

# Infection Control Recommendations for Prevention of Transmission Diseases in Home Health, Medical and Clinical Care Facilities



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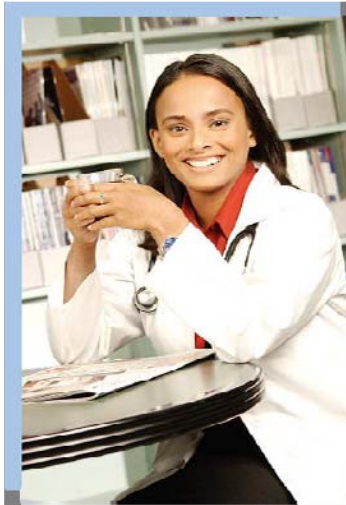
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# Infection Control Recommendations for Prevention of Transmission Diseases in Home Health, Medical and Clinical Care Facilities

## Routes of Transmission

The transmission of infection to the patient or the health worker can occur through one of five central vectors: direct contact, indirect contact, droplet, airborne or common vehicle transmission. The following information has been outlined by the Centers for Disease Control and Prevention (CDC):

**Direct Contact:** Physical transfer of microorganisms (germs) to a susceptible host by body surface-to-body surface contact. Most often associated with blood-borne or sexual contact, this can also occur during patient care activities like turning or bathing. Acquiring or transmitting infections via this route would be a rare occurrence, since health workers typically have only brief, casual contact with patients and their environment.

**Indirect Contact:** Contact of a susceptible host with contaminated hands or object. This probably represents the most common transmission route for health workers. It can happen when they do not wash their hands between patient visits, or when contact is made with a contaminated personal item such as soiled clothing or bedding. It can also occur when a health worker comes in contact with a contaminated common-use item such as a door knob, personal bath towel, TV remote, writing pen, child's toy or eating utensil.

**Droplet Contact:** Nasal, oral, or conjunctiva (membrane that lines the eyelids) mucosa comes in contact with relatively large droplets containing germs from an infected person that is close by, usually within three feet. Germs can spread through the air through an unprotected cough, sneeze or talking — from a patient to a health worker and vice versa, or between health workers.

**Airborne Transmission:** Extremely small (droplet nuclei) germs that are suspended in the air or dust enter the respiratory tract. Unlike droplet contact, airborne transmissions are suspended in the air for significant periods of time and spread by environmental air currents. Important examples include tuberculosis, measles and chickenpox, which in the case

of active symptoms or a confirmed diagnosis, require that health workers use a protective mask.

Common Vehicle Transmission: Contact with contaminated food, water, medications, devices or equipment. Health workers or patients can become infected by coming in contact with contaminated equipment or supplies.

### **Infection Control, the Importance of Hand Washing**

For generations, hand washing with soap and water has been considered a measure of personal hygiene. The concept of cleansing hands with an antiseptic agent probably emerged in the early 19th century. As early as 1822, a French pharmacist demonstrated that solutions containing chlorides of lime or soda could eradicate the foul odors associated with human corpses and that such solutions could be used as disinfectants and antiseptics. In a paper published in 1825, this pharmacist stated that physicians and other persons attending patients with contagious diseases would benefit from moistening their hands with a liquid chloride solution.

In 1846, Ignaz Semmelweis observed that women whose babies were delivered by students and physicians in the First Clinic at the General Hospital of Vienna consistently had a higher mortality rate than those whose babies were delivered by midwives in the Second Clinic. He noted that physicians who went directly from the autopsy suite to the obstetrics ward had a disagreeable odor on their hands despite washing their hands with soap and water upon entering the obstetrics clinic. He postulated that the puerperal fever that affected so many parturient women was caused by "cadaverous particles" transmitted from the autopsy suite to the obstetrics ward via the hands of students and physicians. Perhaps because of the known deodorizing effect of chlorine compounds, as of May 1847, he insisted that students and physicians clean their hands with a chlorine solution between each patient in the clinic. The maternal mortality rate in the First Clinic subsequently dropped dramatically and remained low for years. This intervention by Semmelweis represents the first evidence indicating that cleansing heavily contaminated hands with an antiseptic agent between patient contacts may reduce health care associated

transmission of contagious diseases more effectively than hand washing with plain soap and water.

Hand hygiene (e.g., hand washing, hand antisepsis, or surgical hand antisepsis) substantially reduces potential pathogens on the hands and is considered the single most critical measure for reducing the risk of transmitting organisms to patients and health care workers. Hospital-based studies have demonstrated that noncompliance with hand hygiene practices is associated with health care associated infections and the spread of multi-resistant organisms. Noncompliance also has been a major contributor to outbreaks of infection.

### **Normal Bacterial Skin Flora**

To understand the objectives of different approaches to hand cleansing, a knowledge of normal bacterial skin flora is essential. Normal human skin is colonized with bacteria; different areas of the body have varied total aerobic bacterial counts. In 1938, bacteria recovered from the hands were divided into two categories: transient and resident. Transient flora, which colonize the superficial layers of the skin, are more amenable to removal by routine hand washing. They are often acquired during direct contact with patients or contact with contaminated environmental surfaces within close proximity of the patient. Transient floras are the organisms most frequently associated with health care associated infections. Resident flora, which are attached to deeper layers of the skin, are more resistant to removal. In addition, resident flora is less likely to be associated with such infections. The hands of health care workers may become persistently colonized with pathogenic flora (e.g., *S. aureus*), gram-negative bacilli, or yeast. Investigators have documented that, although the number of transient and resident flora varies considerably from person to person, it is often relatively constant for any specific person.

### **Physiology of Normal Skin**

The primary function of the skin is to reduce water loss, provide protection against abrasive action and microorganisms, and act as a permeability barrier to the environment. The basic structure of skin includes, from outer-

to inner-most layer, the superficial region (i.e., the stratum corneum or horny layer), the viable epidermis, the dermis, and the hypodermis. The barrier to per-cutaneous absorption lies within the stratum corneum, the thinnest and smallest compartment of the skin. The stratum corneum contains the horny cells, which are flat, polyhedral-shaped non-nucleated cells.

The intercellular region of the stratum corneum is composed of lipid (fat). The intercellular lipid layer is required for a competent skin barrier. Directly under the stratum corneum is a stratified epidermis, which is composed primarily of 10--20 layers of keratinizing epithelial cells that are responsible for the synthesis of the stratum corneum. This layer also contains melanocytes involved in skin pigmentation (color); Langerhans cells, which are important for antigen presentation and immune responses; and Merkel cells. The viable epidermis does not contain a vascular network, and the keratinocytes obtain their nutrients from below by passive diffusion through the interstitial fluid.

The skin is a dynamic and active structure and its barrier function does not simply arise from the dying, degeneration, and compaction of the underlying epidermis. Substantial evidence now confirms that the formation of the skin barrier is under homeostatic control, which is illustrated by the skin's response to wear and tear. The more wear and tear the skin is subjected to the more rapidly skin cells are developed, but the more rapid this process is stimulated the less time the cells have to become viable and resistant to contact with foreign substances.

### **Hand Transmission of Disease Can and Does Sicken and Kill Patients**

In a New York Times editorial entitled "Coming Clean," former New York lieutenant governor Betsy McCaughey noted that due to poor hygiene, hospital infections in the United States kill an estimated 103,000 patients every year. That is, the failure of hospitals to enforce cleanliness rules evidently results in the annual death of more patients in this country than AIDS, breast cancer, and auto accidents combined.

Several investigators have studied transmission of infectious agents by using different experimental models. In one study, nurses were asked to touch the groins of patients heavily colonized with gram-negative bacilli for 15 seconds - as though they were taking a femoral pulse. Nurses then cleaned their hands by washing with plain soap and water or by using an alcohol hand rinse. After cleaning their hands, they touched a piece of urinary catheter material with their fingers, and the catheter segment was cultured. The study revealed that touching intact areas of moist skin of the patient transferred enough organisms to the nurses' hands to result in subsequent transmission to catheter material, despite hand washing with plain soap and water.

In the U.S., the failure to maintain a hygienic environment in hospitals results in one in twenty patients contracting an infection during a hospital stay. Such infections are becoming increasingly resistant to existing antibiotics.

### **Relation of Hand Hygiene and Acquisition of Health Care Associated Pathogens**

Proper hand hygiene and antisepsis reduces the incidence of health care associated infections. In the 1960s, a prospective, controlled trial sponsored by the National Institutes of Health and the Office of the Surgeon General demonstrated that infants cared for by nurses who did not wash their hands after handling an index infant colonized with *S. aureus* acquired the organism more often and more rapidly than did infants cared for by nurses who used hexachlorophene to clean their hands between infant contacts. This trial provided evidence that, when compared with no hand washing, washing hands with an antiseptic agent between patient contacts reduces transmission of health care associated pathogens.

Trials have studied the effects of hand washing with plain soap and water versus some form of hand antisepsis on health care associated infection rates. Health care associated infection rates were lower when antiseptic hand washing was performed by health care personnel. In another study,

antiseptic hand washing was associated with lower health care associated infection rates in certain intensive-care units.

Health care associated infection rates were lower after antiseptic hand washing using a chlorhexidine containing detergent compared with hand washing with plain soap or use of an alcohol-based hand rinse.

Increased hand washing frequency among hospital staff has been associated with decreased transmission of *Klebsiella* spp. among patients. In a recent study, the acquisition of various health care associated pathogens was reduced when hand antisepsis was performed more frequently by hospital personnel; both this study and another documented that the prevalence of health-care--associated infections decreased as adherence to recommended hand-hygiene measures improved.

Outbreak investigations have indicated an association between infections and understaffing or overcrowding; the association was consistently linked with poor adherence to proper hand hygiene procedures.

### **Fingernails and Artificial Nails**

Studies have documented that the sub-ungual (under the fingernail) area of the hand harbor high concentrations of bacteria, most frequently coagulase-negative staphylococci, gram-negative rods (including *Pseudomonas* spp.), *Corynebacteria*, and yeasts. Freshly applied nail polish does not increase the number of bacteria recovered from peri-ungual (above the fingernail) skin, but chipped nail polish may support the growth of larger numbers of organisms on fingernails. Even after careful hand washing or the use of surgical scrubs, personnel often harbor substantial numbers of potential pathogens in the sub-ungual spaces.

Whether artificial nails contribute to transmission of health care associated infections is unknown. However, health care workers who wear artificial nails are more likely to harbor gram-negative pathogens on their fingertips than are those who have natural nails, both before and after hand washing.

Whether the length of natural or artificial nails is a substantial risk factor is unknown, because the majority of bacterial growth occurs along the

proximal 1 mm of the nail adjacent to sub-ungual skin. An outbreak of *P. aeruginosa* in a neonatal intensive care unit was attributed to two nurses (one with long natural nails and one with long artificial nails) who carried the implicated strains of *Pseudomonas* spp. on their hands.

### **Gloves do not Provide 100 Percent Protection from Contamination**

The Centers for Disease Control and Prevention (CDC) has recommended that health care workers wear gloves to reduce the risk of acquiring infections from patients, to prevent health care worker flora from being transmitted to patients, and to reduce transient contamination of the hands of workers by flora that can be transmitted from one patient to another. Before the emergence of the acquired immunodeficiency syndrome (AIDS) epidemic, gloves were worn primarily by health care workers caring for patients colonized or infected with certain pathogens or by workers exposed to patients with a high risk of hepatitis B. Since 1987, a dramatic increase in glove use has occurred in an effort to prevent transmission of HIV and other bloodborne pathogens from patients to health care workers. The Occupational Safety and Health Administration (OSHA) mandates that gloves be worn during all patient-care activities that may involve exposure to blood or body fluids that may be contaminated with blood.

The effectiveness of gloves in preventing contamination of health care workers hands has been confirmed in several clinical studies.

Several studies provide evidence that wearing gloves can help reduce transmission of pathogens in health-care settings. In a prospective controlled trial that required personnel to routinely wear vinyl gloves when handling a body substance, the incidence of *C. difficile* diarrhea among patients decreased from 7.7 cases/1,000 patient discharges before the intervention to 1.5 cases/1,000 discharges during the intervention.

The following caveats regarding use of gloves by health care workers must be considered. Personnel should be informed that gloves do not provide complete protection against hand contamination. Bacterial flora colonizing patients may be recovered from the hands of <30% of Health care workers who wear gloves during patient contact. Further, wearing gloves does not

provide complete protection against acquisition of infections caused by hepatitis B virus and herpes simplex virus. In such instances, pathogens presumably gain access to the caregiver's hands via small defects in gloves or by contamination of the hands during glove removal.

Gloves used by Health care workers are usually made of natural rubber latex and synthetic non-latex materials (e.g., vinyl, nitrile, and neoprene [polymers and copolymers of chloroprene]). Because of the increasing prevalence of latex sensitivity among health care workers and patients, the FDA has approved several powdered and powder-free latex gloves with reduced protein contents, as well as synthetic gloves that can be made available by health-care institutions for use by latex-sensitive employees. In published studies, the barrier integrity of gloves varies on the basis of type and quality of glove material, intensity of use, length of time used, manufacturer, whether gloves were tested before or after use, and method used to detect glove leaks. In published studies, vinyl gloves have had defects more frequently than latex gloves, the difference in defect frequency being greatest after use. However, intact vinyl gloves provide protection comparable to that of latex gloves. Limited studies indicate that nitrile gloves have leakage rates that approximate those of latex gloves. Having more than one type of glove available is desirable, because it allows personnel to select the type that best suits their patient-care activities. Although recent studies indicate that improvements have been made in the quality of gloves, hands should be decontaminated or washed after removing gloves. Gloves should not be washed or reused. Use of petroleum-based hand lotions or creams may adversely affect the integrity of latex gloves. After use of powdered gloves, certain alcohol hand rubs may interact with residual powder on the hands of personnel, resulting in a gritty feeling on the hands. In facilities where powdered gloves are commonly used, various alcohol-based hand rubs should be tested after removal of powdered gloves to avoid selecting a product that causes this undesirable reaction. Health care workers should be reminded that failure to remove gloves between patients may contribute to transmission of organisms.

## Recommendations for Hand Washing and Hand Antisepsis

### 1. Indications for hand washing and hand antisepsis

- When hands are visibly dirty or contaminated with proteinaceous material or are visibly soiled with blood or other body fluids, wash hands with either a non-antimicrobial soap and water or an antimicrobial soap and water.
- If hands are not visibly soiled, use an alcohol-based hand rub for routinely decontaminating hands in all other clinical situations. Alternatively, wash hands with an antimicrobial soap and water in all clinical situations.
- Decontaminate hands before having direct contact with patients.
- Decontaminate hands before donning sterile gloves when inserting a central intravascular catheter.
- Decontaminate hands before inserting indwelling urinary catheters, peripheral vascular catheters, or other invasive devices that do not require a surgical procedure.
- Decontaminate hands after contact with a patient's intact skin (e.g., when taking a pulse or blood pressure, and lifting a patient).
- Decontaminate hands after contact with body fluids or excretions, mucous membranes, non-intact skin, and wound dressings if hands are not visibly soiled.
- Decontaminate hands if moving from a contaminated-body site to a clean-body site during patient care.
- Decontaminate hands after contact with inanimate objects (including medical equipment) in the immediate vicinity of the patient.
- Decontaminate hands after removing gloves.
- Before eating and after using a restroom, wash hands with a non-antimicrobial soap and water or with an antimicrobial soap and water.
- Antimicrobial-impregnated wipes (i.e., towelettes) may be considered as an alternative to washing hands with non-antimicrobial soap and water. Because they are not as effective as alcohol-based hand rubs or washing hands with an antimicrobial soap and water for reducing

bacterial counts on the hands of health care workers, they are not a substitute for using an alcohol-based hand rub or antimicrobial soap.

- Wash hands with non-antimicrobial soap and water or with antimicrobial soap and water if exposure to *Bacillus anthracis* is suspected or proven. The physical action of washing and rinsing hands under such circumstances is recommended because alcohols, chlorhexidine, iodophors, and other antiseptic agents have poor activity against spores.
- No recommendation can be made regarding the routine use of non-alcohol-based hand rubs for hand hygiene in health-care settings. Studies are inconclusive at this time.

## 2. Hand-hygiene technique

- 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, until hands are dry. Follow the manufacturer's recommendations regarding the volume of product to use.
- When washing hands with soap and water, wet hands first with water, apply an amount of product recommended by the manufacturer to hands, and rub hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers. Rinse hands with water and dry thoroughly with a disposable towel. Use towel to turn off the faucet. Avoid using hot water, because repeated exposure to hot water may increase the risk of dermatitis.
- Liquid, bar, flaked or powdered forms of plain soap are acceptable when washing hands with a non-antimicrobial soap and water. When bar soap is used, soap racks that facilitate drainage and small bars of soap should be used.
- Multiple-use cloth towels of the hanging or roll type are not recommended for use in health-care settings.

## 3. Surgical hand antisepsis (any invasive procedure including acupuncture)

- Remove rings, watches, and bracelets before beginning the surgical hand scrub.
- Remove debris from underneath fingernails using a nail cleaner under running water.
- Surgical hand antisepsis using either an antimicrobial soap or an alcohol-based hand rub with persistent activity is recommended before donning sterile gloves when performing surgical procedures.
- When performing surgical hand antisepsis using an antimicrobial soap, scrub hands and forearms for the length of time recommended by the manufacturer, usually 2--6 minutes. Long scrub times (e.g., 10 minutes) are not necessary.
- When using an alcohol-based surgical hand-scrub product with persistent activity, follow the manufacturer's instructions. Before applying the alcohol solution, prewash hands and forearms with a non-antimicrobial soap and dry hands and forearms completely. After application of the alcohol-based product as recommended, allow hands and forearms to dry thoroughly before donning sterile gloves.

#### 4. Selection of hand-hygiene agents

Use efficacious hand-hygiene products that have low irritancy potential, particularly when these products are used multiple times per shift. This recommendation applies to products used for hand antisepsis before and after patient care in clinical areas and to products used for surgical hand antisepsis by surgical personnel.

To maximize acceptance of hand-hygiene products by health care workers, solicit input regarding the feel, fragrance, and skin tolerance of any products to be used. The cost of hand-hygiene products should not be the primary factor influencing product selection.

When selecting non-antimicrobial soaps, antimicrobial soaps, or alcohol-based hand rubs, solicit information from manufacturers regarding any known interactions between products used to clean hands, skin care products, and the types of gloves used in the institution.

Before making purchasing decisions, evaluate the dispenser systems of various product manufacturers or distributors to ensure that dispensers function adequately and deliver an appropriate volume of product.

Do not add soap to a partially empty soap dispenser. This practice of "topping off" dispensers can lead to bacterial contamination of soap.

## 5. Skin care

Use hand lotions or creams to minimize the occurrence of irritant contact dermatitis associated with hand antisepsis or hand washing.

Solicit information from manufacturers regarding any effects that hand lotions, creams, or alcohol-based hand antiseptics may have on the persistent effects of antimicrobial soaps being used in the facility or clinic.

## 6. Other Aspects of Hand Hygiene

- Do not wear artificial fingernails or extenders when having direct contact with patients at high risk (e.g., those in intensive-care units or operating rooms).
- Keep natural nails tips less than 1/4-inch long.
- Wear gloves when contact with blood or other potentially infectious materials, mucous membranes, and non-intact skin could occur.
- Remove gloves after caring for a patient. Do not wear the same pair of gloves for the care of more than one patient, and do not wash gloves between uses with different patients.
- Change gloves during patient care if moving from a contaminated body site to a clean body site.
- Do not wear rings or jewelry in health-care settings.

## **Masks, Protective Eyewear, Face Shields**

A surgical mask that covers both the nose and mouth and protective eyewear with solid side shields or a face shield should be worn by health care workers during procedures and patient care activities likely to generate splashes or sprays of blood or body fluids. A surgical mask

protects against microorganisms generated by the wearer, with >95% bacterial filtration efficiency, and also protects the health care worker from large-particle droplet spatter that might contain blood borne pathogens or other infectious microorganisms. The mask's outer surface can become contaminated with infectious droplets from spray of oral fluids or from touching the mask with contaminated fingers. If a mask becomes wet from exhaled moist air - the resistance to airflow through the mask increases. This situation causes more airflow to pass around edges of the mask. If the mask becomes wet, it should be changed between patients or even during patient treatment, when possible.

When airborne infection isolation precautions are necessary (e.g., for TB patients), a National Institute for Occupational Safety and Health (NIOSH)-certified particulate-filter respirator (e.g., N95, N99, or N100) should be used. N95 refers to the ability to filter 1- $\mu\text{m}$  particles in the unloaded state with a filter efficiency of >95% (i.e., filter leakage <5%), given flow rates of <50 L/min (i.e., approximate maximum airflow rate of a health care worker during breathing). Available data indicate infectious droplet nuclei measure 1--5  $\mu\text{m}$ ; therefore, respirators used in health-care settings should be able to efficiently filter the smallest particles in this range.

The majority of surgical masks are not NIOSH-certified as respirators, do not protect the user adequately from exposure to TB, and do not satisfy OSHA requirements for respiratory protection. However, certain surgical masks (i.e., surgical N95 respirator) do meet the requirements and are certified by NIOSH as respirators. The level of protection a respirator provides is determined by the efficiency of the filter material for incoming air and how well the face piece fits or seals to the face (e.g., qualitatively or quantitatively tested in a reliable way to obtain a face-seal leakage of <10% and to fit the different facial sizes and characteristics of different health care workers).

Respirators used while treating patients with diseases requiring airborne transmission precautions (e.g., TB), should be used in the context of a complete respiratory protection program. This program should include

training and fit testing to ensure an adequate seal between the edges of the respirator and the wearer's face.

## **Protective Clothing**

Protective clothing and equipment (e.g., gowns, lab coats, gloves, masks, and protective eyewear or face shield) should be worn to prevent contamination of street clothing and to protect the skin of health care workers from exposures to blood and body substances. OSHA blood borne pathogens standard requires sleeves to be long enough to protect the forearms when the gown is worn (i.e., when spatter and spray of blood, saliva, body fluids or contaminants to the forearms is anticipated). Health care workers should change protective clothing when it becomes visibly soiled and as soon as feasible if penetrated by blood or other potentially infectious fluids. All protective clothing should be removed before leaving the work area.

## **Infection Control Related to Diarrheal Diseases**

People crowded together in places such as in home health facilities are vulnerable to outbreaks of vomiting and diarrhea. These illnesses can be caused by many different germs including bacteria, parasites and, more commonly, viruses. One of the most common viruses that cause this illness are noroviruses (Norwalk-like viruses). Diagnosis of illness through collection and testing of specimens should always be undertaken by a physician to confirm the cause of an outbreak.

Various agents may cause diarrhea in patients and health care workers. Salmonella, Shigella, and Campylobacter species are among the common bacterial enteric pathogens. Infection with these agents may produce mild symptoms but is often accompanied by other symptoms, such as abdominal cramps, fever, or bloody diarrhea. Diarrheal illness accompanied by such symptoms suggests a bacterial cause. Rotavirus and the 27-nanometer (Norwalk and Norwalk-like) agents are among the chief causes of sporadic and epidemic viral gastroenteritis. Giardia lamblia and other protozoa are also frequent causes of diarrhea. Any of these agents

may be nosocomially transmitted via the hands of personnel who are infected.

If personnel contract an acute diarrheal illness accompanied by fever, cramps, or bloody stools, they are likely to be excreting potentially infective organisms in high titer in their feces. The specific cause of acute diarrhea, however, cannot be determined solely on the basis of clinical symptoms; thus, appropriate laboratory tests are important. Not allowing these persons to take care of patients pending evaluation will prevent transmission. Evaluation of personnel may usually be limited to an initial culture for bacterial pathogens and stool examination for intestinal protozoa; repeat studies may be indicated if the results of the first tests are negative and the illness persists.

### **Facts about Spread of Diarrheal Diseases**

People can become infected with germs that cause diarrhea by:

- Eating food or drinking liquids contaminated with diarrhea-causing germs.
- Touching surfaces or objects contaminated with the diarrhea-causing germs and then touching their own mouth, nose, or eyes.
- Sharing personal items such as towels and toothbrushes.
- Having contact with an infected person, for example, by:
  1. Being present while someone is vomiting
  2. Sharing food or eating from the same utensils
  3. Caring for a sick person
  4. Shaking hands with a person who did not wash hands after using the bathroom or changing a child or adult diaper
  5. Not washing hands after changing child or adult diapers or before eating or preparing food.

### **Infection Control Measures to Prevent the Spread of Diarrheal Diseases**

- Wash hands regularly with soap and water.
- Alcohol hand gels are an adequate substitute when soap and clean water are not readily available.

- Maintain a clean living environment.
- Maintain good personal hygiene.
- Follow good hygienic practices during food preparation.
- Do not share eating utensils or drinking containers.
- Do not share personal toilet articles such as toothbrushes or towels with anyone else.
- Facilities should be adequate to allow residents to bathe at least twice weekly.
- Laundry facilities should be available to allow appropriate laundering of clothes and bed linens.

### **Measures for sick persons**

If persons in the facilities are sick with diarrheal diseases, facilities staff should:

- Provide residents with information about gastroenteritis. Ask sick persons about the type and frequency of symptoms (including whether they have fever or bloody diarrhea) to determine if medical care is necessary.
- Separate sick persons from other residents until 24 hours after diarrhea and vomiting stop. Sick children should be accompanied by only one responsible adult. The same adult should stay with the child until 24 hours after symptoms stop. If possible, put them in a separate room or, alternatively, place sick people in a separate section of the facilities away from facilities residents who are not sick. Designated areas should have full time staff supervision to ensure that the area is properly cleaned and appropriately supplied.
- Designate toilets for use only by persons who are sick.
- Serve food to ill persons away from persons who are not sick, if possible.
- Provide residents with plastic bags (e.g., small bathroom trash can liners) to contain vomit and to dispose of diapers.
- Provide residents with supplies to clean up spills, especially vomit and stool.

### **Maintaining a clean living environment and disinfection of surfaces**

1) Wiping up areas soiled with vomit or stool.

- It is important to remove vomit and stool quickly because they may contain a large number of disease-causing germs and be highly contagious. The vomit or stool must be cleaned up before disinfecting, or the disinfectant will not work.
- Wear disposable gloves during cleaning. If you expect that liquid may splash, wear a disposable mask and cover gown or apron, if available.
- Do not use a vacuum cleaner to clean up vomit or stool. Wipe up the material with paper towels and dispose of used towels in a plastic garbage bag. Rinse areas with water.
- For carpeted areas, use absorbent materials such as kitty litter to absorb liquid, and dispose as above.
- Disinfect areas as instructed below.

2) Disinfecting surfaces (both routine and after cleaning a soiled area).

### **Hard surfaces**

Some germs can persist on hard surfaces and be a source of infection. Hard surfaces that are frequently touched, such as door knobs and hand rails, should be disinfected at least 3-4 times a day, if possible.

- Wear gloves.
- Use diluted household bleach (1000 ppm sodium hypochlorite or 5 tablespoons of 6% household bleach to 1 gallon of water).
- Wet surfaces with the diluted bleach allow the area to remain wet for 10 minutes, if possible.
- Allow to air dry.
- Remove gloves and discard in plastic bag.
- Wash hands with soap and water or use alcohol hand gel immediately after removing gloves.

### **Restrooms**

- Clean restrooms frequently; restrooms used by sick people should be cleaned hourly, if possible.
- Clean all fixtures of visible soil as necessary.

- Wipe surfaces with a disinfectant such as diluted household bleach (1000 ppm sodium hypochlorite or 5 tablespoons of 6% household bleach to 1 gallon of water).
- Pay particular attention to doorknobs, toilet seats, taps, etc.
- Allow surfaces to remain wet for 10 minutes, if possible.
- Allow to air dry.
- Remove gloves and discard in plastic bag.
- Wash hands with soap and water or use alcohol hand gel immediately after removing gloves.
- When diluting the disinfectants, wear eye protection to prevent splashes into the eyes.
- Chlorine solution is the disinfectant of choice. Household bleach without thickeners, scents, or additives should be used. Chlorine solutions can be made weekly, if in a bottle that no light passes through; otherwise, they should be made daily. Bottles should be labeled with the date and concentration of the solutions.

There are now products (e.g., Virkon S, NP9.0 Detergent Disinfectant, etc.) registered with the EPA that have label claims for either norovirus or its surrogate feline calicivirus; these products should be used per labeled instructions. Some commercially available disinfectants (e.g., VirkonS, Miiikro-Bak III, EcoTru, and Virox) have been used successfully in the past following outbreaks on cruise ships.

### **Other Measures to Keep Restrooms Clean and Prevent the Spread of Disease**

- Keep restrooms supplied with paper towels and hand soap.
- Post signs to remind people to wash hands after restroom use.
- If feasible, provide hands free exit from the toilet room, for example:  
By propping the doors open  
Or, by providing paper towels for use to open door.

### **Handling of Soiled Clothing and Linen**

Garments heavily soiled with stool should be handled carefully by wearing gloves, and placing garments in a plastic bag for disposal. If stool can easily be removed using toilet paper, the garment may be laundered as

described below. Lightly soiled clothing (stained by no solids attached) may be washed as described below.

- Wash clothing in a washing machine, preferably with hot water (temperature  $\geq 165^{\circ}\text{F}$ ).
- Use household detergents for washing clothing.
- Household bleach can be used in the rinse water.
- Dry clothes in a hot dryer (temperature  $\geq 171^{\circ}\text{F}$ ).
- There is no need to disinfect the tubs of washers or tumblers of dryers if cycles are run until they are completed.
- Hands should be washed with soap and water or cleaned with alcohol hand gel after handling soiled linens.

### **Handling of Household and Medical Waste**

- Contact local authorities to determine local requirements for disposal of household and medical waste (items soiled with vomit and stool, or other body fluids).
- Use trash receptacles lined with plastic bags accepted by local trash pickup that can be securely tied.
- Do not overfill bags.
- Place trash in an area separated from the living spaces, preferably in trash bins.
- Separate medical waste from household waste for pick-up; follow local guidelines for pick-up of medical waste.
- Have waste pick-ups scheduled frequently, daily if possible.
- Hands should be washed with soap and water or cleaned with alcohol hand gel after handling household or medical waste.

### **Measures for Food Service Operations**

Ensure that proper food safety and sanitation procedures are followed. Measures for prevention of cross-contamination during serving, hand hygiene, and cleaning of dining room surfaces are:

#### **Serving Food**

- Wash hands and/or use alcohol hand gel.
- Serve food in individual portions rather than shared “family-style”.

- Wear disposable gloves when serving food.

## **Hand Hygiene**

- Wash hands and/or provide alcohol hand gels.
- Food handlers should wash hands with soap and water before beginning work, and before returning to work from any toilet visit or break.
- Change gloves anytime soiled or non-food service surfaces or items are touched, e.g., the floor, their nose or mouth, dirty dishes, etc, and also after using the bathroom.

## **Cleaning of Dining Room Surfaces Such as Tables and Chairs**

- Clean surfaces frequently throughout the day, including at the beginning and end of meal service times.
- Clean visible soil from surfaces first.
- Wipe down cleaned surfaces with diluted household bleach solution (1000 ppm i.e., 5 tablespoons of 6% household bleach to 1 gallon of water) and allow to air dry.
- Persons cleaning should wear disposable gloves.
- Wash hands with soap and water or use alcohol hand gel immediately after removing gloves.

## **Monitor Caregivers for illness**

- Carefully monitor for worker health by providing a sign-in log for workers, staff, and volunteers attesting to health status and fitness to work with patients.
- Any worker with diarrheal illness should go home and not return until at least 24 hours after diarrhea and vomiting stop.

## Definition of Terms

*Alcohol-based hand rub.* An alcohol-containing preparation designed for application to the hands for reducing the number of viable microorganisms on the hands. In the United States, such preparations usually contain 60%-95% ethanol or isopropanol.

*Antimicrobial soap.* Soap (i.e., detergent) containing an antiseptic agent.  
*Antiseptic agent.* Antimicrobial substances that are applied to the skin to reduce the number of microbial flora. Examples include alcohols, chlorhexidine, chlorine, hexachlorophene, iodine, chloroxylenol (PCMX), quaternary ammonium compounds, and triclosan.

*Antiseptic hand wash.* Washing hands with water and soap or other detergents containing an antiseptic agent.

*Antiseptic hand rub.* Applying an antiseptic hand-rub product to all surfaces of the hands to reduce the number of microorganisms present.

*Cumulative effect.* A progressive decrease in the numbers of microorganisms recovered after repeated applications of a test material.

*Decontaminate hands.* To Reduce bacterial counts on hands by performing antiseptic hand rub or antiseptic hand wash.

*Detergent.* Detergents (i.e., surfactants) are compounds that possess a cleaning action. They are composed of both hydrophilic and lipophilic parts and can be divided into four groups: anionic, cationic, amphoteric, and nonionic detergents. Although products used for hand washing or antiseptic hand wash in health-care settings represent various types of detergents, the term "soap" is used to refer to such detergents in this guideline.

*Hand antisepsis.* Refers to either antiseptic handwash or antiseptic hand rub.

*Hand hygiene.* A general term that applies to either hand washing, antiseptic handwash, antiseptic hand rub, or surgical hand antisepsis.

*Hand washing.* Washing hands with plain (i.e., non-antimicrobial) soap and

water.

*Persistent activity.* Persistent activity is defined as the prolonged or extended antimicrobial activity that prevents or inhibits the proliferation or survival of microorganisms after application of the product. This activity may be demonstrated by sampling a site several minutes or hours after application and demonstrating bacterial antimicrobial effectiveness when compared with a baseline level. This property also has been referred to as "residual activity." Both substantive and non-substantive active ingredients can show a persistent effect if they substantially lower the number of bacteria during the wash period.

*Plain soap.* Plain soap refers to detergents that do not contain antimicrobial agents or contain low concentrations of antimicrobial agents that are effective solely as preservatives.

*Substantivity.* Substantivity is an attribute of certain active ingredients that adhere to the stratum corneum (i.e., remain on the skin after rinsing or drying) to provide an inhibitory effect on the growth of bacteria remaining on the skin.

*Surgical hand antisepsis.* Antiseptic hand wash or antiseptic hand rub performed preoperatively by surgical personnel to eliminate transient and reduce resident hand flora. Antiseptic detergent preparations often have persistent antimicrobial activity.

*Visibly soiled hands.* Hands showing visible dirt or visibly contaminated with proteinaceous material, blood, or other body fluids (e.g., fecal material or urine).

*Waterless antiseptic agent.* An antiseptic agent that does not require use of exogenous water. After applying such an agent, the hands are rubbed together until the agent has dried.

# **Infection Control Recommendations for Prevention of Transmission Diseases in Home Health, Medical and Clinical Care Facilities**



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