

Hand hygiene: at a glance

Written by

Claire Ford - Lecturer, Adult Nursing, Northumbria University

&

Laura, J. Park - Graduate Tutor, Adult Nursing, Northumbria University

This article will:

- Raise awareness of the importance of hand hygiene and skin health.
- Demonstrate the correct techniques for hand washing and hand decontamination.

Hand hygiene

One of the most common means of transmission that is found within healthcare environments is touch; directly by shaking someone's hand or indirectly by touching an object that has previously been touched by another. Consequently, hands can be populated with an enormous number of microorganisms, which can be inadvertently transferred from surface-to-surface, or person-to-person. Hands are colonised by two types of microorganisms, transient and resident. Transient microorganisms are found on the skin surface, can move around and are readily acquired from contact with other body sites, people, and the environment; thus, they are easily transferred to others. Resident microorganisms are the normal skin flora, which are found in the deeper skin layers, hair follicles and sweat glands; thus, they are more difficult to remove. The World Health Organisation (WHO) (2009a) highlight that within healthcare environments there are five key moments when the transfer of microorganisms can take place (see diagram 1), and Loveday *et al.* (2014) also advocates a further moment after removing personal protective equipment. Therefore, hand hygiene, which is seen as the single most important factor in

reducing and preventing infection, should be a key priority for every healthcare practitioner (WHO, 2009a).

There are several varieties of hand hygiene products, which can be utilised. Hands can be washed with liquid soap, antiseptic and antimicrobial solutions, antiseptic hand wipes, or cleansed with alcohol hand solutions (National Institute for Health and Care Excellence (NICE), 2012). Washing with soap, which has been traditionally recognised as the best way to decontaminate hands, removes transient microorganisms and makes the hands socially clean. Antiseptic solutions, such as chlorhexidine and iodine, have been shown to have a residual effect, often continuing to work after they have been applied and reducing both transient and resident microorganisms. Therefore, they are routinely used before surgery, invasive procedures and during outbreaks of infections. More recently, alcohol hand gel has proven to be a very effective product that can be used alongside, or in some cases as an alternative, to the use of soap and water (Gould *et al.*, 2010). NICE (2012) and Loveday *et al.* (2014) claim alcohol can be routinely used, as it kills both transient and resident microorganisms, is quicker to use, does not require washing facilities, and can be provided at the point of care. However, although alcohol gel is an effective product for decontaminating hands, it is imperative that healthcare workers fully understand when alcohol gel is not appropriate to use, i.e. when hands are visibly soiled, if the patient has *Clostridium Difficile*, a gastrointestinal infection or if faecal to oral transmission is possible (Kozier *et al.*, 2012).

Hand health

Skin, which is the largest, and principle organ of the body, is a multifunctional membrane structure, with a primary role in protecting the body surface from pathogens (Patton and

Thibodeau, 2018). The skin is comprised of three layers, the epidermis, dermis and hypodermis (subcutaneous) all of which are subdivided into additional layers (see image 2) (WHO, 2009a). The outermost layer is the epidermis, which every 30-35 days, is regularly replaced and renewed, by process of replication and detachment (Boore, Cook and Shepherd, 2016). The most outward sublayer of the epidermis is the stratum corneum, and it is this layer which is routinely exposed to environmental elements, such as physical, chemical and microbial assaults (Langoen and Bianchi, 2013). These can lead to irritation, dehydration and damage to the delegate structures of the stratum corneum, reducing the skins ability to protect against infectious agents. Therefore, it is necessary for healthcare professionals to regularly inspect their fingers, nails, hands and forearms, to ensure that the protective stratum is in good health, as open wounds and cuts on the skin act can serve as a portal of entry for infectious agents. If hands are dry, hand cream should regularly be applied, and if skin irritation and excoriation is present, advice must be sought from occupation health or a general practitioner, as alternative hand hygiene products, such as alcohol-based hand rubs containing humectants, may be required (WHO, 2009a; NICE, 2012; Weston, 2013).

Hand washing preparation

Before hands are washed, it is essential that additional precautions are undertaken in order to increase the efficiency and effectiveness of the hand washing procedure. The following information has been collated by Northumbria University staff in response to questions asked by students during hand washing teaching sessions.

1. Why is it important to be bare below the elbow?

Being bare below the elbow is necessary in order to ensure adequate washing of the wrists and forearms (if required). Sleeves of clothing, jewellery and watches also

pose a risk, as they act as temporary reservoirs and increase the possibility of cross-contamination (NICE, 2012; Doherty and Lister, 2015).

2. *What happens if I don't dry my hands properly?*

Ensuring hands are thoroughly dried is vital, as microorganisms thrive in a warm moist environment and inadequate drying may cause damage to the stratum corneum (WHO, 2009a; Doherty and Lister, 2015).

3. *Can I wear acrylic or false nails?*

Firstly, longer nails increase the surface area for organisms to reside. Secondly, microorganisms can often become trapped between the two surfaces, and lastly, they may hinder the washing technique due to their length (Loveday *et al.*, 2014; Doherty and Lister, 2015).

4. *Why do I need to remove nail varnish?*

Due to wear and tear, sections of the varnish can flake and fall off, leaving ridges along the surface of the varnish that can harbour microorganisms. A top tip would be to carry some nail varnish remover in your handbag or keep some in your work locker (WHO, 2009a; Doherty and Lister, 2015).

5. *Why do rings need to be removed?*

Rings, especially with stones, have an irregular surface area, and these ridges can act as a reservoir for potential pathogens (NICE, 2012; Doherty and Lister, 2015). Due to the stones and irregular shapes, they are also difficult to clean. It is good practice to remove all jewellery whilst in clinical practice. **N.B. Some Trusts allow plain wedding bands and other religious jewellery.**

6. *How long does hand washing take?*

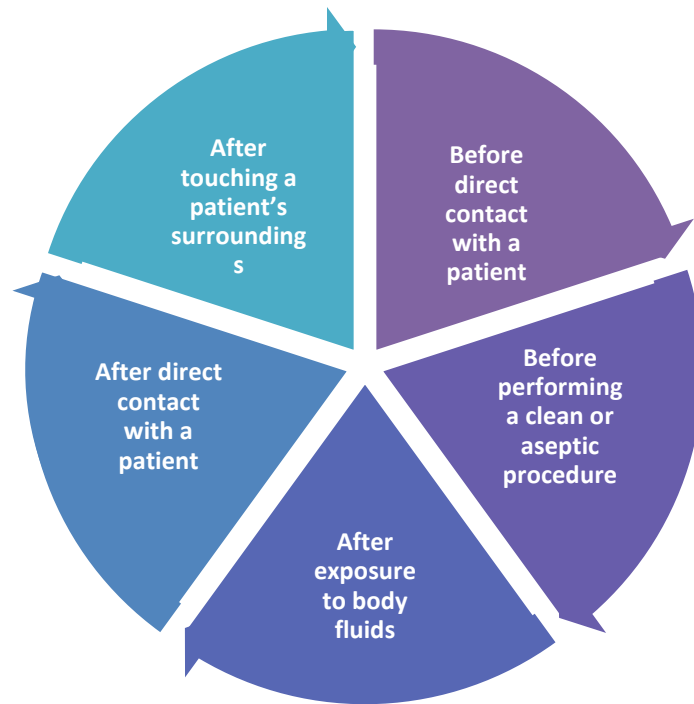
Hand washing, using the appropriate technique, should take 40-60 seconds and application of hand rub should take 20-30 seconds (WHO, 2009b).

How to decontaminate hands using liquid soap [BJN, please tabulate this procedure]

Hand decontamination is the easiest and most effective way of preventing the spread of infection. This has resulted in the clinical skill of hand washing becoming a popular scholarly topic and recognised as a significant fundamental principle of infection control (NICE, 2012). The following will focus on the hand washing technique, which should be performed by all healthcare professionals in all clinical areas.

1. Ensure that you are bare below the elbow (figure 8.1).
2. Turn on the taps and adjust the water temperature, so the water is tepid.
3. Wet your hands thoroughly with water before applying the liquid soap
4. Rub your hands palm to palm, (figure 8.2) then place your right hand over the left with fingers interlaced, then reverse the procedure for the other hand (figure 8.3).
5. Rub your hands palm to palm with fingers interlaced (figure 8.4).
6. Rub the back of your fingers with the opposing palm (figure 8.5).
7. Rub each thumb with the opposite hand (figure 8.6).
8. With clasped fingers, rub your palm in a circular motion (figure 8.7).
9. Finally, rub your wrists (figure 8.8).
10. Rinse hands thoroughly without touching the sink, and turn off the tap with your elbows.
11. Dry hands carefully thoroughly from fingertips to wrist.

Diagram 1



(WHO, 2009a and Loveday *et al.*, 2014).

Image 2

Please insert a diagram of the skin layers.

Images for handwashing (the below images are the property of Northumbria University, and we give permission to the BJN to use these in this publication)

Image 3.1



Image 3.2



Image 3.3



Image 3.4



Image 3.5



Image 3.6



Image 3.7



Image 3.8



References:

- Boore, J., Cook, N. and Shepherd, A. (2016) *Essentials of anatomy and physiology for nursing practice*. London: Sage.
- Dougherty, L. and Lister, S. (2015) *The Royal Marsden manual of clinical nursing procedures*. 9th edn. Chichester: John Wiley & Sons Ltd.
- Gould, D., Moralejo, D., Drey, N. and Chudleigh, J. H. (2010) 'Interventions to improve hand hygiene compliance in patient care', *Cochrane Database Syst Rev*, 9, CD005186.
- Kozier, B., Erb, G., Berman, A., Snyder, S., Harvey, S. and Morgan-Samuel, H. (2012) *Fundamentals of Nursing: Concepts, process and practice*. 2nd edn. Edinburgh: Pearson Education Limited.
- Langoen, A. and Bianchi, J. (2013) 'Maintaining skin integrity', in Flanagan, M. (ed.) *Wound healing and skin integrity: principles and practice*. West Sussex: Wiley, pp. 18-30.
- Loveday, H.P., Wilson, J.A., Pratt, R.J., Golsorkhi, M., Tingle, A., Bak, A., Browne, J., Prieto, J. and Wilcox, M. (2014) 'epic3: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England', *Journal of Hospital Infections*, 86S1, pp. S1-S70.
- National Institute for Health and Care Excellence (NICE) (2012) *Prevention and control of healthcare-associated infections in primary and community care*. London: NICE.
- Patton, K. T. and Thibodeau, G. A. (2018) *The human body in health and disease*. 7th edn. Missouri: Elsevier.

- Weston, D. (2013) *Fundamentals of infection prevention and control: Theory and practice*. 2nd edn. West Sussex: Wiley.
- World Health Organisation. (2009a) *WHO guidelines on hand hygiene in health care*. Geneva: World Health Organisation.
- World Health Organisation. (2009b) *Hand Hygiene: When and How*. Geneva: World Health Organisation.