AHRQ Safety Program for MRSA Prevention: Targeting SSI

Use of Pre-Operative Chlorhexidine

Surgical Services

Program Support and Target Audience

Program Support

- Jointly provided by Postgraduate Institute for Medicine and Johns Hopkins Medicine/Armstrong Institute
- This activity is supported by a contract from the Agency for Healthcare Research and Quality (AHRQ)

Target Audience

- This activity is intended for surgeons, clinic staff, OR staff, infection preventionists, and those engaged in the care of patients in surgical services.

Educational Objectives

- Review the purpose and process of pre-operative CHG bathing
- Review using CHG as part of pre-operative decolonization
- Recognize the importance of teaching patients how and when to bathe themselves with CHG
- Explain the correct technique for patients to use when using CHG bathing

Presenter

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- Associate Hospital Epidemiologist, Johns Hopkins Medicine
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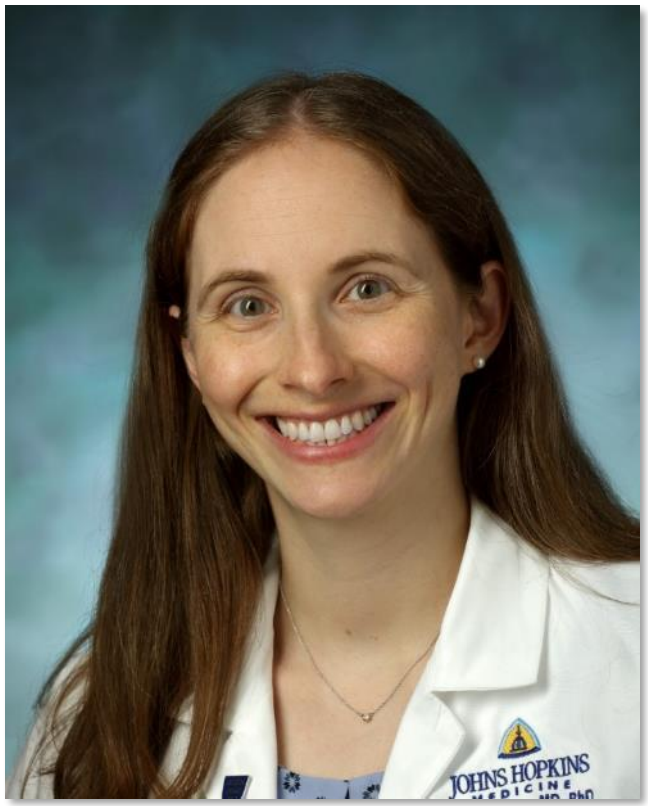

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- **Dr. Sara Karaba** has nothing to disclose.
- The PIM planners and others have nothing to disclose.
- The Johns Hopkins University/Armstrong Institute planners and others have nothing to disclose.

Request for Credit

In order to obtain your CE certificate, please follow the steps below at the conclusion of the activity:

1) Go to www.cmeuniversity.com.
2) Login or Create a New Account (will take less than 1 minute)
   a) If you receive a message when creating a new account that "the email you entered is already in use", please click the Forgot my Username or Password link to have your Username and Password sent to you via email
   b) After logging in, you may be asked to verify/update your information; after doing so, click Save at the bottom of the page
3) Type in **17724** at the top of the page, "Find Post-Test/Evaluation by Course", and click enter Click on the activity title when it appears
4) Choose the type of credit you desire
5) Complete the online Evaluation
6) Receive an immediate CE Certificate to download and/or print for your files

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Continuing Nursing Education

The maximum number of hours awarded for this Continuing Nursing Education activity is 1.0 contact hours. Pharmacotherapy contact hours for Advanced Practice Registered Nurses will be designated on your certificate.

Interprofessional Continuing Education

This activity was planned by and for the healthcare team, and learners will receive 1 Interprofessional Continuing Education (IPCE) credit for learning and change.

NEW! Credit for Infection Prevention Professionals

The Certification Board of Infection Control and Epidemiology (CBIC) accepts courses accredited by organizations accredited by Joint Accreditation towards recertification requirements. One AMA credit is equivalent to 1 IPU. Attendees must submit their credits earned through their profile with the CBIC.

Computer System Requirements

This activity uses Zoom videoconference software. Minimum system requirements to use Zoom include:

- Internet connection – broadband recommended
- Computer or mobile device with speaker and microphone
  - Operating systems
    - MacOS X with macOS 10.9 or later
    - Windows 11, 10, 8.1, 8, 7
    - Ubuntu 12.04 or higher
    - Mint 17.1 or higher
    - Red Hat Enterprise Linux 6.4 or higher
    - iOS 7.0 or later
    - iPadOS 13 or later
    - Android 4.0x or later
  - RAM requirements
    - Processor: Single-core 1Ghz or higher (2+ Ghz is recommended)
    - 4GB of RAM recommended
  - Supported browsers
    - Safari 7+,Edge 12+, IE 11+, Firefox 27+, Chrome 30+

Disclosure of Unlabeled Use

This educational activity may contain discussion of published and/or investigational uses of agents that are not indicated by the FDA. The planners of this activity do not recommend the use of any agent outside of the labeled indications. The opinions expressed in the educational activity are those of the faculty and do not necessarily represent the views of the planners. Please refer to the official prescribing information for each product for discussion of approved indications, contraindications, and warnings.

Disclaimer

Participants have an implied responsibility to use the newly acquired information to enhance patient outcomes and their own professional development. The information presented in this activity is not meant to serve as a guideline for patient management. Any procedures, medications, or other courses of diagnosis or treatment discussed or suggested in this activity should not be used by clinicians without evaluation of their patient's conditions and possible contraindications and/or dangers in use, review of any applicable manufacturer's product information, and comparison with recommendations of other authorities.

Polling Question 1

Where Do You Work?

A.	Surgery Clinic / Doctor's Office
B.	Surgical Center / Hospital
C.	Pre-op Area
D.	Operating Room
E.	Immediate Post-op Area
F.	Other

What Is Your Role?

A.	Administration
B.	Anesthetist / CRNA
C.	CNA
D.	Environmental Services
E.	Infection Preventionist
F.	Physician
G.	NP / PA
H.	Nurse
I.	Surgeon
J.	Other

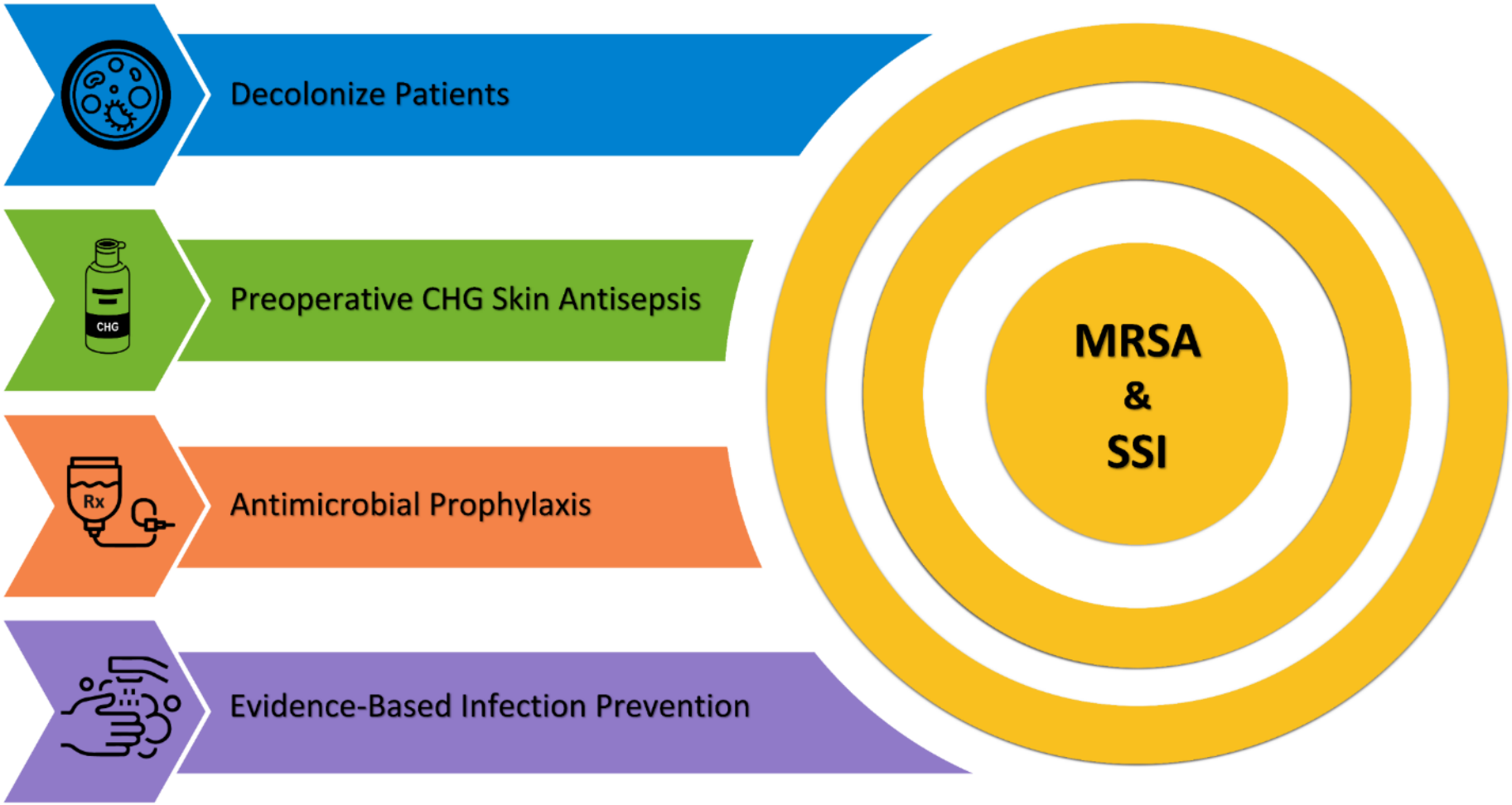
Webinar # 9: Pre-Operative CHG

Part 1 of 4

Pre-Operative CHG

Key Strategies To

Target MRSA and Surgical Site Infections



Decolonization

SSI Prevention Phases

Office / Home

Pre-op

Polling Question 2

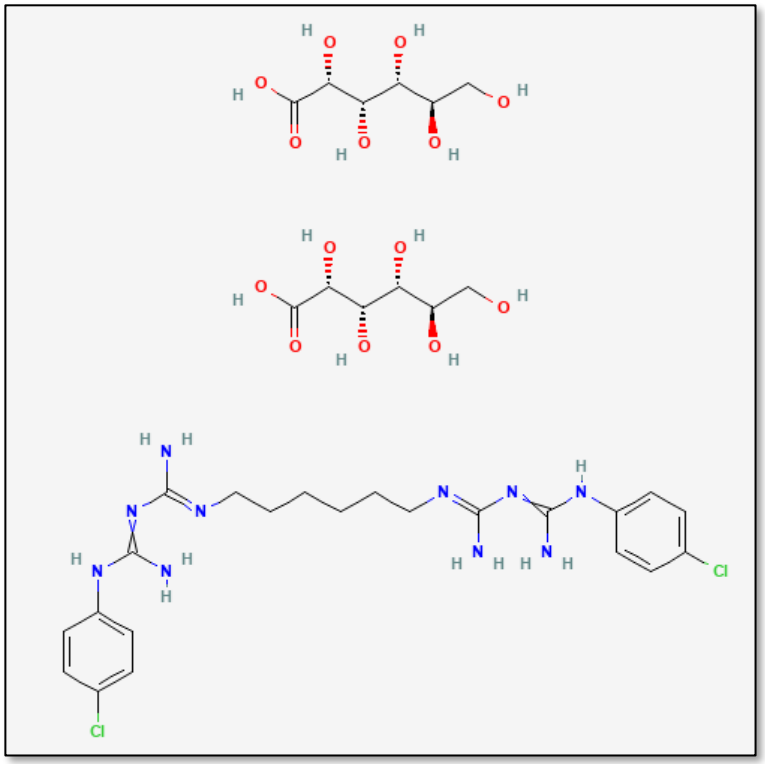
Has your team previously implemented pre-op CHG for your surgical patients?

A. Our team has already previously utilized night before/morning of CHG and succeeded.
B. Our team has already previously utilized CHG for 5 days before surgery and succeeded.
C. Our team has previously implemented pre-op CHG but has not succeeded.
D. We have not previously utilized pre-op CHG for our patients and are starting that process now
E. We have not previously utilized pre-op CHG and do not think this will be feasible for our site

Recap: CHG

- Cationic antiseptic that disrupts cell membranes
- Binds to skin proteins, broadly active
- Provides germicidal kill for up to 24 hours
- Common preparations:
  - 0.12% mouthwash
  - 2% no-rinse skin antiseptic
  - 4% rinse-off skin antiseptic

Chlorhexidine gluconate[1]



1. National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 29089. https://pubchem.ncbi.nlm.nih.gov/compound/29089. Accessed May 9,, 2023.

How Pre-Operative CHG Bathing Has Been Studied

- CHG bathing alone (i.e., night before and morning of surgery)
- As part of decolonization program that uses CHG bathing and nasal decolonization (x5 days)
- Common CHG preparations are cloths (2%) and wash (4% [preferred] and 2%)

CHG Bathing for 5 Days Before Surgery (with Nasal Decolonization)

Bode et al, 2010:[2]

- 5 hospitals, 2005-2007
  - 88.1% surgical patients
  - *S. aureus* nasal carriers, screened on admission
- Randomized: nasal mupirocin and CHG soap/bathing x5 days vs placebo
- ↓ 58% risk of *S. aureus* infection
- ↓ 79% risk of deep SSI

Bode et al, 2016:[3]

- Mortality in 80 surgical patients
- Mupirocin and CHG: 62% reduction in mortality

"STOP SSI" - Schweizer et al, 2015[4]

- Pragmatic study including 20 US hospitals, 2013-2014
  - Cardiac surgery, orthopedic knee and hip surgery
  - Bundled intervention among *S. aureus* colonized patients – intra-nasal mupirocin and CHG bathing (x5 days) and optimal perioperative antimicrobial prophylaxis
- ↓42% complex *S. aureus* SSIs in all operations

2. Bode LG, Kluytmans JA, Wertheim HF, et al. Preventing surgical-site infections in nasal carriers of *Staphylococcus aureus*. N Engl J Med. 2010 Jan 7;362(1):9-17. PMID: 20054045.
3. Bode LG, van Rijen MML, Wertheim HF, et al. Long-term mortality after rapid screening and decolonization of Staphylococcus aureus carriers. Ann Surg. 2016 Mar;263(3):511-5. PMID: 26565136.
4. Schweizer M, Hsiu-Yin C, Septimus E, et al. Association of a bundled intervention with surgical site infections among patients undergoing cardiac, hip, or knee surgery. JAMA 2015 Jun 2; 313(21):2162-71. PMID: 26034956.

CHG Bathing Night Before/Morning of Surgery (with Nasal Decolonization)

Phillips et al, 2014:[5]

- Joint arthroplasty and spinal fusion
- Utilized CHG night before/morning of surgery with either mupirocin or iodophor

Bebko et al, 2015:[6]

- Elective orthopedic surgery with hardware implantation
- CHG night before/morning of surgery plus iodophor
- 76% decreased risk of developing SSI, compared to pre-intervention

5. Phillips M, Rosenberg A, Shopsin B, et al. Preventing surgical site infections: a randomized, open-label trial of nasal mupirocin ointment and nasal povidone-iodine solution. Infect Control Hosp Epidemiol. 2014 Jul;35(7):826-32. PMID: 24915210.
6. Bebko SP, Green DM, Awad SS. Effect of a preoperative decontamination protocol on surgical site infections in patients undergoing elective orthopedic surgery with hardware implantation. JAMA Surg. 2015 May;150(5):390-5. PMID: 25738898.

CHG Bathing Night Before/Morning of Surgery

Eiselt, 2009:[7]

- Total joint replacement, single center
- 2% CHG wipes night before/morning of surgery
- 50.2% reduction in SSIs

Kapadia et al, 2016:[8]

- Total knee arthroplasty, single center
- 991/3717 patients used the 2% CHG wipes
- 84% reduction in SSIs with use of CHG

7. Eiselt D. Presurgical skin preparation with a novel 2% chlorhexidine gluconate cloth reduces rates of surgical site infection in orthopedic surgical patients. Orthop Nurs. 2009 May-Jun;28(3):141-5. PMID: 19494763.
8. Kapadia BH, Zhou PL, Jauregui JJ, et al. Does preadmission cutaneous chlorhexidine preparation reduce surgical site infections after total knee arthroplasty? Clin Orthop Relat Res. 2016 Jul;474(7):1592-8. PMID: 26956247.

Summary: CHG Prior to Surgery

- Preferred: Pre-op CHG bathing x5 days, as part of decolonization
- Alternative: CHG bathing night before/morning of surgery, as part of decolonization
- Consider: work-flow, patient population, local preferences

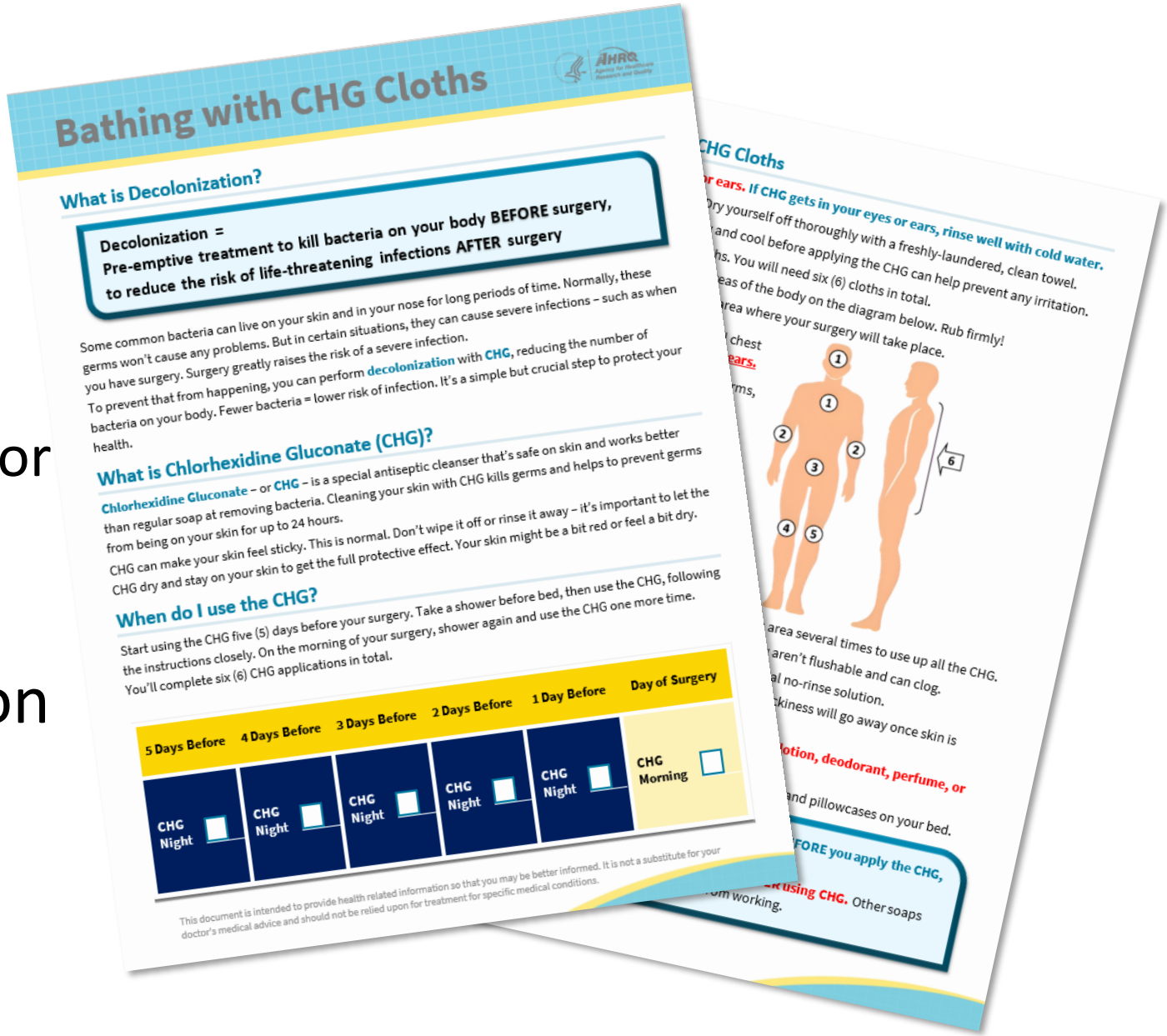
Webinar #9: Pre-Operative CHG

Part 2 of 4

Teaching Patients about CHG Bathing

CHG Bathing: Information for Patients

- Provide information to patients:
  - Purpose
  - Instructions for use
- Patient Education Tools



Bathing with CHG Cloths

What is Decolonization?

Decolonization =
Pre-emptive treatment to kill bacteria on your body BEFORE surgery,
to reduce the risk of life-threatening infections AFTER surgery

Some common bacteria can live on your skin and in your nose for long periods of time. Normally, these germs won't cause any problems. But in certain situations, they can cause severe infections – such as when you have surgery. Surgery greatly raises the risk of a severe infection.
To prevent that from happening, you can perform decolonization with CHG, reducing the number of bacteria on your body. Fewer bacteria = lower risk of infection. It's a simple but crucial step to protect your health.

What is Chlorhexidine Gluconate (CHG)?

Chlorhexidine Gluconate – or CHG – is a special antiseptic cleanser that's safe on skin and works better than regular soap at removing bacteria. Cleaning your skin with CHG kills germs and helps to prevent germs from being on your skin for up to 24 hours.
CHG can make your skin feel sticky. This is normal. Don't wipe it off or rinse it away – it's important to let the CHG dry and stay on your skin to get the full protective effect. Your skin might be a bit red or feel a bit dry.

When do I use the CHG?

Start using the CHG five (5) days before your surgery. Take a shower before bed, then use the CHG, following the instructions closely. On the morning of your surgery, shower again and use the CHG one more time.
You'll complete six (6) CHG applications in total.

5 Days Before	4 Days Before	3 Days Before	2 Days Before	1 Day Before	Day of Surgery
CHG Night ☐	CHG Night ☐	CHG Night ☐	CHG Night ☐	CHG Night ☐	CHG Morning ☐

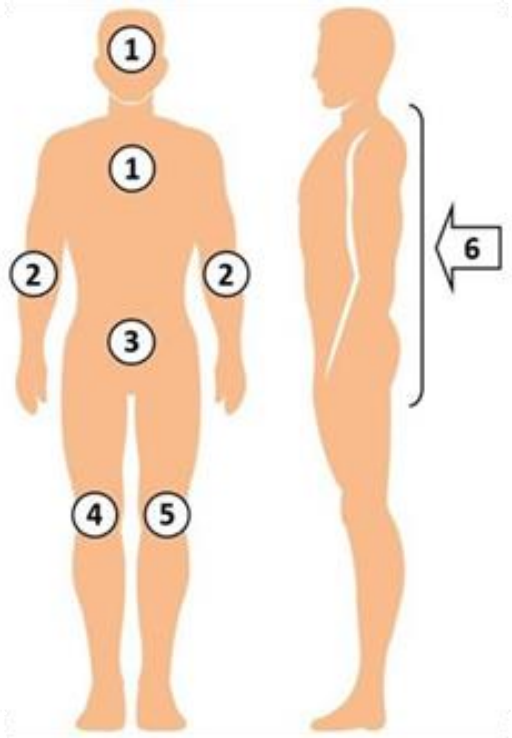
This document is intended to provide health related information so that you may be better informed. It is not a substitute for your doctor's medical advice and should not be relied upon for treatment for specific medical conditions.

CHG Bathing: Purpose

- CHG is a skin antiseptic cleanser to reduce the amount of bacteria that are naturally present on your skin
- CHG is active and can kill bacteria up to 24 hours after application
- Safe to use, and used in healthcare for over 50 years
- Using CHG bathing before surgery can help reduce the risk of infection

CHG Bathing: Instructions For Use

- Be clear if using liquid soap (4%) or pre-impregnated wipes (2%)
- Give instructions on how and where to use either product
  - Providing instructions increases the concentration of CHG on skin surface[9]
- Do not use other skin products after CHG
- What to expect
  - May take a few minutes to fully dry
  - Sticky
  - Skin may be slightly red



9. Edmiston CE, Krepel CJ, Seabrook GR, et al. Preoperative shower revisited: can high topical antiseptic levels be achieved on the skin surface before surgical admission? J Am Coll Surg. 2008 Aug;207(2):233-9. PMID: 18656052.

CHG: Liquid Soap vs Wipes

4% Liquid Soap	2% Wipes
Available over the counter	Ease of use
Lower cost	Higher cost
	Concentration of CHG on skin is higher[9]

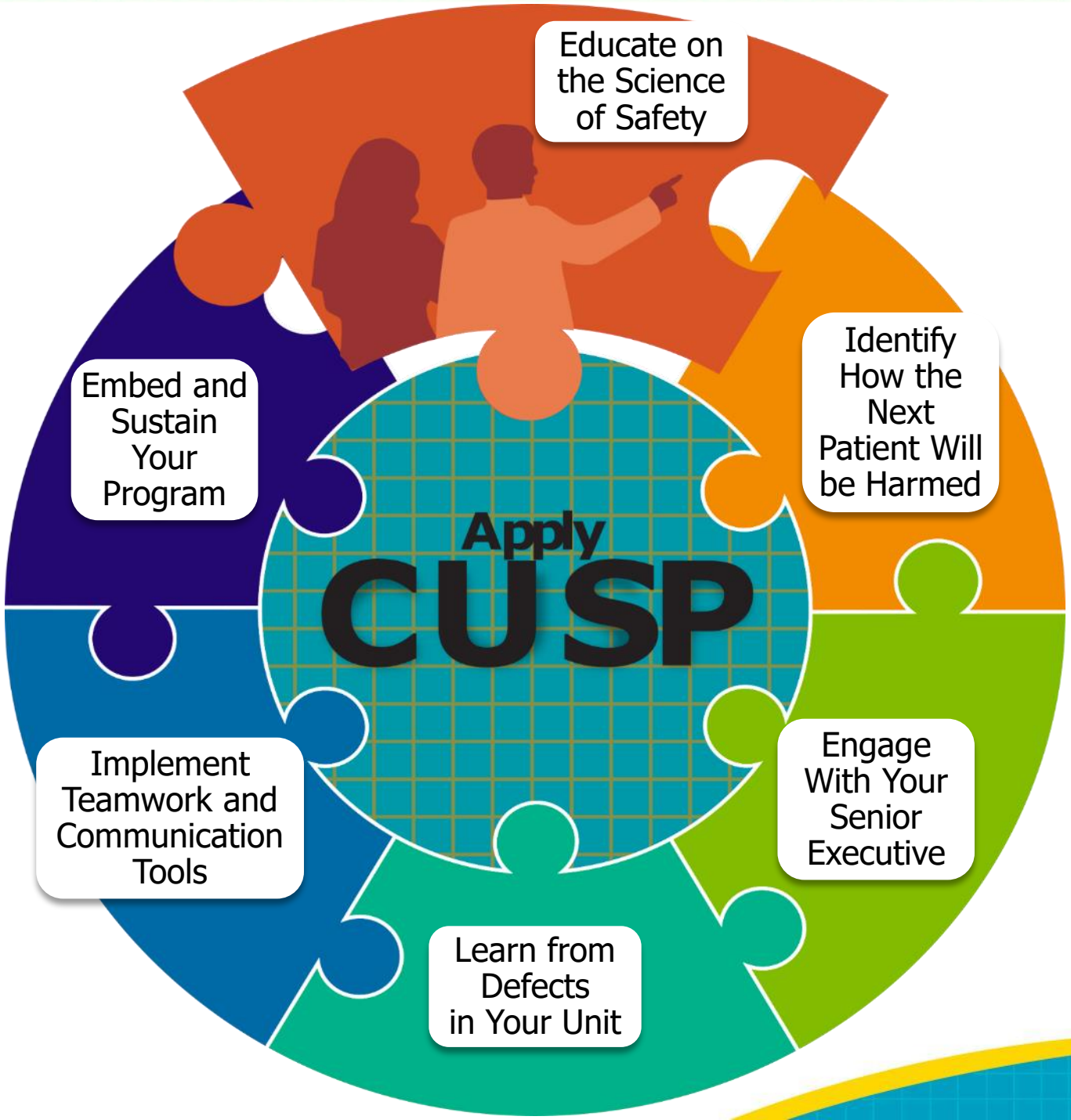
9. Edmiston CE, Krepel CJ, Seabrook GR, et al. Preoperative shower revisited: can high topical antiseptic levels be achieved on the skin surface before surgical admission? J Am Coll Surg. 2008 Aug;207(2):233-9. PMID: 18656052.

Summary: CHG Bathing Prior to Surgery

- **Preferred:** Pre-op CHG bathing x5 days, as part of decolonization
- **Alternative:** CHG bathing night before/morning of surgery, as part of decolonization
- **Consider:** workflow, patient population, local preferences
  - Provide clear instructions and information
- **With either strategy:** opportunity to "check" adherence and perform in peri-operative area before surgery
  - Peri-Operative Checklist is available on program website

SSI Investigation Tool and LFD

CUSP: Working Together to Identify Defects



SSI Investigation Tool

PREVENT HAIs Healthcare-Associated Infections

AHRQ Safety Program for MRSA Prevention: Targeting SSI

Surgical Site Infection Investigation Tool

Problem statement: Your team cannot always predict which patients will develop a surgical site infection (SSI), but you can learn from them when they occur. To improve, perioperative teams need a structured approach to investigate infections at a systems level and develop strategies to address the underlying contributing factors.

Introduction

Purpose of this tool: This tool will help your CUSP team understand lapses in infection prevention processes that may have contributed to your SSI case. It can help your team identify practice patterns and inconsistencies in practice, so you can more easily pinpoint opportunities for improvement.

Please adapt this tool: A team of clinicians designed this tool to assess practice variability in their perioperative area. Your team may want to investigate care processes that are not included in this tool, and this tool may include processes that your team does not use. Please modify this tool to best fit your team's needs.

How to use this tool: Your team should investigate as many SSIs as possible, but there is no right number to review. A CUSP team member can abstract this information from the patient's chart and present it to the team at a routine CUSP meeting. If you already have an SSI review process, you can embed this tool into your existing process. Only your team knows the approach that will work best in your perioperative area.

How to use investigation data: Even if some CUSP team members are not part of the data collection process, the entire improvement team is responsible for creating a cohesive plan to address performance gaps. If the investigation reveals variability in surgical care, your CUSP team can use additional audit tools to dig deeper into the care delivery system. Once your defects have been clearly identified, your team can then use the Learning from Defects Tool to design a quality improvement (QI) intervention to address them. You should also share investigation results monthly or quarterly with your frontline staff and Peri-op leadership (if they are not part of your CUSP team) to make them aware of ongoing quality issues.

AHRQ Agency for Healthcare Research and Quality

The Purpose of the SSI investigation Tool

Purpose of this tool: This tool will help your CUSP team understand lapses in infection prevention processes that may have contributed to your SSI case. It can help your team identify practice patterns and inconsistencies in practice, so you can more easily pinpoint opportunities for improvement.

- Tool that is easy and actionable
- Helps your CUSP team understand what may have contributed to an SSI
- Helps your team identify where opportunities for improvement exist

Who Should Use the SSI Investigation Tool

Please adapt this tool: A team of clinicians designed this tool to assess practice variability in their perioperative area. Your team may want to investigate care processes that are not included in this tool, and this tool may include processes that your team does not use. Please modify this tool to best fit your team's needs.

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Example of SSI investigation Tool Use

- SSI Investigation Tool includes:
  - Prompts to confirm practices across several known and evidence-based contributors to things that can go wrong in surgical procedures.
  - Normothermia maintenance
  - Glucose control
  - Nasal decolonization and skin preparation
  - Use of prophylactic antibiotics.

- If you already have a review process for SSI's
  - Review the SSI Investigation Tool and adapt
  - Make sure your team feels like this tool is applicable for your environment

Identifying the Defects

- To complete the questions in the SSI Investigation Tool, you may need other sources of information outside of the electronic patient record.
- Get creative with ideas to show patient adherence, brainstorm with your team to create ideas.
- Make sure to include frontline staff as these individuals are often interacting with patients the most.

Summary

- Domains of the SSI Investigation Tool:
  - Patient and Procedure-related Factors
  - Normothermia Maintenance
  - Glucose Control
  - Nasal Decolonization and Skin Preparation
  - Oxygenation
  - Prophylactic Antibiotics

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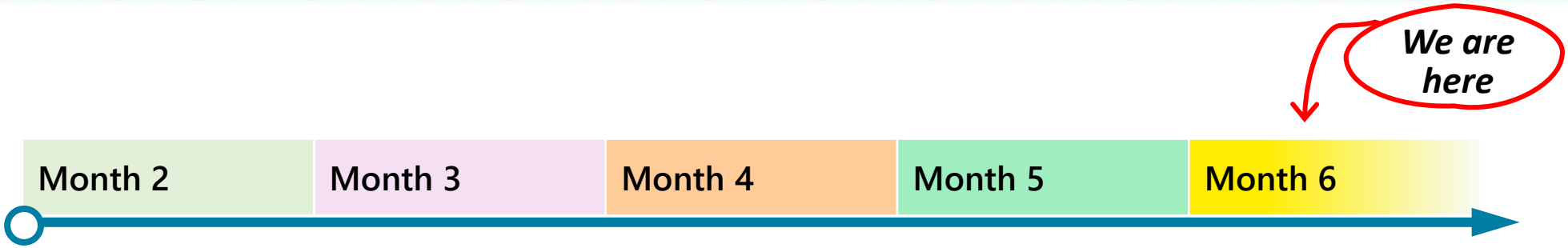
Next Steps

- Variations exist in practices across settings and the SSI Investigation Tool can help identify defects.
- The SSI Investigation Tool includes many different care processes that may be associated with MRSA and SSI infections.
- Using the SSI Investigation Tool in conjunction with CUSP practices can help staff and teams Learn from Defects.
- Once you identify a potential defect, your CUSP team can apply the CUSP Learn from Defects tool to prevent mistakes from happening again.

MRSA & SSI Prevention Program Timeline

Where should you be in the process?

Implementation Timeline



Completed Activities – Month 6

- ✓ Identify CUSP Team Leads
- ✓ Identify CUSP Team members
- ✓ Schedule CUSP Team meetings
- ✓ Finalize process for clinical data extraction and submission
- ✓ Submit initial Gap Analysis and HSOPS data
- ✓ Distribute and collect the Staff Safety Assessment

Upcoming Implementation Activities

Upcoming Activities – Month 6

- ✓ Review the results of the Staff Safety Assessment
  - Prioritize defects by the potential level of risk.
  - Select one defect and develop a plan to address that defect.
- ✓ During next CUSP meeting discuss the following topics:
  - Review the evidence for CHG bathing and decolonization.
  - Discuss how you can incorporate CHG bathing into your phases of care
  - Discuss whether to implement universal vs targeted strategies.
  - Discuss what decolonization agents you will use and how you will distribute products to patients.
  - Discuss how you will measure patient compliance and the impact of your intervention.

Upcoming Data Submission Deadlines

Data Collection Tool	Due Date
May Team Checkup Tool	6/30/2023
Retrospective Clinical Outcomes (January 2022-December 2022)	6/30/2023
Retrospective STS Data Extraction Tool (January 2022-December 2022)	6/30/2023
Quarter 1 STS Data Extraction Tool (January 2023-March 2023)	7/31/2023
Quarter 1 Clinical Outcomes Survey (January 2023-March 2023)	8/31/2023

Program Website Access

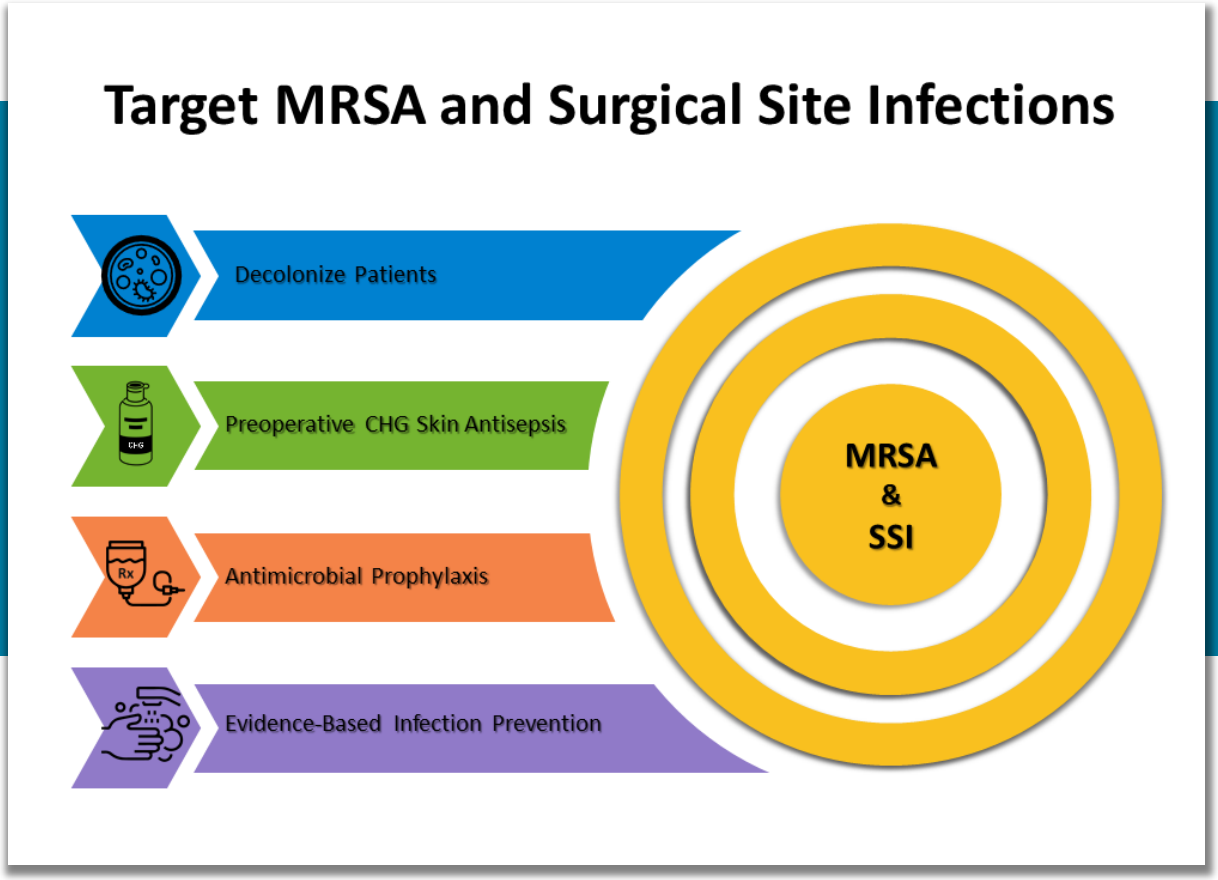
Project Website: http://safetyprogram4mrsaprevention.org

Project Email: MRSAPrevention@norc.org

Thank You

Questions?

Email:
MRSAPrevention@norc.org



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http://safetyprogram4mrsaprevention.org

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- The findings and recommendations in this webinar are those of the authors, who are responsible for its content, and do not necessarily represent the views of AHRQ. No statement in this webinar should be construed as an official position of AHRQ or of the U.S. Department of Health and Human Services.

- Any practice described in this webinar must be applied by health care practitioners in accordance with professional judgment and standards of care in regard to the unique circumstances that may apply in each situation they encounter. These practices are offered as helpful options for consideration by health care practitioners, not as guidelines.

References

1. National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 29089. https://pubchem.ncbi.nlm.nih.gov/compound/29089. Accessed May 9, 2023.
2. Bode LG, Kluytmans JA, Wertheim HF, et al. Preventing surgical-site infections in nasal carriers of *Staphylococcus aureus*. N Engl J Med. 2010 Jan 7;362(1):9-17. PMID: 20054045.
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