Chlorhexidine Bathing
Practical Advice

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Disclosures

Conducting clinical trials and studies in which participating hospitals and nursing homes are receiving contributed product from Sage Products, 3M, Clorox, and Molnlycke
The Case for Chlorhexidine
What is Chlorhexidine (CHG)?

- Chemical antiseptic (1950, England)
- Active against bacteria and fungi
- Works by disrupting cell membranes
- Colorless and odorless
- Available in 0.12%, 2%, and 4% aqueous formulations
Chlorhexidine Uses

- Dental – gingivitis, periodontal disease
- Central line skin prep
- Surgical skin prep
- Surgical pre-operative bathing
- Wound cleanser
- Bathing to reduce microbial burden and infection
Source Control

• Numerous pathogens
• Resistance rising
• Shedding is common and persistent
• Contamination hard to remove
• Need a broad solution
• Impact carriers not just prevent new carriers
Effect of Daily Chlorhexidine Bathing on Hospital-Acquired Infection

Michael W. Climo, M.D., Deborah S. Yokoe, M.D., M.P.H., David K. Warren, M.D., Trish M. Perl, M.D., Maureen Bolon, M.D., Loreen A. Herwaldt, M.D., Robert A. Weinstein, M.D., Kent A. Sepkowitz, M.D., John A. Jernigan, M.D., Kakotan Sanogo, M.S., and Edward S. Wong, M.D.

- 7 academic hospitals, 12 ICUs
- 23% decrease in MDRO acquisition
- 27% decrease in bloodstream infection
- 53% decrease in central line infections

Pediatric SCRUB Trial
Scrubbing with CHG Reduces Unwanted Bacteria

Daily chlorhexidine bathing to reduce bacteraemia in critically ill children: a multicentre, cluster-randomised, crossover trial

Aaron M Milstone, Alexis Eward, Xiaoyan Song, Danielle M Zerr, Rachel Orscheln, Kathleen Speck, Daniel Obeng, Nicholas G Reich, Susan E Coffin, Trish M Perl, for the Pediatric SCRUB Trial Study Group

• 5 academic hospitals, 10 pediatric ICUs
• 36% decrease in bloodstream infection

The REDUCE MRSA Trial
• 43 hospitals, 74 ICUs
• Community hospitals
• Universal decolonization with CHG bathing and nasal mupirocin: 37% reduction in MRSA, 44% reduction in all-cause bacteremia

Targeted versus Universal Decolonization to Prevent ICU Infection

Susan S. Huang, M.D., M.P.H., Edward Septimus, M.D., Ken Kleinman, Sc.D., Julia Moody, M.S.,
Jason Hickok, M.B.A., R.N., Talisier R. Avery, M.S., Julie Lankiewicz, M.P.H., Adriana Gomboshev, B.S.,
Leah Terpstra, B.A., Fallon Hartford, M.S., Mary K. Hayden, M.D., John A. Jernigan, M.D., Robert A. Weinstein, M.D.,
Victoria J. Fraser, M.D., Katherine Haffrenreffer, B.S., Eric Cui, B.S., Rebecca E. Kaganov, B.A., Karen Lolans, B.S.,
Jonathan B. Perlin, M.D., Ph.D., and Richard Platt, M.D., for the CDC Prevention Epicenters Program
and the AHRQ DECIDE Network and Healthcare-Associated Infections Program

Pragmatic Protocol: REDUCE MRSA Trial

- Goal was to test QI strategy
  - Leveraged routine infrastructure at each site
  - No research staff on site
  - Provided protocol, education, tools, coaching calls, observation forms
  - Intent was to reflect what a usual US hospital could achieve if protocol implemented
Post-Trial Roll Out
Hospital Corporation of America

- Release of ICU universal decolonization protocol to 90 hospitals, 136 ICUs
  - Rolled out post-abstract Jan-July 2013
  - 24% reduction in CLABSI

Septimus, IDWeek 2014 (In press, CID)
Secondary Outcomes for Universal Decolonization

• Blood culture contamination decreased by 45% ¹
• Urinary bacterial colony counts in men ²
  – 37% reduction in candiduria
  – 26% reduction in low level bacteriuria
• Cost effectiveness per 1,000 ICU admissions ³
  – Saves $171,000 (USD) (vs. screening and isolation)
  – Prevents 9 additional bloodstream infections

Implementation Pitfalls and Pearls for Chlorhexidine Bathing
Things That Matter

- Method
- Concentration
- Consistency
- Safety
Decolonization Method

• Technique
  – Massage into skin for sustained 24 hour activity
  – No rinse

• Protocol
  – Attention to high risk skin areas
  – Clean over non-gauze dressings
  – Proximal 6 inches of lines, catheters, devices
  – Perineum and wounds
  – Interactions – many soaps and shampoos inactivate
Chlorhexidine Concentration

• Concentration matters
  – 2% no-rinse cloth most commonly studied
  – 4% no rinse solution → higher skin adverse events
  – 4% rinse solution in shower or bath
    • Lower but adequate concentrations
    • 2 minute contact time → rinse
    • Mesh sponge works well for liquid application
Consistency

- Consistency
  - 24 hour effect → daily application
  - Staff training \(^1\)
    - Include night and temporary staff
    - Reinforce method: no rinse and high risk areas
    - Compliance checks

\(^1\) Popovich et al. Intensive Care Med 2010;36(5):854-8
Safety: Minimal Adverse Events

• <1% Attributable Mild Skin Reactions
• Climo et al.
  – 2.0% CHG skin reactions vs 3.4% regular soap
• REDUCE MRSA
  – 7 mild events (<0.1%)
• Pediatric SCRUB Trial
  – 3% (n=43) CHG vs 1% (n=26) of controls
  – Mild skin reactions, only 12 believed to be related
• Anaphylaxis rare
AHRQ Website: Toolkit

Universal ICU Decolonization: An Enhanced Protocol

Introduction and Welcome

This enhanced protocol is based on materials successfully used in the REDUCE MRSA Trial (Randomized Evaluation of Decolonization vs. Universal Clearance to Eliminate Methicillin-Resistant Staphylococcus aureus), which found that universal decolonization was the most effective intervention. Universal decolonization led to a 37 percent reduction in MRSA clinical cultures and a 44 percent reduction in all-cause bloodstream infections.

Toolkit Contents

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Introduction and Welcome
Universal ICU Decolonization Protocol Overview
Scientific Rationale
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Appendix D. Universal ICU Decolonization Nursing Protocol
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Appendix F. Chlorhexidine Bathing Skills Assessment
Appendix G. Safety and Adverse Events
Appendix A. Steps for Implementing Universal Decolonization

1. Assess the quality of the evidence and the need for intervention
2. Decision to adopt Universal ICU Decolonization per REDUCE MRSA Trial
3. Consider intervention scope across adult ICUs
4. Assess timing of intervention and elements of provided protocol
5. Garner institutional support from key stakeholders
6. Identify physician and nursing champions for each participating ICU
7. Finalize protocol and obtain committee approval
8. Set launch date, stock product, and address compatibility issues
9. Education and training
10. Assess adherence and impact
Universal ICU Decolonization

**DO**
- Use chlorhexidine (CHG) baths in place of daily bathing with soap and water.
- Massage firmly into skin to bind skin proteins and prevent bacteria for 24 hours.
- Give CHG baths every day for entire ICU stay.
- Use nasal mupirocin twice a day for 5 days of ICU stay.
- Only use CHG-compatible lotions.
- Restart entire protocol for readmitted ICU patients.
- Clean 6 inches of tubing closest to body.
- Use over superficial wounds, including stages 1 and 2 decubitus ulcers.

**DON’T**
- Do NOT use above jawline.
- Do NOT rinse or wipe off CHG. Let air dry.
- Do NOT flush CHG cloths (discard in trash, not toilet or commode).
- Do NOT continue protocol after ICU discharge.
- Do NOT include patients who are allergic to mupirocin and/or CHG.

Current recommendations to avoid eyes and ear canal
Appendix F. CHG Bathing Skills Assessment

Please record your observations when monitoring a patient being bathed with CHG.

<table>
<thead>
<tr>
<th>Observed CHG Bathing Practices</th>
</tr>
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<tbody>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Cleanses entire neck area well including skin folds and around ears.</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Massages skin firmly with CHG cloth to ensure adequate cleansing.</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>States rationale for not using soap below jaw line at any time.</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Uses all six cloths and more if needed.</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Cleans armpit and back of knee well.</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Cleans in between toes and fingers.</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Cleans between all folds in perineal and genital area.</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Wipes occlusive and semi-permeable dressing with CHG cloth.</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Cleans tubing, lines, and drains closest to body (after emptying drains).</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Bathing is completed with no skin below jaw line missed.</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Uses CHG on superficial wounds, rash, and stage 1 &amp; 2 decubitus ulcers.</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Uses on closed surgical wounds.</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Allows to air dry/does not wipe off CHG.</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>CHG bathing documented.</td>
</tr>
</tbody>
</table>

Queries to Bathing Assistant/Nurse

1. Do you ever use soap in conjunction with a CHG bathing cloth? If so, when?

2. Do you reapply CHG after an episode of incontinence?

3. If a patient needs freshening up/second bath, do you use CHG cloths or a different product?

4. Are you comfortable applying CHG to superficial wounds?

5. Are you comfortable applying CHG to stage 1 & 2 decubitus ulcers?

6. Are you comfortable applying CHG to closed surgical wounds?

7. Do you ever wipe off the CHG after bathing?
Decolonization Trials in Progress

• ICU
  REDUCE MRSA Trial →
  Mupirocin-Iodophor Swapout

• Non-ICU
  ABATE Infection Trial

• Post-Discharge
  Project CLEAR

• Nursing Homes
  PROTECT Trial

• Regions
  SHIELD Orange County
Questions?