashing that healthcare personnel must comply with on a daily basis. The problem is that many skin cleansers don’t discriminate between the dirt on the skin surface and the essential oils that protect the skin.

Even given the problems associated with dermatitis, the simple act of handwashing has been an important and enduring element of most infection control programs. And now, more than ever, it is recognized that an effective handwashing program can greatly reduce the risks of cross-contamination.

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[Sidebar]

Make It Easy To Wash Up Right

- A sink should be located in or just outside every patient room. More than one sink per room may be necessary if a large room is used for several patients.
- If bar soap is used, it should be kept on racks that allow drainage of water. Small bars of soap that can be changed frequently should be used.
- If liquid soap is used, it should be stored in closed containers, and the dispenser should be replaced or cleaned and filled with fresh product when empty. Liquids should not be added to a partially full dispenser.
- Paper towels should be within easy reach of the sink, but beyond splash contamination. A “no-touch” dispenser lets users touch only the towels they need and reduces the possibility of hand contamination via soiled levers.
- Antimicrobial-containing products that do not require water for use can be used in areas where no sinks are available or in small containers for portability.
- Lotions supplied in small, non-refillable containers can be used to help prevent skin dryness and dermatitis. Lotion formulations should be checked for compatibility with antiseptic products and their effect on glove integrity.

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References

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