Evidence-Based Approaches to Hand Hygiene: Best Practices for Collaboration

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**Historical perspective**

Hand hygiene is recognized by infection prevention and control experts as the single most important intervention in decreasing the spread of infection in both healthcare and community settings. Because the hands are vectors for transmission between people as well as inanimate objects such as environmental surfaces (i.e., blood pressure cuffs), it is critical to practice frequent hand hygiene using the traditional soap and water or an alcohol-based hand rub as appropriate.

The Centers for Disease Control and Prevention and World Health Organization both maintain extensive guidelines to inform healthcare providers about the proper practices of hand hygiene. Additionally, various quality and patient safety organizations such as the Institute for Healthcare Improvement and The Joint Commission have published ancillary resources to assist facilities with implementation of the latest evidence-based practices. A solid hand hygiene program with documented compliance will reduce risk for transmission of microorganisms to patients, reduce risk for healthcare worker colonization, and also reduce the mortality, morbidity and costs associated with treatment of healthcare-acquired infections.

**Indications for hand hygiene in healthcare settings**

The goal of hand washing and hand hygiene is to remove as many microorganisms from the hand as possible to avoid transmission. The skin flora is divided into two layers: transient and resident. The transient flora colonizes the most superficial layers of the skin (epidermis) and is fairly easily removed from the hand after thorough hand hygiene is performed.
According to the latest guidelines from the WHO, healthcare workers should practice proper hand hygiene before touching the patient, after touching the patient, after touching inanimate objects in the patient's surroundings, after exposure to bodily fluids and before clean/aseptic procedures.

**Transmission of microorganisms via the hands of healthcare workers**

The 2009 World Health Guidelines for Hand Hygiene for Healthcare Settings identifies five ways the nosocomial transmission of pathogens from one patient to another via a healthcare worker's hands can occur.

1. Microorganisms must be present on the patient's skin or have to be shed into the patient's environment such as nearby inanimate objects, such as the bedside table.
2. Microorganisms must be transferred to the hands of the healthcare worker.
3. The microorganisms that have contaminated the worker's hands must be able to survive on the hands.
4. The healthcare worker must either omit hand hygiene or inadequately perform it.
5. The healthcare worker's contaminated hands must come into direct contact with either another patient or with an inanimate object that will come into contact with a patient, such as a shared portable vital signs monitor.

**Factors influencing adherence to hand hygiene practices**

According to studies published by the WHO's Didier Pittet, MD, there are several factors that influence adherence to hand hygiene practices.¹

Observed risk factors for poor adherence to recommended hand-hygiene practices include:

- Physician status
- Male sex
- Nursing assistant
- Working in an intensive care setting
- Wearing gowns/gloves
- Automated sinks
- Activities associated with high risk of cross-contamination
- High number of opportunities for hand hygiene per hour of patient care
Self reported factors for poor adherence with hand hygiene include:

- Hand-washing agents cause irritation and dryness of the skin
- Sinks are not located in convenient locations
- Lack of soap and water and/or paper towels to dry the hands
- Too busy
- Understaffing
- Patient care needs take priority
- No administrative support
- Disagreement with the hand hygiene recommendations
- Low risk of acquiring infection from patients

**Availability of hand hygiene agents**

Hand hygiene products are available in a wide variety of forms to meet the specific clinical needs of the healthcare environment. Typical agents include plain (non-antimicrobial) soap, alcohols, chlorhexidine, chloroxylenol, hexachlorophene, iodine and iodophors, quaternary ammonium compounds or triclosan. The Food and Drug Administration classifies healthcare antiseptic drug products into three unique categories:

1. **Surgical hand scrubs** — an antiseptic containing preparation that substantially reduces the number of microorganisms on intact skin.
2. **Antiseptic hand washes** — antiseptics containing preparation designed for frequent use, reducing the number of microorganisms on intact skin to an initial baseline level after adequate washing, rinsing, and drying.
3. **Patient preoperative skin preparations** — fast-acting, broad-spectrum and persistent antiseptics containing preparation that reduce the number of microorganisms.

Most products currently available to healthcare workers in hospitals are alcohol-based as alcohol has significant activity against a wide variety of bacteria and viruses.

**Techniques for hand hygiene**

Soap and water is still considered the gold standard for hand hygiene. When using soap and water, it is important to wet the hands first. Then apply 3 to 5 mL of soap to the hands, avoiding bar soap. Next rub the hands together for a minimum of 15 seconds covering all
surfaces of the hands and fingers. Finally rinse the hands off with water, dry thoroughly with a paper towel and use the paper towel to turn off the faucet.

When soap and water is not available, alcohol-based hand rubs (wipes, gels, or foams) should be applied. When using an alcohol-based product, healthcare workers must completely follow the manufacturer’s label to ensure that the desired efficacy is reached.

Alcohol-based agents may be used in the following cases:

- When hands are not visibly soiled or contaminated with blood or body fluids
- Before direct contact with patients
- After direct contact with a patient’s skin
- After contact with bodily fluids or excretions, mucous membranes, broken skin or wound dressings
- When moving from a contaminated to a clean body site
- After contact with an inanimate environment (equipment or furniture near patient)
- After removing gloves
- Emergency situations where sinks are not available (EMS, Police, Fire Rescue) and hands are visibly soiled

When using agents containing alcohol, such as wipes, the entire surface of the hand must be covered by the product and allowed to dry prior to donning gloves. In order to maintain adequate moisture in the hands, it may be necessary to apply a healthcare-grade lotion, especially during the winter season.

Selection of hand hygiene agents

Hand hygiene agents must be carefully selected in order to ensure compliance, efficacy and safety for both the healthcare worker and patient. Several factors must be taken into consideration:

- Cost of the agent
- Ease of use for healthcare workers
- Potential for dermal irritation and skin reactions.
- Efficacy of the agent.
- Product availability and accessibility within the healthcare facility
- Drying time necessary after applying the agent
- Staff support for the selected product.
An evaluation of the agent should be done to assess the staff's application of the product and to ensure a smooth transition. In addition, adjuncts to prevent contact dermatitis such as hospital grade lotions must be considered to ensure a low risk for adverse events.²

**Strategies for compliance**

Monitoring of hand hygiene is a key component in improving processes and compliance. The use of "secret shoppers" has proven to be an effective measurement tool for some facilities, while others rely on different measures to gauge compliance. Monitoring should be conducted on a routine basis and documented. Any personnel not compliant with the hand hygiene standards should be immediately counseled to ensure prompt remediation. The IHI has created an entire resource guide centered on the proper methods of monitoring hand hygiene and judging compliance.

**Appropriate placement of hand hygiene products**

All too often, the hands of the patients and/or residents are neglected while in a healthcare facility. The contaminated hands of the patient can serve as not only a source for transmission, but also as a reservoir for microbial growth. The acuity of many of today's hospitalized patients is extremely high, with some completely non-ambulatory and confined to bed. Hand hygiene dispensers located on a wall away from the patient are not ideal for situations where the patient may not be able to walk to the dispenser. It is critical to place hand hygiene solutions at the point-of-care and use, which in many cases is directly at the patient's bedside. This will improve compliance for patient hand hygiene, and more importantly serve as a constant reminder of the importance of hand hygiene for all that are involved with the care of the patient. Healthcare providers should encourage not only the patient, but also their family members and visitors, to regularly practice hand hygiene frequently when indicated to minimize contamination and potential transmission.

**Resources for success**

Several organizations provide free resources to healthcare providers to assist with compliance of hand hygiene standards. For instance, WHO has hundreds of resources including scientific evidence to support their recommendations for hand hygiene, as well as easy-to-use implementation guides and training materials that can be adapted for use in any healthcare setting. This resource can be accessed by visiting the WHO website at [www.who.int](http://www.who.int). Additionally, The CDC has several key resources and a dedicated web course on hand hygiene for healthcare providers. This resource can be access by visiting the CDC website at [www.cdc.gov](http://www.cdc.gov).
Hand hygiene is not only the most important infection prevention practice that both healthcare workers and patients can perform, but it is among the simplest and most cost-effective. A lack of proper hand hygiene can have a severely detrimental effect on both patient mortality and finances.

Footnotes:


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