

ChloraPrep Application and Dry Time In The Operating Room - Change Paper

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An individual inside or outside an organization who assists with the transformation and operation is considered a change agent. A change agent can make improvements by encouraging and influencing others. They have an essential role in nursing to drive and support providing high-quality care to patients. This paper reviews and introduces the current literature to inform the theory behind a planned organizational change. This process includes completing steps recommended by change theory through the data collection, analysis, planning, implementation, stabilization, and evaluation stages. Lewin's Change Theory includes three stages. These stages are unfreezing, movement, and refreezing. Lewin says the process of change involves creating the perception that change is needed and then moving toward a new preferred level of behavior (Marquis & Huston, 2021). In summary, as the problem is recognized by all affected parties, identifying, and implementing corrective change, and sustaining the change, respectively (Marquis & Huston, 2021). With this theory of change and the proposed focus on allowing sufficient antiseptic agent dry time, this information's literature review and distribution rely on rational-empirical strategies (Marquis & Huston, 2021).

The proposed change in this paper will focus on the surgical preparation of patients related to procedures. One of the most common causes of healthcare-associated infections stems from surgical site infections. Implementing and incorporating change theories into nursing practices can reduce rates of infection and prevent improper techniques. Before surgery, prepping the skin removes any debris, cleans the skin, and reduces the number of microbes present. The Joint Commission, the Institute for Safe Medication Practices, and the FDA provide monitoring and guidance regarding preventing these sentinel events (Institute for Safe Medication Practices, 2018). There are an estimated 200-240 (0.5 per 100,00 procedures) surgical fires each year in the U.S., occurring in operating rooms or during surgical activities

(ISMP, 2018). Patients' fires or thermal injuries can occur due to surgical site preparation that involves solutions containing bactericidal agents and isopropyl alcohol, the volatile component. Surgical site infection rates correlate with the agent used, improper application, and failure to allow appropriate drying times. Antiseptic agent dry times contributed to the increased risk for surgical site infection or fires created in the operating room. The change agent goals are to describe the problem and identify evidence-based practices that encourage policy changes to reduce risks.

Various investigations have been designed to inform the decision to use either povidone-iodine or chlorhexidine gluconate-containing products in healthcare settings. Appropriate antiseptic action is related to the agent's penetration depth, chemical activity, and the total time of exposure to the agent. Other considerations include cost-effectiveness, whether the agent is alcohol or water-based, and the potential for adverse events in patients related to toxicity or allergies. The Centers for Disease Control and Prevention (CDC) publish guidelines without an explicit preference regarding the agent used; however, they recommend that the solution be alcohol-based (O'Hara et al., 2018). Charehibili et al. (2019) performed a randomized cluster trial utilizing chlorhexidine-alcohol and iodine-alcohol solutions to determine which antiseptic solutions effectively reduce SSIs. Of the five surgeries performed in this trial, researchers indicated that chlorhexidine and iodine were similar in preventive measures to reduce surgical site infection. Investigations have been designed to inform the decision to use either povidone-iodine or chlorhexidine gluconate-containing products in healthcare settings. Appropriate antiseptic action is related to the agent's penetration depth, chemical activity, and the total time of exposure to the agent. Other considerations include cost-effectiveness, whether the agent is alcohol or water-based, and the potential for adverse events in patients related to allergies or

toxicity. The Centers for Disease Control and Prevention (CDC) publish guidelines without an explicit preference regarding the agent used; however, they recommend that the solution be alcohol-based (O'Hara et al., 2018). Charehibili et al. (2019) performed a randomized cluster trial utilizing chlorhexidine-alcohol and iodine-alcohol solutions to determine which antiseptic solutions effectively reduce SSIs. Of the five surgeries performed in this trial, researchers indicated that chlorhexidine and iodine were similar in preventive measures to reduce surgical site infection. According to recent studies, Charehibili et al. (2019) performed a randomized cluster trial utilizing chlorhexidine-alcohol and iodine-alcohol solutions to find which antiseptic solutions effectively reduce surgical site infection. Of the five surgeries performed in this trial, researchers indicated that chlorhexidine and iodine were similar in preventive measures to reduce surgical site infection. According to Charehibili et al. (2019), nearly 2.8 % of Surgical site infections have decreased due to chlorhexidine-alcoholic solution versus iodine-alcohol. Researchers proved another study tried to test the efficiency in preoperative prevention of SSI between chlorhexidine-alcohol and iodine-alcohol was proven to be similar (Charehibili et al., 2019). It did not make a difference, no matter how painful the surgery was (Charehibili et al., 2019).

The change theory's implementation requires the organization to set goals and present regulations to change surgical preparation protocols. Chlorhexidine gluconate applicators have a maximum treatment area of 2.5 x 2.5 inches (Multum, 2019). The forward and back motion should be repeated for thirty seconds, ensuring the entire treatment area is wet with antiseptic. Employers should apply the antiseptic for wet surgical regions such as inguinal folds for approximately two minutes (Multum, 2019). Individuals should be careful to avoid pooling the

solution and allow the site to air dry for three minutes without tapping, blotting, or wiping it away. Before using antiseptic, remove any hair from the client to reduce drying times and the potential for fine hairs remaining wet. If hair gets wet, allow for a full hour of drying, essential for fire prevention in the operating room. In a report by ISMP (2018), a recent fire occurred after the Chloraprep solution dried for a full 10 minutes as the provider was unaware that the client's hair was still wet. This client suffered second and 3rd-degree burns on their chest, neck, ear, and upper extremities. To help prevent flames, avoid using or draping ignition sources such as cauteries or lasers.

As part of the unfreezing stage, data collection, education, and establishing systematic change regarding an identified issue is essential. The OSF Healthcare surgical preparation policy (Appendix, Figure 1) shows that dry times are not consistently specified or reference the manufacturer's recommendations only. These nursing students' observations included a lack of consistency in completing procedural steps and how long the cleaning agents were allowed to dry. Therefore, education for all providers within the department may need to proceed with the movement stage. Through a national survey, (Shapiro et al., 2020) found that surgical residents often perform the surgical prep directly or supervise others' work to accomplish this task. However, there is little educational or systematic measurement of the comprehension that assesses these individuals' knowledge regarding best practices (Shapiro et al., 2020). Organizations can develop and introduce more detailed education and test knowledge acquisition and retention through surveys and quizzes.

With education and group recognition of Chloraprep dry time issues, the movement phase is possible by implementing appropriate strategies. As part of this policy or procedural revision, a solution may require an egg-timer or similar device to be placed in the surgical suite

to objectively quantify how long the agent was allowed to dry (Kroning et al., 2019). The stated benefits associated with using timers in the OR are "...loud sound, its portability, and, most important, its value in reducing the risk of OR fires." (Kroning et al., 2019, para. 1). A risk-benefit analysis can guide selecting which antiseptic agent to adopt based on the associated risk for fires while maintaining an aseptic field. Given that research supports equivalent antiseptic effects of both Betadine and Chloraprep, the researchers believe that the strict use of aqueous preparations of either agent should be considered for incorporation into policy as well (Charhebhili et al., 2019; Ghobrial et al., 2017). The recommended drying time for these agents is equivalent. There is a minor issue in efficacy and efficiency, particularly regarding surgical preparation, procedures, and OR turnover time. Finally, should an organization or provider strongly prefer the use of an alcohol-based prep? A recent study suggests that including carbon dioxide in the environment immediately around tools such as cautery is effective in eliminating fires related to the ignition of isopropyl alcohol contained in these preparations (Samuels et al., 2020).

Throughout the clinical rotation in the OR, it was apparent that there are specific requirements associated with Chloraprep administration and dry-time. Developing a plan requires keeping all staff engaged and compliant. One step to further implement change includes integrating educational simulations before preparation for surgery. As previously stated, when making a change, problems may occur. If an organization does not clearly define and educate workers on new procedures and the best evidenced-based practice, those problems are more likely to occur. Before a client goes to surgery, most healthcare facilities clean the client and keep everything aseptic to prevent infection. When making a change in healthcare, the workers may experience stress or anxiety if the change is not understood or unknown. Leaders need to

help implement change and show positive aspects of that change to motivate and show support to the workers for the process to continue. Employees should be encouraged to give their insight to overcome any obstacles they may face in this process.

Evaluation is critical when assessing the change and achievement of goals and outcomes. Evaluation occurs throughout the implementation of the "movement" stage and as the focus moves to stabilize the implementing change, otherwise known as the refreezing stage. Evaluation allows researchers to determine if the approach was successful or if further research and modification are needed. Based on this data and the activities associated with the increased incidence of fires and SSIs in the operating room, these nursing students suggest auditing as a means of evaluation. The Agency for Healthcare Research and Quality (AHRQ) has developed and provided an audit tool (Appendix, Figure 2), which includes measurement of the drying time used for ChloroPrep or related agents during surgical procedures (AHRQ, 2017). This audit tool could initially determine that revised procedures are being followed and subsequently reveal whether enacted policies and adopted changes related to drying time are maintained.

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Figure 1. OSF Healthcare Surgical/Operating Room Protocol Example

OSF Healthcare
Skin preparation, preoperative
 Revised: May 15, 2020

Introduction

Proper preparation of a patient's skin for surgery renders it as free as possible from microorganisms, which reduces the risk of infection at the incision site.¹

Unless contraindicated, before undergoing a surgical procedure, the patient should be instructed or assisted to have a preoperative bath or shower the night before or day of the procedure with soap or prescribed skin antiseptic, such as 4% chlorhexidine gluconate, to reduce the number of microorganisms on the skin and to decrease the risk of contaminating the surgical incision. The skin should be dried with a fresh, clean, dry towel, and the patient should put on clean clothing to reduce the risk of reintroducing microorganisms onto clean skin. The patient shouldn't apply any body lotion, emollients, or cosmetics after the shower because they may impede the antiseptic effectiveness of the bath or shower or affect the ability of adhesive products such as monitors leads to adhere to the patient's skin. Patients should also avoid alcohol-based skin products because they may pose a fire risk in the operating room. Patients undergoing a procedure involving the axilla shouldn't apply deodorant.¹

A patient undergoing surgery of the head or neck should be instructed or assisted to perform a preoperative shampoo with shampoo or a prescribed antiseptic shampoo product. Care should be taken to prevent contact of an antiseptic shampoo with the eyes, ears, and other mucosal membranes. Alcohol-based hair care products, conditioners, and other hair care products should be avoided after shampooing.¹

If hair removal is necessary, it should occur on the day of surgery and in a location outside the operating or procedure room to decrease the risk of surgical site infection.^{1,2,3}

The area of skin preparation should always extend that of the expected incision to minimize the number of microorganisms in the area adjacent to the proposed incision, allow surgical draping of the patient without contamination, and allow for the potential of additional incisions and drains.¹ This skin preparation procedure doesn't duplicate or replace the full sterile preparation that immediately precedes surgery. Instead, it covers skin preparation when preoperative baths or showers haven't been performed, because the efficacy of antiseptic agents depends on the cleanliness of the skin, any superficial soil, debris, and transient microbes should be removed to reduce the risk of wound contamination.¹

Equipment

- 4% chlorhexidine gluconate antiseptic skin cleaner
- Gloves
- Tap water
- Bath blanket
- Fluid-impermeable pad
- Washcloth(s)
- Towel
- Basin
- Adjustable light
- Optional: 4" x 4" (10-cm x 10-cm) gauze pads, cotton-tipped applicators, nail polish remover, nonirritating makeup remover, plastic or paper trash bag, electric or battery-operated hair clippers with a single-use head or a reusable head that can be disinfected, other personal protective equipment

Preparation of Equipment

Pour plain, warm tap water into a basin for rinsing. Use warm water because heat reduces the skin's surface tension and facilitates the removal of soil and hair. Inspect all equipment and supplies. If a product is expired, is defective, or has compromised integrity, remove it from patient use, label it as expired or defective, and report the expiration or defect as directed by your facility.

- Verify the practitioner's order.
- Review the patient's medical record for an allergy or a sensitivity to chlorhexidine. Use an alternative antiseptic agent, if indicated.¹
- Gather and prepare the necessary equipment and supplies.
- Perform hand hygiene.^{4,5,6,7,8,9}
- Confirm the patient's identity using at least two patient identifiers.¹⁰
- Provide privacy.^{11,12,13,14}
- Explain the procedure to the patient and family (if appropriate) according to their individual communication and learning needs to increase their understanding, allay their fears, and enhance cooperation.¹⁵
- Raise the bed to waist level before providing care to prevent caregiver back strain.¹⁶
- Perform hand hygiene.^{4,5,6,7,8,9}
- Put on gloves and, as needed, other personal protective equipment.^{17,18,19}
- Place the patient in a comfortable position, drape with a bath blanket, and expose the preparation area to ensure privacy and to avoid chilling the patient. Expose only one small area at a time while performing skin preparation.
- Position a fluid-impermeable pad beneath the patient to catch spills and to avoid linen changes.
- Adjust the light to illuminate the preparation area.
- Assess the condition of the patient's skin in the preparation area. Report any rash, abrasion, or laceration to the surgeon before beginning the preparation procedure because a break in the skin increases the risk of infection and could require cancellation of the planned surgery.¹
- Instruct the patient to remove all jewelry.¹
- Remove cosmetics using a nonirritating agent to facilitate securement of the endotracheal tube, if needed, and to allow for adequate skin assessment during surgery.¹
- Clean under the patient's fingernails and remove nail polish, if needed. If the patient is undergoing surgery of the hand or wrist, ensure that the nails are clean and natural, without artificial nail surfaces (such as extensions, overlays, acrylics, silk wraps, or enhancements).¹
- When hair removal is necessary, remove it using a hair clipper. Only hair that interferes with the surgical procedure should be removed because hair removal may increase the risk of infection.^{1,10,14} Limit the amount of clipping to reduce the risk of microscopic nicks which may increase the risk of surgical site infection.^{1,1}

- Wash the skin around the surgical site to remove gross contaminants and oils that may block the penetration of the antiseptic agent used during the sterile prep before surgery.¹ Clean skin folds and crevices carefully because they harbor greater numbers of microorganisms. Clean anatomic areas that contain more debris separately to prevent the distribution of microorganisms from these areas to the surgical site.¹
- If the patient is undergoing abdominal surgery, clean the umbilicus. If needed, instill soap and water, or antiseptic solutions such as chlorhexidine, into the umbilicus to soften debris. Then remove the debris using a cotton-tipped applicator because debris within the umbilicus is a contaminant that can't be adequately disinfected.
- If an intestinal or urinary stoma is present within the surgical field, clean the area gently and separately from the rest of the prepared area to remove organic material that might interfere with the effectiveness of the antiseptic agent.¹
- For a surgical field that includes the penis, retract the foreskin (if present) and then clean the penis gently because organic material and microorganisms accumulate under the foreskin.¹ After cleaning, pull the foreskin back over the glans to prevent circulatory compromise.
- Dry the prepared area with a clean towel.
- Remove the fluid-impermeable pad.
- Return the bed to the lowest position to prevent falls and maintain patient safety.²²
- Give the patient any special instructions or care of the prepared area and remind the patient to keep the area clean for surgery. Make sure that the patient is comfortable.
- Discard used supplies in appropriate receptacles.¹⁹
- Remove and discard your gloves and any other personal protective equipment worn.¹⁹
- Perform hand hygiene.^{4,5,6,7,8,9}
- Document the procedure.^{23,24,25,26}

Figure 2. AHRQ Surgical Skin Preparation Audit Tool

AHRQ Safety Program for Surgery

Surgical Skin Preparation Audit Tool

Introduction

Problem Statement

Purpose of This Tool

Please Adapt This Tool

How To Use This Tool

How To Use Audit Data

Data Table*

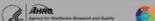
QUESTION	DATA
Observation Number	
1. Name of Procedure	
2. Date of Operation	
3. Time of Operation	
4. Surgeon	
5. What type of skin preparation was used for this case?	Betadine <input type="checkbox"/> Chloraprep <input type="checkbox"/> DuraPrep <input type="checkbox"/> Other <input type="checkbox"/> Name, if other:
6. If the patient had an ostomy, what type of skin preparation was used on the ostomy only?	Betadine <input type="checkbox"/> Chloraprep <input type="checkbox"/> DuraPrep <input type="checkbox"/> Other <input type="checkbox"/> Name, if other:
7. If DuraPrep was used, was it allowed to air dry for 3 minutes (please time it)?	Yes <input type="checkbox"/> No <input type="checkbox"/> Yes, after reminder <input type="checkbox"/>
8. If Chloraprep was used, was it allowed to air dry for 2 minutes (please time it)?	Yes <input type="checkbox"/> No <input type="checkbox"/> Yes, after reminder <input type="checkbox"/>
9. If Chloraprep was used, was it applied using a "groose back and forth scrubbing motion"?	Yes <input type="checkbox"/> No <input type="checkbox"/> Yes, after reminder <input type="checkbox"/>
10. How many skin preparation sticks were used?	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>
11. Who prepared the skin for incision?	Name: Role:
a. Ask if trained in a protocol for skin preparation based on the product used and the manufacturer's recommendations.	Trained: Yes <input type="checkbox"/> No <input type="checkbox"/>
12. Comments	

*Use of brand names is for identification only and does not imply endorsement by the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.

Sensemaking Table*

QUESTION	DATA
1. Month and year	
2. How many observations were done this month?	
Count responses from Data Table to answer the following questions.	
3. How many times was Chloraprep used for skin preparation this month?	
Count the number of "Chloraprep" responses for question 5.	
4. How many times was DuraPrep used for skin preparation this month?	
Count the number of "DuraPrep" responses for question 5.	
5. How many times was Chloraprep used for ostomy prep this month?	
Count the number of "Chloraprep" responses for question 6.	
6. How many times was Betadine used for ostomy prep this month?	
Count the number of "Betadine" responses for question 6.	
7. How many times was DuraPrep allowed to air dry for 3 minutes this month?	
Count the number of "yes" responses for question 7.	
8. How many times was a reminder required to allow DuraPrep to air dry for 3 minutes this month?	
Count the number of "yes, after reminder" responses for question 7.	
9. How many times was Chloraprep allowed to air dry for 2 minutes this month?	
Count the number of "yes" responses for question 8.	
10. How many times was a reminder required to allow Chloraprep to air dry for 2 minutes this month?	
Count the number of "yes, after reminder" responses for question 8.	
11. How many times were 2 prep sticks used during skin preparation this month?	
Count the number of "2" responses for question 10.	
12. How many times did a trained provider perform the skin preparation this month?	
Count the number of "yes" responses for question 11a.	

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AHRQ Safety Program for Surgery



Skin Prep Audit Tool 2



AHRQ Safety Program for Surgery

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