

Hand Hygiene

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Lisa Spruce, DNP, RN, CNS-CP, CNOR, ACNS, ACNP, FAAN

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OUTCOME

The learner will have knowledge of best practices for hand hygiene and will translate that knowledge into practice.

OBJECTIVES

1. Discuss common areas of concern that relate to perioperative best practices.
2. Discuss best practices that could enhance safety in the perioperative area.
3. Describe implementation of evidence-based practice in relation to perioperative nursing care.

ACCREDITATION

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APPROVALS

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Lisa Spruce, DNP, RN, CNS-CP, CNOR, ACNS, ACNP, FAAN, has no declared affiliation that could be perceived as posing a potential conflict of interest in the publication of this article.

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BACK TO BASICS 2.0

Hand Hygiene



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The Healthcare Infection Control Practices Advisory Committee recommends that health care workers (HCWs) routinely perform hand hygiene as a simple and effective way to prevent health care-associated infections (HAIs).¹ Although the recommendation to perform hand hygiene is a core infection prevention measure, the Centers for Disease Control and Prevention estimates that HCWs complete the hand hygiene process less than 50% of the time that it is indicated.² Health care workers can act as a vector in the transmission of bacteria and other pathogens from contaminated patients or surfaces to other patients when they do not perform effective hand hygiene between tasks.³

In the mid-19th century, Ignaz Semmelweis noticed that maternal patients at the First Clinic of the General Hospital in Vienna, Austria, experienced improved outcomes (ie, decreased mortality) when hospital staff members began cleaning their hands with a chlorine solution

between patients.^{3,4} Current available literature continues to suggest that effective hand hygiene can reduce HAIs.⁵ This article provides a review of basic concepts related to hand hygiene that perioperative personnel can use to help decrease HAIs.

PRACTICE POINT: Hands and Fingernails

Initiatives in a hand hygiene protocol should support the maintenance of healthy hands and fingernails.⁶ It can be difficult for HCWs to remove microorganisms from nonintact skin. Conditions such as dermatitis and eczema also may cause damage to healthy skin flora and discourage HCWs from performing hand hygiene.^{6,7} As a result, there may be higher frequency of staphylococci and gram-negative bacilli colonization on the hands.⁷ One preventive measure that HCWs can use to help minimize hand hygiene-related skin irritation includes using moisturizing skin care products that are

compatible with other hand hygiene products (eg, soap, alcohol-based hand rub) and gloves used at their facility.^{6,7} Perioperative leaders should request plant operations personnel to maintain the hand-washing water temperature between 70° F (21.1° C) and 80° F (26.7° C) and HCWs should completely dry their hands before donning gloves.^{6,7} Although available guidelines do not include specific temperature ranges when skin tissue damage occurs, repeated washing of hands in hot water irritates the skin and can lead to dermatitis and bacterial colonization.^{3,6} Use of an alcohol-based hand rub when hands are not visibly soiled can help prevent the development of contact dermatitis.^{6,7} If a HCW with contact dermatitis anticipates prolonged glove wearing, he or she may wear an appropriate cotton glove liner under the gloves (eg, sterile liner for sterile gloves) to help decrease skin irritation.⁸

Another healthy hand and fingernail initiative involves HCWs maintaining natural and short (ie, no longer than 2 mm) fingernails.⁶ Artificial nails and nail extenders have been associated with contamination of the hands and have been implicated in yeast and gram-negative bacterial infection outbreaks among patients. The available research on the use of standard nail polish in the perioperative setting has been low quality. In 2018, however, researchers sought to determine the bacterial burden of gel nail polish, standard nail polish, and natural nails on the hands of HCWs at three health care facilities in different states (ie, Nebraska, California, Indiana).⁹ A licensed nail technician applied gel nail polish and standard nail polish to two different nails on the HCWs' dominant hands and left the remaining nails on that hand natural. The researchers obtained bacterial cultures on days 1, 7, and 14 of wear. On day 7, the researchers also obtained cultures both before and after hand hygiene with an alcohol-based hand gel product. The researchers obtained 741 cultures and found that bacterial burden increased for all nail types (ie, gel polish, standard polish, natural). They also found that the bacterial burden decreased after hand hygiene for natural nails and standard polish but not gel polish. All three nail types became more contaminated with bacteria over time. The authors concluded that hand hygiene was less effective with gel polish than it was with standard polish and natural nails.⁹

Facility leaders should convene interdisciplinary teams that include perioperative nurses, physicians, and infection preventionists to decide if HCWs may wear nail polish

in the perioperative setting.^{6,7} The wearing of nail polish may make it difficult for HCWs to perform effective hand hygiene, leading to pathogens remaining in chipped or old polish. Patient harm may occur if these pathogens are then transferred to the patient or if the polish chips and fragments are deposited into the patient's wound or onto the sterile field.⁶

Hand and wrist jewelry (eg, rings, watches, bracelets) may prevent effective hand hygiene and removal of microorganisms. The World Health Organization (WHO) discourages the wearing of hand and wrist jewelry, but recognizes that cultural and religious beliefs may affect HCWs' compliance with removal of wedding rings.⁷ Although the available evidence does not confirm that direct transmission of microorganisms to patients occurs when HCWs wear hand and wrist jewelry, the hand hygiene guideline recommends that perioperative personnel avoid such jewelry in patient care areas.⁶



✓ KNOWLEDGE CHECK

Janae, a recently hired nurse, is working with Sirinya, her preceptor, in the perioperative setting. Janae asks Sirinya if she can wear her wedding ring at work when she cares for patients. Sirinya replies that there is no policy on jewelry and that staff members wear jewelry as they desire. During a visit to the OR while working on quality improvement initiatives, Stacey, the infection preventionist, notices perioperative staff members wearing jewelry. She overhears Janae and Sirinya's conversation on jewelry and asks them to participate on an interdisciplinary team focused on developing a new hand hygiene policy that will include information on jewelry in the OR. Stacey also invites Alberto, a CRNA, and Dr D, a surgeon, to participate. During the first meeting, the group decides to use the AORN "Guideline for hand hygiene"⁶

as a foundation for the new policy. They also decide that each team member will review a section of the guideline and bring at least one policy recommendation to the next meeting.

When the group reconvenes, each team member shares his or her suggestions for inclusion in the policy. Dr D shares that although the guideline indicates all hand and wrist jewelry should be prohibited, he recommends that the policy allow one ring and prohibit watches and bracelets. Alberto suggests that the policy include the recommendation that personnel use an alcohol-based hand rub when their hands are not visibly soiled. He also requests that an alcohol-based product dispenser be installed near the anesthesia workstation. Janae mentions that the guideline recommends cotton glove liners for personnel with irritant contact dermatitis who must wear gloves for long periods of time; she suggests that the group include this recommendation in the new policy. Sirinya suggests that the group recommend that facility leaders provide moisturizing products to help perioperative personnel maintain intact skin. She also mentions that when the plant operations staff member visited the perioperative department, he checked the water temperature at the scrub sinks and found it was 79° F (26.1° C); she requested that he raise it to 90° F (32.2° C).

1. In this scenario, who did not follow the recommended practice point?
 - a. Janae
 - b. Sirinya
 - c. Dr D
 - d. Alberto

PRACTICE POINT: Performing Hand Hygiene

When performing hand hygiene, HCWs should use soap and water or an alcohol-based hand rub.^{7,10} Health care workers should wash their hands with soap and water when they are visibly soiled,^{7,10} after caring for a patient with known or suspected infectious diarrhea,¹⁰ after exposure to spores (eg, *Clostridioides difficile*, *Bacillus anthracis*) or norovirus,^{7,10} and after using the restroom.⁷ When performing hand hygiene with soap and water, HCWs should complete the following steps.

1. Remove hand and wrist jewelry (eg, rings, watches) if present.
2. Verify the water is at a comfortable temperature and not hot.

3. Wet hands thoroughly.
4. Apply enough soap to cover all hand surfaces.
5. Rub hands together for 15 seconds to distribute soap to all hand and finger surfaces.
6. Rinse hands with water.
7. Dry hands thoroughly with a paper towel.
8. If the faucet is not automatic, turn it off using a clean paper towel.⁶

For some activities, HCWs can use an alcohol-based hand rub instead of soap and water. Health care workers are required to perform hand hygiene but may use an alcohol-based hand rub in the following instances:

- *immediately before touching a patient;*
- *before performing an aseptic task (e.g., placing an indwelling device) or handling invasive medical devices;*
- *before moving from work on a soiled body site to a clean body site on the same patient;*
- *after touching a patient or the patient's immediate environment;*
- *after contact with blood, body fluids, or contaminated surfaces; [and]*
- *immediately after glove removal.*¹⁰

When performing hand hygiene using an alcohol-based hand rub, HCWs should complete the following steps.

1. Remove hand and wrist jewelry (eg, rings, watches) if present.
2. Adhere to the manufacturer's instructions for use when applying the product to the hands.
3. Rub hands and fingers together until dry. All hand and finger surfaces should be covered with the product during this process.⁶

In the perioperative environment, team members should perform hand hygiene before and after direct patient contact (eg, assessing a patient, confirming a site marking, positioning a patient, completing surgical skin preparation).⁶ Perioperative team members also should perform hand hygiene before completing a clean or sterile task (eg, opening sterile supplies to create a sterile field, preparing medications and delivering them to the sterile field, performing or assisting with regional anesthesia procedures). Because perioperative personnel are at risk for exposure to blood and other body fluids, they should perform hand hygiene after

- removing personal protective equipment (eg, gloves, gowns, masks);
- contacting nonintact skin, wounds, mucous membranes, and body fluids;
- assisting with aerosol-generating procedures;
- handling specimens or used sponges;
- emptying patient drainage systems; and
- removing surgical drapes.⁶

Perioperative team members also should perform hand hygiene after coming into contact with patient-related medical equipment (eg, patient beds and controls, linens) and after touching the floor or any items that have touched the floor.⁶ Wearing gloves does not negate the need for staff members to perform hand hygiene—perioperative team members should remember that several indicators for performing hand hygiene may arise simultaneously, creating a singular hand-hygiene “moment.”

Perioperative team members should review education information on hand hygiene, understand applicable policies and procedures, and demonstrate competency performing hand hygiene.⁶ Facility leaders should monitor their staff members’ performance of hand hygiene according to the applicable guidelines and facility policies. This oversight includes conducting audits to verify that staff members use soap and water when their hands are visibly soiled. In addition, leaders should ensure that adequate supplies for hand hygiene are available in a convenient location in patient care delivery areas. A lack of knowledge, education, or experience can lead to low compliance with hand hygiene protocols and place patients and personnel at risk for transmitting organisms that could cause an HAI.⁶



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✓ KNOWLEDGE CHECK

Audrey, a preoperative nurse assigned to Mr J, prepares to insert his IV catheter and uses an alcohol-based hand rub before donning gloves to begin the procedure. After completing the IV insertion, Audrey removes her gloves, performs hand hygiene with an alcohol-based hand rub, finishes her tasks (eg, answering Mr J’s questions), and exits the room. Although Mr J is ready for surgery, he identifies an additional question a few minutes later and turns on his call light. Audrey re-enters his room to answer it and completes hand hygiene upon entry. Mr J asks his question and then requests that Audrey raise the head of his bed. Audrey accesses the electronic health record before providing the answer to Mr J’s question, then completes hand hygiene, dons gloves, and presses the bed controls to raise the head of the bed until Mr J is comfortable. She removes her gloves, completes hand hygiene, and exits the room. Bonita, the RN circulator, enters Mr J’s room to complete her preoperative assessment. She completes hand hygiene, verifies the patient information on Mr J’s armband, asks him a few questions, pats his hand, completes computer documentation of the interaction, and exits the room. Dr A, the anesthesiologist, performs hand hygiene and enters Mr J’s room to complete the preanesthetic interview and assess Mr J’s heart and lungs. Dr A uses an alcohol pad to clean the stethoscope, performs the heart and lung assessment on Mr J, cleans the stethoscope again, and performs hand hygiene before discussing Mr J’s anesthetic plan of care. Finally, the surgeon (Dr S) enters the room to talk to Mr J about his surgery and mark the surgical site. Dr S performs hand hygiene as he enters Mr J’s room, dons gloves, and retrieves the marking pen from the bedside table. After completing the site marking, Dr S removes his gloves and performs hand hygiene before exiting the room.

2. In this scenario, who did not follow the recommended practice point?

- | | |
|-----------|-----------|
| a. Dr S | b. Audrey |
| c. Bonita | d. Dr A |

🔴 PRACTICE POINT: Hand Hygiene Improvement

Researchers conducted an observational study of OR team members (eg, anesthesia professionals, RN circulators, scrub personnel, surgeons, students) to identify risks for hand contamination and cross-contamination during 46

operative procedures.¹¹ The researchers found that study participants self-contaminated their own hands in a variety of ways (eg, touching their faces, adjusting their glasses). The participants also contaminated their hands when they touched other contaminated objects or patients. The researchers also observed perioperative team members

- handling medical devices or manipulating IV lines without disinfecting their hands;
- reusing medication vial stoppers;
- failing to open sterile packages at the seams;
- using their scrub tops rather than a clean gauze pad to open a glass ampule;
- touching computer keyboards, pens, phones, drawers, furniture, and door handles without completing hand hygiene afterward; and
- picking up items from the floor and using the items without disinfecting either the items or their hands.¹¹

Perioperative team members also contaminated their hands when they touched patients or items near the patient (eg, when adjusting the OR bed, positioning the patient, connecting the patient to monitoring devices, adjusting blankets, or holding the patient's hand).¹¹

The researchers also determined that perioperative team members were unaware of the “normal” behaviors that could result in contamination (eg, head scratching, nose blowing, sneezing, coughing, nail biting). These unconscious behaviors can threaten patient safety; perioperative team members should increase their personal awareness of these behaviors and work to eliminate them in the perioperative setting. Further, perioperative personnel should incorporate performing hand hygiene into all patient care activities and the act of performing hand hygiene should become automatic,¹¹ facilitated by hygiene products that are easily accessible to personnel.⁶

Another group of researchers found that there is a lack of knowledge among anesthesia professionals regarding opportunities to perform hand hygiene.¹² This research group surveyed 396 anesthesia professionals at three academic medical centers and 5,449 randomly selected active members of the American Society of Anesthesiologists on their awareness of the WHO's 2006 initiative relating to five opportunities for hand hygiene (ie, before patient contact, before an aseptic task, after body fluid exposure risk, after patient contact, after

contact with patient surroundings¹³). The response rate was approximately 56% for the academic medical center anesthesia professionals and 18% for the American Society of Anesthesiologists active members.¹² The results showed that only 20% of the respondents exhibited complete knowledge of the WHO's guidelines on hand hygiene, and many anesthesia professionals failed to recognize opportunities for hand hygiene, especially related to interactions with patients' skin surfaces and the surrounding environment—two principal sources of intraoperative bacterial transmission.

Based on the findings of these two studies,^{11,12} this is an opportunity for infection preventionists to work with perioperative personnel to increase their hand hygiene knowledge and identify specific areas for improvement. Perioperative team members should take individual responsibility for their own hand hygiene routines and follow established guidelines. When modifying existing behaviors and learning new hand hygiene processes, perioperative personnel may benefit from feedback that identifies instances when hand hygiene is inadequate.^{6,11}

Perioperative team members have varying responsibilities related to hand hygiene initiatives. Perioperative personnel should increase their awareness of personal behaviors that can cause hand contamination and cross-contamination.¹¹ Managers should establish goals for their teams that focus on preventing HAIs and improving patient outcomes. They should inform team members of applicable hand hygiene policies and procedures, implement quality improvement initiatives to increase compliance, and foster a culture that limits placing blame and instead supports positive behavioral change. Educators should work with leaders to provide hand hygiene education programs for perioperative



personnel, surgeons, and anesthesia professionals. These programs should help personnel increase their personal awareness of hand contamination and identify inadequate hand hygiene and its consequences.¹¹ In addition, educators can perform audits so that perioperative team members are aware of breaches in hand hygiene compliance during operative and other invasive procedures.

✔ KNOWLEDGE CHECK

Mr P is scheduled to undergo a laparoscopic cholecystectomy under general anesthesia. Dylan, the RN circulator, transports Mr P to the OR and uses an alcohol-based hand rub before donning gloves and assisting Mr P onto the OR bed. Zoe, the CRNA, dons gloves and assists with patient positioning. She completes the arrival documentation, places the monitoring devices on Mr P, and prepares for intubation while intermittently completing documentation. At the same time, Dylan pushes the transport cart out of the OR, removes his gloves, and performs hand hygiene. As he assists Zoe with intubation, he notices that a bundle of clean sponges has dropped off the surgical back table and asks the medical student, Martina, to pick it up. Martina retrieves the bundle, places it in the designated area on the prepping stand, and performs hand hygiene. Dr E, the surgeon, adjusts his surgical head covering as he enters the room and reties his mask. He completes hand hygiene and joins Dylan at the patient's side to expose the surgical area for application of surgical skin antisepsis solution. Dylan completes hand hygiene, opens the sterile skin preparation kit, and dons sterile gloves before applying the solution.

3. In this scenario, who did not follow the recommended practice point?
- | | |
|------------|---------|
| a. Dylan | b. Dr E |
| c. Martina | d. Zoe |

CONCLUSION

Perioperative personnel can use hand hygiene to help reduce transmission of microorganisms and prevent HAIs. Available research findings indicate that HCWs do not always comply with hand hygiene initiatives because they lack knowledge of requirements or awareness of behaviors that may increase hand contamination. For perioperative areas, guidelines support short fingernail length, maintenance of intact skin, and compliance with

Resources

Global Handwashing Partnership.

<https://globalhandwashing.org/resources/>.

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Hand hygiene. Association for Professionals in Infection Control and Epidemiology. <https://apic.org/resources/topic-specific-infection-prevention/hand-hygiene/>. Accessed November 11, 2020.

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hand hygiene policies and procedures during all patient care activities. Perioperative leaders should work with educators and staff members to develop and implement policies related to hand hygiene, monitor staff member compliance with hand hygiene initiatives, and work toward behavioral changes if indicated. When perioperative personnel perform effective hand hygiene, they help decrease the risk of HAIs for their patients and promote safe patient care.

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Lisa Spruce, DNP, RN, CNSCP, CNOR, ACNS, ACNP, FAAN, is the director of Evidence-Based Perioperative Practice at AORN, Inc, Denver, CO. *Dr Spruce has no declared affiliation that could be perceived as posing a potential conflict of interest in the publication of this article.*

Knowledge Check Answers:

1. In this scenario, Sirinya did not follow the recommended practice point.
2. In this scenario, Bonita did not follow the recommended practice point.
3. In this scenario, Zoe did not follow the recommended practice point.

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OUTCOME

The learner will have knowledge of best practices for hand hygiene and will translate that knowledge into practice.

OBJECTIVES

To what extent were the following objectives of this continuing education program achieved?

1. Discuss common areas of concern that relate to perioperative best practices.
Low 1. 2. 3. 4. 5. High
2. Discuss best practices that could enhance safety in the perioperative area.
Low 1. 2. 3. 4. 5. High
3. Describe implementation of evidence-based practice in relation to perioperative nursing care.
Low 1. 2. 3. 4. 5. High

CONTENT

4. To what extent did this article increase your knowledge of the subject matter?
Low 1. 2. 3. 4. 5. High
5. To what extent will you translate the knowledge of the subject matter into practice?
Low 1. 2. 3. 4. 5. High

6. To what extent were your individual objectives met?

Low 1. 2. 3. 4. 5. High

7. Will you be able to use the information from this article in your work setting?

1. Yes 2. No

8. Will you change your practice as a result of reading this article? (If yes, answer question #8A. If no, answer question #8B.)

- 8A. How will you change your practice? (*Select all that apply.*)

1. I will provide education to my team regarding why change is needed.
2. I will work with management to change/implement a policy and procedure.
3. I will plan an informational meeting with physicians to seek their input and acceptance of the need for change.
4. I will implement change and evaluate the effect of the change at regular intervals until the change is incorporated as best practice.
5. Other: _____

- 8B. If you will not change your practice as a result of reading this article, why? (*Select all that apply.*)

1. The content of the article is not relevant to my practice.
2. I do not have enough time to teach others about the purpose of the needed change.
3. I do not have management support to make a change.
4. Other: _____