

Hand Hygiene: Challenges and Strategies

October 19, 2009 [0 Comments](#)

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Despite acknowledgement of the critically important role of hand hygiene in reducing the transmission of pathogenic microorganisms, overall compliance with hand hygiene is less than optimal in healthcare settings. This article addresses hand hygiene best practices, measuring compliance and considerations for improvement strategies. In this context, the term hand hygiene refers to handwashing, antiseptic handwashing, antiseptic hand rub or surgical hand antisepsis.¹

Opportunities for Transmission

Although they are a healthcare professional's most relied-upon tools, the hands are also among the most common conduits for infection. Hand hygiene is recognized as the single most important practice to reduce the transmission of infectious agents in healthcare settings.²

Opportunities for the transfer of microorganisms fall into three primary categories:³⁻⁴

1. Animate transmission. The healthcare worker comes into contact with an infected patient, does not perform appropriate hand hygiene and transfers the pathogen through touching another patient.
2. Inanimate transmission: An object, such as a stethoscope, is contaminated through contact with an infected patient, is not properly disinfected and is then used on another patient.
3. Animate and inanimate interaction: The hands of an infected patient touch and contaminate an object, which is then touched by a healthcare worker who does not perform hand hygiene before touching another patient.

Protective garments provide another opportunity for transfer of microbes. One study found that 65 percent of healthcare workers' gowns or uniforms were contaminated following routine morning care nursing activities. When caring for patients who have methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococci* (VRE) patients, 69 percent of lab coats were contaminated. Additionally, 27 percent of these healthcare workers contaminated their hands after touching their coats.⁵⁻⁶

Hand Hygiene Best Practices

Primary sources of guidance on hand hygiene are those published by the Centers for Disease Control and Prevention (CDC)⁷ and the World Health Organization (WHO).⁸ Although both reflect widely accepted best practices, a healthcare organization is best served by adopting one set of guidelines and doing so consistently. Hand hygiene best practices as recommended by the CDC's Guideline for Hand Hygiene in Health-Care Setting follow.⁷

The guideline maintains that hand hygiene should be performed when hands are contaminated with proteinaceous material, or are visibly soiled with blood or other body fluids. In such cases, hands should be washed with a non-antimicrobial soap and water, or with an antimicrobial soap and water. In all other clinical situations, routine decontamination should be performed on hands that are not visibly soiled by using an alcohol-based handrub.

Hands should be decontaminated before:

- Direct patient contact
- Inserting urinary catheters, peripheral vascular catheters or other invasive devices not requiring surgery
- Eating

- Donning sterile gloves when inserting a central intravascular catheter Hands should be decontaminated after:
- Contact with a patient's intact skin
- Contact with body fluids or excretions, mucous membranes, non-intact skin and wound dressings
- Contact with inanimate objects in a patient's immediate vicinity
- Removing gloves
- Using the toilet

As well, personnel should decontaminate hands during patient care when moving from a contaminated body site to a clean body site. Gloving is not a substitute for hand hygiene; healthcare workers should be trained on, and frequently reminded of, this distinction.

The prevalence of healthcare-associated diarrhea caused by *Clostridium difficile* has raised significant concerns regarding the capability of antiseptic agents to combat spore-forming bacteria. Unfortunately, none of the agents used in antiseptic handwash or hand-rub preparations (alcohols, chlorohexidine and iodophors) is reliably sporicidal, and is thus ineffective against *Clostridium* or *Bacillus* species. Washing with soap (non-antimicrobial or antimicrobial) can physically remove spores from the surface of contaminated hands. healthcare workers should be encouraged to wear gloves when caring for patients with *C. difficile*-associated diarrhea. As always, hands should be washed or disinfected after gloves are removed.

Other general recommendations:

- Artificial fingernails or extenders should not be worn while in direct contact with patients at high risk for infection.
- Gloves should be worn if there is a possibility of contact with blood or other potentially infectious materials, mucous membranes and other non-intact skin.
- Hand hygiene should always be performed following patient care and subsequent glove removal.

Guidelines for Technique

Handwashing with soap and water

- Wet the hands with water, apply soap and rub hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers. Some facilities place a clock with a second hand at the handwashing station
- Rinse and dry thoroughly with a disposable towel. Avoid use of hot water, as it may increase the risk of dermatitis.
- Use that towel to turn off the faucet before disposing.

Decontamination with an alcohol-based handrub

- Apply the handrub to the palm of one hand. Follow manufacturer's recommendations regarding the amount of product to use.
- Rub the hands together, covering all surfaces of the hands and fingers until the hands are dry.

Surgical hand antisepsis should be performed before donning sterile gloves in advance of performing a surgical procedure. Antimicrobial soap or an alcohol-based hand rub may be used.

Surgical hand antisepsis using antimicrobial soap

- Scrub hands and forearms for the duration recommended by the manufacturer (typically 2-6 minutes) before donning sterile gloves. Longer scrub times are not necessary.

Surgical hand antisepsis using a hand rub

- Pre-wash the hands and forearms.
- Follow manufacturer's instructions for using the rub.
- Allow hands and forearms to dry thoroughly before donning sterile gloves. A

Measuring Compliance

Despite the relative simplicity of the process, compliance with recommended hand hygiene best practices continues to lag. The CDC suggests mean baseline rates of 5 percent to 81 percent, with an overall average of 40 percent of personnel complying.⁷ Measurement is difficult, in part because the methods used for defining and measuring compliance vary among studies. Reports often fail to provide detailed information on methods and criteria.

The primary means of measuring compliance with hand hygiene rules and their relative merits are direct observation, self-reporting or surveys and product usage.⁹

Direct observation enables the observer to see which products are used and who is following guidelines. However, the method can be labor-intensive and costly. Also, apparent improvement can be due to the fact that the subject is aware of being observed (the Hawthorne Effect). Success relies on accurate calculation of adherence rates, which requires careful training of data collectors.

Self-reporting or surveys can yield valuable data regarding perceptions, attitudes and behavior, such as whether a worker's perception of hand hygiene behavior matches the perception of patients and family members. However, the method is limited because healthcare workers tend to overstate their level of compliance. This can be overcome to some degree by using a well-designed, carefully administered survey. Weinstein found that self-reporting yielded much higher rates of compliance than reporting by coworkers.¹⁰ Just over half of those surveyed reported compliance by colleagues; self-reporting suggested a compliance rate of 85 percent.

Product usage can be less time-consuming and less costly than the other methods, and is not subject to selection bias. However, data regarding who, how and when hand hygiene is being performed is not collected. Also, spillage/waste and use by non-healthcare workers may not be accounted for. In 2009, findings of a large (306 facilities) study found compliance in the intensive care unit (ICU) to be 26 percent at baseline and 37 percent after 12 months. In non-ICU areas, those numbers were 36 percent and 51 percent.¹¹

Because each method has its strengths and weaknesses, the Joint Commission recommends a strategy that combines measurement methods. A multiple method strategy makes it possible to validate results and increase the level of confidence in findings if similar results are obtained using different approaches.

Considerations for Improvement

Improving hand hygiene is a multi-factored challenge that should consider and reflect:

- Organizational/system characteristics such as the capacity of a facility to provide easy, convenient access to products; the role of leaders in setting policy, serving as role models, establishing accountability and celebrating success; and an organization's overall safety culture.
- Personnel factors such as staff knowledge, attitude, behavior, engagement and overall job satisfaction.
- Patient and family factors such as involvement and awareness, obstacles to compliance and the severity or acuity of the patient's illness.

- Environmental factors including regulatory requirements and oversight, organizational requirements, payment systems and reporting methods.
- Improvement strategies such as evaluation and training, audit and feedback, use of systematic performance improvement models, reminders and multidisciplinary teams.

No one-size-fits-all method for improving compliance has emerged, nor is one anticipated. Infection preventionists are advised to use a combination of strategies based on compliance challenges, nature of the work and workforce and organizational culture. It's essential to understand where your workplace is on the compliance continuum and craft a plan to close those gaps in view of demographics and culture.

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