Hand Hygiene

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Conflict of Interest Disclosure Statement

- Dr. MacNeill reports no conflicts of interest associated with this course. She has no relevant financial relationships to disclose.
- Dr. Huber is a member of the dentalcare.com Advisory Board and has no relevant financial relationships to disclose.

Introduction – Hand Hygiene

This course presents the background essential to understand the importance of hand hygiene in healthcare settings and provides evidence based information related to handwashing; hand antisepsis, i.e., antiseptic handwash and antiseptic handrub; and surgical hand antisepsis.

Course Contents

Overview

The transmission of pathogens most often occurs via the contaminated hands of healthcare personnel (HCP). Accordingly, hand hygiene is one of the most important infection prevention measures to reduce the risk of healthcare-associated infections (HAIs). Oral healthcare facilities are accountable for establishing a system in which oral HCP have the knowledge, competence, time, and tools to practice effective hand hygiene; and oral HCP have the duty to properly perform hand hygiene as indicated.

Learning Objectives

Upon completion of this course, the dental professional should be able to:

- Discuss the relevance resident and transient microorganisms in reference to hand hygiene.
- Discuss the criteria for the transmission of healthcare-associated pathogens in reference to hand hygiene.
- Understand the role of detergents and antiseptic agents in reference to hand hygiene products.
- Understand the indications for and demonstrate handwashing, antiseptic handwash, and surgical hand antisepsis.
- Discuss considerations when purchasing hand hygiene products.
- Discuss irritant contact dermatitis and allergic contact dermatitis as they relate to hand hygiene.
- Discuss strategies to improve hand hygiene practices.
- Discuss hand hygiene-related basic expectations for safe care.

Introduction

Microbes recovered from hands can be divided into two categories: transient and resident organisms. Transient microorganisms tend to colonize the superficial layers of skin and while they are amenable to removal by washing hands with plain (i.e., non-antimicrobial) soap and water, they are responsible for most HAIs. Resident organisms are attached to deeper layers of the skin and while they are more resistant to removal, they are less likely to be associated with HAIs.

Hand surfaces harbor >150 unique resident bacterial phylotypes and as many as 4742 transient phylotypes have been identified. The number of resident and transient organisms on the hands of HCP vary greatly, yet it is often relatively constant for any one individual.1 The hands of HCP may become persistently colonized with transient pathogenic organisms (e.g., S. aureus, gram-negative bacilli, or yeast). HCP may acquire transient microorganisms during:

1. contact with a patient's intact skin (e.g., when taking a pulse or blood pressure),
2. contact with nonintact skin and mucous membranes,
3. direct contact with blood and other potentially infectious material (OPIM); and
4. contact with contaminated instruments, equipment, and environmental surfaces.

The transmission of healthcare-associated pathogens from one patient to another via the hands of HCP must meet 4 criteria:[2,3]

- Organisms present on the patient's skin or mucous membranes, or on contaminated instruments, equipment, and environmental surfaces must be transferred to the hands of HCP.
- The organisms transferred must then be capable to survive for at least several minutes on the hands of HCP.

- Hand hygiene by HCP must be inadequate or omitted entirely, or the agent used for hand hygiene is inappropriate.
- The contaminated hands of HCP must come in direct contact with another patient, or with an inanimate object that will come into direct contact with the patient.

Standard Precautions mandate that HCP wear gloves.[2-4] However, simply wearing gloves does not provide complete protection against cross-infection. Bacterial flora colonizing patients have been recovered from the hands of ≥30% of HCP who wore gloves during patient contact.[5-9] Since pathogens can be transmitted via small defects in gloves or by contamination of the hands during glove removal, wearing gloves does not eliminate the need for appropriate hand hygiene practices.[9-10]

Excerpts published by the CDC in 2016 from the Guidelines for Infection Control in Dental Health-Care Settings – 2003 emphasize that oral HCP must perform hand hygiene with either a non-antimicrobial or an antimicrobial soap and water when hands are visibly soiled; otherwise, the preferred method of hand hygiene in clinical situations is with an alcohol-based handrub; and when performing surgical procedures oral HCP must perform surgical hand antisepsis.[3]

Hand Hygiene

Hand hygiene is a general term that applies to (1) handwashing; (2) hand antisepsis, i.e., antiseptic handwash and antiseptic handrub; and (3) surgical hand antisepsis.[2,3,11] Performing hand hygiene is indicated (1) when hands are visibly soiled, (2) after barehanded touching of inanimate objects likely to be contaminated by blood and OPIM such as saliva or respiratory secretions, (3) before and after treating each patient, (4) before donning gloves, and (5) immediately after removing gloves.

Products used for hand hygiene in healthcare settings include detergents and antiseptic agents. **Detergents** contain esterified fatty acids and sodium or potassium hydroxide and are often referred to as "soaps." Plain soap does not contain an antimicrobial agent or contains only such a low concentration that it is effective solely as a preservative.[2] The cleaning activity of plain soap results in the removal of dirt, soil, and various organic substances from the hands.

Antiseptic agents (Table 1) in hand hygiene products used in healthcare settings should (1) have a broad spectrum, (2) be fast acting, reduce the number of microorganisms on intact skin to an initial baseline level (i.e., by 2-log10 or 99% on each hand within 5 minute after the first use of the product and by 3-log10 or 99.9% on each hand within 5 minutes after the tenth use) after adequate washing, rinsing and/or rubbing and drying; and (3) should have persistent or residual activity.[2,12]

Persistence is characterized by prolonged antimicrobial activity that prevents or inhibits the survival or proliferation of microorganisms after application of the product. Some antiseptic products also demonstrate substantivity, i.e., they adhere to the stratum corneum of the skin and continue to provide an inhibitory effect on microbial growth after rinsing or drying. However, substantivity is not an absolute requirement for an agent to lower the number of bacteria following hand hygiene.

The FDA classifies antiseptic agents as Category I, II, or III. Category I agents are generally recognized as safe and effective; Category II agents are not generally recognized as safe and effective; data on Category III agents are insufficient to classify as safe and effective. Based on available evidence, the FDA concluded that only ethanol, 60 to 95% formulations; and povidone iodine, 5 to 10% formulations, meet the test and product labeling requirements as antiseptic agents.[12]

Handwashing

Handwashing is defined as washing hands with water and plain soap, i.e., a detergent (esterified fatty acids and sodium or potassium hydroxide) that does not contain an antimicrobial agent or contains low concentrations of antimicrobial agents that are effective solely as preservatives. The cleaning activity of plain soap is attributed to its detergent properties, which result in removal of dirt, soil, and various organic substances from the hands.

Table 1. Microbial spectrum of various antiseptic agents.*

Class	Gram-positive bacteria	Gram-negative bacteria	MBT[1]	Viruses	Fungi	Onset of action
Ethanol (60 to 95%)	+++	+++	+++	+++	+++	Fast
Iodophors (5 to 10%)	+++	+++	+	++	++	Intermediate
Chlorhexidine (2 to 4%)	+++	++	+	+++	++	Intermediate
Phenol derivatives	+++	+	+	+	+	Intermediate
Quaternary ammonium compounds	+	++	-	-	+	Slow

Note: [1]*Mycobacterium tuberculosis*
+++ = excellent; ++ = good; + = fair; - = no activity or not sufficient
*Hexachlorophene and triclosan are not included because they are no longer acceptable ingredients in hand disinfectants.

Handwashing removes loosely adherent transient microorganisms and is indicated when (1) hands are visible soiled with blood, and/or other potentially infectious material, (2) before eating, (3) after using a restroom, (4) after caring for patients colonized with *Clostridioides difficile*, (5) following suspected or proven exposure to *Bacillus anthraces*, and (6) as part of two-stage surgical hand antisepsis, i.e., handwashing followed by the application of an alcohol-based hand scrub.[2,13]

When performing handwashing (Figure 1), wet hands with water. Follow the manufacturer's recommendations regarding the volume of soap to be used. Bar, liquid, foaming, leaflet, or powdered forms of plain soap are acceptable. When bar soap is used, the soap should be small and stored in a soap rack that facilitates drainage. Occasionally, plain soaps have become contaminated with gram-negative bacilli and have caused outbreaks of nosocomial infections.[14]

Following handwashing, the hands must be dried thoroughly with a single-use towel. It is of note that organisms are transferred in much larger numbers from wet versus dried hands.6 Multiple-use cloth towels are not recommended for use in healthcare settings. Antimicrobial-impregnated wipes (i.e., towelettes) may be considered as an acceptable alternative to handwashing; however, the use of towelettes is not an acceptable alternative to hand antisepsis or surgical hand antisepsis.

Anitseptic Handwash

Povidone iodine, 5 to 10% formulations, is considered safe and effective for use in antiseptic handwash.[15] Povidone iodine is an iodophor composed of elemental iodine, iodide or triiodide, and a polymer carrier. The amount of free iodine

Figure 1. How to Handwash when Hands are Visibly Soiled?

Figure 2. How to Handrub when Hands are not Visibly Soiled?

determines its level of antimicrobial activity.[16] Iodine molecules rapidly penetrate the microbial cell wall resulting in impaired protein synthesis and disruption of the cell membrane. The extent of persistent antimicrobial activity is unclear.[2]

Antiseptic handwash (Figure 1) removes or destroys transient microorganisms and reduces the resident hand flora.[2] It is an acceptable alternative to handwashing when the hands are visibly soiled. However, when the hands are not visibly soiled, the use of an alcohol-based handrub (Figure 2) is preferred.[2,13,15] The concomitant use of an alcohol-based handrub and povidone iodine is contraindicated and the use of antimicrobial-impregnated wipes (i.e., towelettes) are not acceptable for antiseptic handwash.

Antiseptic Handrub

Antiseptic handrub is defined as applying a waterless antiseptic agent (i.e., an antiseptic agent such as alcohol that does not require the use of exogenous water) to the hands. The FDA classifies ethanol, 60 to 95% formulations, as a Category I agent.[12] The antiseptic activity of ethanol is attributed to its ability to denature proteins.[17] Ethanol, 60-95% (expressed as percent by volume) is more effective than higher concentrations because proteins are not denatured easily in the absence of water.

Antiseptic handrub removes or destroys transient microorganisms and reduces the resident flora.[2,13] The CDC and the WHO have concluded that an antiseptic handrub is more effective than handwashing or an antiseptic handwash and is recommended for routine hand hygiene in clinical situations when the hands are not visibly soiled.[2,12,13] As noted earlier, the concurrent use of an alcohol-based handrub and an iodophor-based antimicrobial soap is contraindicated.

Follow the manufacturers' recommendations regarding the volume of product to be used and perform antiseptic handrub for 20 to 30 seconds according to the technique described in Figure 2. Alcohol-based liquids, gels, or foam formulations are all acceptable. Contamination of alcohol-based products is remote.[18] Alcohol-based handrub products are flammable and should be stored away from high temperatures (flash points range from 210°C to 240°C) or flames.[19]

Surgical Hand Antisepsis

The CDC concluded that performing surgical hand antisepsis by scrubbing the hands/forearms with a brush for 10 minutes can damage skin and result in increased shedding of microorganisms from the hands; scrubbing for 5 minutes is as effective as scrubbing for 10 minutes; scrubbing for 2 to 3 minutes reduces microbial counts to an acceptable level; and that neither a brush nor a sponge is necessary to reduce microbial counts on the hands of surgical personnel.[2]

The FDA, the CDC, and the WHO recommend performing either (Option-1) a two-stage surgical hand antisepsis, i.e., handwashing with plain soap and water followed by antiseptic handrub, preferably with an alcohol-based formulation containing 0.5% to 1% chlorhexidine gluconate for persistent residual activity; or (Option-2) surgical antiseptic handwash with povidone iodine.[2,3,11,13] The use of antimicrobial-impregnated wipes (i.e., towelettes) in surgical hand antisepsis is inappropriate.

Option 1 – Two-stage surgical hand antisepsis

Stage I steps:

1. Remove rings, watches, and bracelets before beginning surgical hand antisepsis.
2. Remove debris from underneath fingernails using a nail on the other hand.
   a. Natural nails should be kept short (tips < 0.5 cm long).
   b. Artificial fingernails or extenders should not be worn
3. Wet hands and forearms with warm running water.
4. Apply plain soap to hands and forearms.
5. Wash hands and forearms by rubbing vigorously (frictional scrub) - see Figure 1.
   a. Usually 40 to 60 seconds.
6. Dry hands and forearms thoroughly with a single-use towel.
   a. Use towel to turn off the faucet.

Stage II steps:
1. Apply enough alcohol-based product to the palm of one hand to cover all surfaces (hands/forearms).
2. Rub hands and forearms vigorously (frictional scrub) until dry – see Figure 2.
   a. Usually 20 to 30 seconds
3. When hands and forearms are dry, don sterile surgical gloves.

Option 2 - Surgical antiseptic handwash

Steps:
1. Remove rings, watches, and bracelets before beginning the surgical hand antisepsis.
2. Remove debris from underneath fingernails using a nail on the other hand.
   a. Natural nails should be kept short (tips <0.5 cm long).
   b. Artificial fingernails or extenders should not be worn.
3. Wet hands and forearms with warm running water.
4. Apply a 5 to 10% povidone iodine formulation to hands and forearms.
5. Wash the hands and forearm by rubbing vigorously (frictional scrub) – see Figure 1.
   a. Usually 2 to 5 minutes.
6. Rinse hands and forearms with warm running water.
7. Dry hands and forearms thoroughly with a single use towel.
   a. Use towel to turn off faucet.
8. When hands and forearms are dry, don sterile surgical gloves.

Other Considerations in the Selection of Hand-Hygiene Products

The cost of hand hygiene products should not be the primary factor influencing product selection; however, the routine use of an alcohol-based handrub is more cost effective than the use of an antimicrobial soap and water handwash.[20] When making purchasing decisions consider the general reliability of the dispenser system; the functional reliability to deliver an appropriate volume of the product; and, for alcohol-based formulations, confirm that the container is flame-resistant.

When selecting a plain soap, an antimicrobial soap, or an alcohol-based handrub solicit information from manufacturers regarding any known interactions between the hand hygiene products, skin care products, and the type of gloves used in the healthcare setting; and the risk of product contamination. Hand-care products should be stored in disposable/reusable closed containers. Never "top off" partially empty soap dispensers as it can lead to bacterial contamination of the content.

HCP should be provided with hand hygiene products of proven efficacy that have low irritability potential and with compatible hand lotions to minimize the occurrence of irritant contact dermatitis. To maximize acceptance of hand hygiene products solicit input from HCP regarding fragrance (smell), consistency ("feel"), skin tolerance, and color. Formulations with strong fragrances may be poorly tolerated by HCP and patients with respiratory allergies.

Irritant Contact Dermatitis

The most common reaction associated with the frequent and repeated use of hand-hygiene products is irritant contact dermatitis (ICD). ICD is a non-immunologically mediated dermatitis characterized by dryness, itchiness, or burning; the skin may feel "rough;" and appear erythematous, scaly, or fissured. These signs and symptoms of ICD are similar to those associated with allergic contact dermatitis (ACD), which can be ruled out by allergy testing.

Detergents damage skin by (1) denuding the stratum corneum, (2) depleting or reorganizing intracellular lipid moieties, (3) decreasing corneocyte cohesion, and (4) decreasing the water-binding capacity of the stratum corneum.[21] Other factors that contribute to ICD include using hot water, physically stripping the stratum corneum while scrubbing, drying with coarse paper towels, the shear forces associated with donning and removing gloves, and low relative humidity (winter months).

ICD may also be caused by the antimicrobial agent or by other ingredients in a product. ICD is most commonly reported with iodophors. Following an exhaustive review of available data, the CDC concluded that alcohol-based handrubs are the safest antiseptics available and ethanol is usually less irritating than

isopropanol.16 However, washing hands after each use of an alcohol-based handrub may contribute to ICD and is recommended only after 5 to 10 applications of an alcohol-based handrub.

Allergic Contact Dermatitis

Allergic contact dermatitis (ACD) is a T cell-mediated delayed hypersensitivity reaction (Gell and Coombs Type IV). It is caused primarily by fragrances and preservatives; and less commonly by emulsifiers found in hand-hygiene products.[22,23] Iodophors may cause ACD, but ACD with alcohol-based products is uncommon.[19,23,24] ACD usually begins as a rash, redness, and itching that may progress to oozing skin blisters and may spread to areas of skin untouched by the product.

Strategies to Improve Hand Hygiene Practices

The Institute for Healthcare Improvement in its How-to Guide: Improving Hand Hygiene recommends a multidimensional approach (e.g., introduction of alcohol-based handrub, and educational and behavioral initiatives) to improve compliance with hand hygiene guidelines in healthcare settings.[25] The science supporting a multidimensional approach to hand hygiene is sufficiently established to be considered the standard and consist of four components:[2,3,11]

1. HCP demonstrate knowledge
   a. Predicated on educational exposure, HCP understand the rationale for hand hygiene:
      i. Types of patient care activities that result in hand contamination.
      ii. Relative advantages and disadvantages of handwashing and the use of alcohol-based handrubs at the point of care
      iii. Important role that contaminated hands play in transmission of healthcare-associated pathogens, including multidrug-resistant organisms.
      iv. Morbidity and mortality caused by HAIs.
2. HCP demonstrate competence
   a. Predicated on exposure to live demonstrations, video-presentations, and/or fluorescent dye-based training methods, HCP perform appropriate hand hygiene:
      i. Correct technique for handwashing, hand antisepsis, and surgical hand antisepsis
      ii. Application of an appropriate volume of alcohol-based handrub, or a plain or antiseptic soap.
3. Institution enables staff
   a. Predicated on institutional commitment to good hand hygiene practices:
      i. Alcohol-based handrub and gloves of various sizes are readily available to HCP near the point of use.
      ii. Alcohol-based hand rub dispensers available in locations that are compliant with local and federal fire safety regulations.
      iii. Established protocol with responsibility assigned for checking alcohol-based hand rub dispensers and glove boxes on a regular basis to ensure that (a) dispersers and glove boxes are not empty, (b) dispersers are operational, and (c) containers dispense the correct amount of the product.
      iv. Evaluated the design and function of dispensers before selecting a product for use since poorly functioning dispensers may adversely affect hand hygiene compliance rates.
4. Institution verifies competency of HCP and provides feed back
   a. Predicated on an established program to monitor that hand hygiene is performed and gloves are used appropriately by HCP as recommended by the CDC:
      i. Routinely using alcohol-based handrub when hands are not visibly soiled.
      ii. Washing hands with plain or antimicrobial soap and water when hands are visibly dirty or contaminated with proteinaceous material or with blood and other potentially infectious material.
      iii. Wearing gloves when contact with blood or OPIM (all body fluids, excretions, secretions [except sweat]), mucous membranes, and nonintact skin could occur

Hand Hygiene-related Basic Expectations for Safe Care

The Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care published by the CDC in 2016 includes an Infection Prevention Checklist for Dental Settings (*Appendix A*).[11] The Infection Prevention Checklist, Section I.5, Hand Hygiene, provides a tool to monitor institutional compliance with administrative measures and Section II.1, Hand Hygiene is Practiced Correctly, is an evaluation tool to monitor compliance by direct observation of oral HCP.

Summary

The most effective hand hygiene technique, if the hands are not visibly soiled, is the routine use of an alcohol-based handrub. Alcohol-based handrub has been shown to be more effective in reducing the number of viable bacteria, viruses, and fungi on hands than a plain or an antimicrobial soap and water; require less time to use; can be made available at the point of care; cause less hand irritation and dryness with repeated use; and improves compliance with hand hygiene standards.

The most effective hand hygiene technique, if the hands are not visibly soiled, is the routine use of an alcohol-based handrub. Alcohol-based handrub has been shown to be more effective in reducing the number of viable bacteria, viruses, and fungi on hands than a plain or an antimicrobial soap and water; require less time to use; can be made available at the point of care; cause less hand irritation and dryness with repeated use; and improves compliance with hand hygiene standards.

Course Test Preview

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1. All of the following statements related to microbial contamination of hands are correct, EXCEPT for one. Which one is the exception?

A. Microbes recovered from hands can be divided into two categories: transient and resident organisms.
B. Transient microorganisms tend to colonize the superficial layers of skin and while they are amenable to removal by washing hands with plain (i.e., non-antimicrobial) soap and water, they are responsible for most HAIs.
C. Resident organisms are attached to deeper layers of the skin and while they are more resistant to removal, they are less likely to be associated with HAIs.
D. Transient microorganisms tend to colonize the superficial layers of skin and are rarely responsible for an HAI.

2. All of the following statements related to the transmission of healthcare-associated pathogens from one patient to another via the hands of HCP are correct, EXCEPT for one. Which one is the exception?

A. Organisms present on the patient's skin or mucous membranes, or on contaminated instruments, equipment, and environmental surfaces and contaminate the hands of HCP.
B. Organisms on the hands of HCP must be capable of surviving for at least several hours.
C. HCP perform inadequate hand hygiene, omit hand hygiene entirely, or use an inappropriate hand hygiene product.
D. Contaminated hands come in direct contact with another patient, or with an inanimate object that will come into direct contact with the patient.

3. All of the following statements related to wearing of gloves in healthcare settings are correct, EXCEPT for one. Which one is the exception?

A. To prevent or reduce the risk of occupational exposure, the standard of care mandates that HCP wear gloves.
B. Wearing gloves does not eliminate the need for appropriate hand hygiene practices.
C. Bacterial flora colonizing patients have not been recovered from the hands of HCP who wore gloves during patient contact.
D. Pathogens can be transmitted via small defects in gloves or by contamination of the hands during glove removal.

4. All of the following statements are correct with respect to detergents and antiseptic agents, EXCEPT for one. Which one is the exception?

A. Detergents contain esterified fatty acids and sodium or potassium hydroxide and are often referred to as "soaps."
B. Detergent formulations used in healthcare settings should have a broad antibacterial spectrum, be fast acting, and should have persistent or residual activity.
C. The cleaning activity of plain soap results in the removal of dirt, soil, and various organic substances from the hands.
D. Only ethanol, 60 to 95% formulations; and povidone iodine, 5 to 10% formulations, meet the test and product labeling requirements as antiseptic agents.

5. All of the following statements related to handwashing are correct, EXCEPT for one. Which one is the exception?

A. Handwashing is washing hands with water and plain soap that does not contain an antimicrobial agent or contains low concentrations effective solely as preservatives.
B. Handwashing is not recommend for routine hand hygiene in clinical situations when the hands are visibly soiled with blood, and/or other potentially infectious material.
C. Following handwashing, the hands must be dried thoroughly with a single-use towel; it is of note that organisms are transferred in larger numbers from wet versus dried hands.
D. Antimicrobial-impregnated wipes (i.e., towelettes) may be considered as an acceptable alternative to handwashing.

6. All of the following statements about antiseptic handwash are correct, EXCEPT for one. Which one is the exception?

A. Povidone iodine, 5 to 10% formulations, is considered safe and effective for use in antiseptic handwash.
B. Antiseptic handwash removes or destroys transient microorganisms and reduces the resident hand flora.
C. Antiseptic handwash is an acceptable alternative to handwashing when the hands are visibly soiled; otherwise, an alcohol-based handrub is recommended.
D. The use of antimicrobial-impregnated wipes (i.e., towelettes) is an acceptable alternative to antiseptic handwash.

7. All of the following statements about antiseptic handrub are correct, EXCEPT for one. Which one is the exception?

A. Antiseptic handrub is defined as applying a waterless antiseptic agent (i.e., ethanol, 60-95%, expressed as percent by volume) to the hands.
B. Antiseptic handrub removes or destroys transient microorganisms and reduces the resident flora.
C. Antiseptic handrub is more effective than handwashing or an antiseptic handwash and it is the preferred method for routine hand hygiene when the hands are visibly soiled.
D. The concurrent use of an alcohol-based handrub and an iodophor-based antimicrobial soap is contraindicated.

8. All of the following statements regarding surgical hand antisepsis are correct, EXCEPT for one. Which one is the exception?

A. Performing surgical hand antisepsis by scrubbing the hands/forearms with a brush for 10 minutes can damage skin and result in increased shedding of microorganisms.
B. Scrubbing the hands/forearms with a brush or a sponge for 2 to 3 minutes reduces microbial counts to acceptable levels.
C. Surgical hand antisepsis is defined as performing either a two-stage surgical hand antisepsis or surgical antiseptic handwash with povidone iodine.
D. In a two-stage surgical hand antisepsis, antiseptic handrub with an alcohol-based formulation containing 0.5% to 1% chlorhexidine gluconate is preferred.

9. All of the following are important considerations when purchasing hand hygiene products, EXCEPT for one. Which one is the exception?

A. The primary factor influencing product selection should be cost.
B. The general reliability of the dispenser system.
C. The functional reliability to deliver an appropriate volume of the product.
D. For alcohol-based formulations, confirm that the container is flame-resistant.

10. All of the following statements are correct with respect to selecting and/or handling plain (non-antimicrobial) or antimicrobial soaps, or an alcohol-based handrub, EXCEPT for one. Which one is the exception?

A. Solicit information from manufacturers regarding any known interactions between hand hygiene products, skin care products, and the type of gloves used in the facility.
B. Hand care products should be stored in disposable or reusable closed containers.
C. To minimize the risk of product contamination, always "top off" partially empty soap dispensers at the end of each day.
D. To maximize acceptance of hand hygiene products solicit input from HCP regarding fragrance (smell), consistency ("feel"), skin tolerance, and color.

11. All of the following statements related to irritant contact dermatitis (ICD) are correct, EXCEPT for which one. Which one is the exception?

A. ICD is the most common reaction associated with the frequent and repeated use of hand-hygiene products.
B. ICD is an immunologically mediated dermatitis.
C. ICD is characterized by dryness, itchiness, or burning; the skin may feel "rough;" and appear erythematous, scaly, or fissured.
D. Signs and symptoms of ICD are similar to those associated with allergic contact dermatitis (ACD), which can be ruled out by allergy testing.

12. All of the following statements related to ICD are correct EXCEPT, for one. Which one is the exception?

A. Factors that contribute to ICD include using hot water, scrubbing, the quality of paper towels used, wearing and removing gloves, and low relative humidity (winter months).
B. ICD is most commonly reported with iodophors.
C. Alcohol-based handrubs are the safest antiseptics available and ethanol is usually less irritating than isopropanol.
D. To minimize the likelihood of ICD, washing hands with soap and water after each use of alcohol-based handrub is highly recommended.

13. All of the following statements related to allergic contact dermatitis (ACD) are correct, EXCEPT for one. Which one is the exception?

A. ACD is a T cell-mediated delayed hypersensitivity reaction (Gell and Coombs Type IV).
B. ACD is caused primarily by fragrances and preservatives; and less commonly by emulsifiers found in hand-hygiene products.
C. ACD with alcohol-based products is quite common, but ACD with iodophors is rare.
D. ACD usually begins as a rash, redness, and itching that may progress to oozing skin blisters and may spread to areas of skin untouched by the product.

14. The Institute for Healthcare Improvement in its How-to Guide: Improving Hand Hygiene recommends a multidimensional approach, e.g., introduction of alcohol-based handrub, and educational, and behavioral initiatives, to improve compliance with hand hygiene guidelines.

A. True
B. False

15. All of the following statements are correct with respect to the Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care published in 2016, EXCEPT for one. Which one is the exception?

A. The document was published by OSHA.
B. Summary includes an Appendix, Infection Prevention Checklist for Dental Settings.
C. Section I.5, Hand Hygiene, provides a tool to monitor institutional compliance with administrative measures.
D. Section II.1, Hand Hygiene is Practiced Correctly, is an evaluation tool to monitor compliance by direct observation of oral HCP.

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Additional Resources

- No Additional Resources Available.

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