Chlorhexidine Gluconate: The “It” Antiseptic?

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PDI Healthcare
Disclosure

I am an employee of the clinical team of PDI Healthcare. The content of this presentation is not representative of the views of PDI or its ownership.

There will be NO discussion of any PDI products and/or solutions in accordance with CE Requirements
Objectives

- Define the mechanism of action of chlorhexidine gluconate (CHG)
- Understand the two modes of bacterial pathogenesis into the bloodstream from intravascular devices
- Define the uses of CHG to prevent central line-associated bloodstream infections (CLABSI)
- State the current CDC recommendations for the use of CHG to prevent CLABSI
- Define the mechanism for development of CHG resistance
CHG Mechanism of Action

- Broad spectrum topical anti-infective; active against gram-positive, gram-negative bacterial pathogens and fungi responsible for healthcare-associated infections (HAIs)
- Disrupts cytoplasmic membranes
CHG Mechanism of Action

- Bathing with no-rinse 2% CHG-impregnated cloths; patient samples processed for CHG concentration and microbial colonization
- Swab samples were taken from the neck, antecubital fossae and inguinal areas at 1 hour before and 1, 4, and 23 hours after the bath
- CHG concentration correlated inversely with density of gram-positive bacteria on patient’s skin
- Residual antimicrobial activity persists on the skin up to 24 hours

1Popovich KJ et al. Relationship between chlorhexidine gluconate skin concentration and microbial density on the skin of critically ill patients bathed daily with CHG. Infect Control Hosp Epidemiol 2012;33(9):889-896.
Chlorhexidine Applications As An Infection Prevention Tool

- Uses with FDA –approval and strong evidence of efficacy\(^1\)
  - Surgical hand scrub: an 86%-92% reduction in hand skin flora
  - General skin cleansing: significant reduction in normal skin flora, gram-negative organisms and \textit{S. aureus}
  - Preoperative scrub: superior to other antiseptics in reducing skin flora at surgical site
  - Central venous catheter site preparation: 49% reduction in catheter-related BSI comparing skin prep with chlorhexidine vs. povidone -iodine
  - Vascular catheter dressings: reduction in catheter colonization
  - Epidural catheter dressings: reduction in catheter colonization

\*Use for intravascular catheter maintenance to disinfect needleless connectors

\(^1\)Milstone AM, Passaretti CL, Perl TM. Chlorhexidine: Expanding the Armamentarium for Infection Control and Prevention. CID 2008:46; 274-281.
Chlorhexidine Applications to Reduce CLABSI

• Cutaneous antisepsis

• Catheter hub disinfection
Pathogenesis of Intravascular Device-Related Bloodstream Infections (BSI)

- Microorganisms gain access to the device surface, adhere and become incorporated into a biofilm

- Access to the extraluminal surface of the device
  - Cutaneous origin from skin flora at the insertion site or from healthcare worker’s hands; percutaneous tract invaded
  - Density of skin flora at the insertion site is a major risk factor for CLABSIs

- Access to the intraluminal surface of the device
  - Catheter hub and lumen contamination from device manipulation
CHG: Preventing Extraluminal Entry of Microorganisms: Cutaneous antisepsis

- “CHG is superior to povidone-iodine indicating that CHG-containing antiseptics should be first choice for the insertion of vascular access devices”


<table>
<thead>
<tr>
<th>Technology</th>
<th>No. of trials</th>
<th>Study technology</th>
<th>Control device</th>
<th>RR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorhexidine (vs. povidone-iodine) cutaneous antisepsis</td>
<td>5</td>
<td>14/931</td>
<td>33/1213</td>
<td>0.55 (0.22–1.15)</td>
<td>.07</td>
</tr>
</tbody>
</table>

Purpose: Bloodstream infections related to use of catheters, particularly central-line catheters, are an important cause of patient morbidity, mortality, and increased health care costs. This study evaluated the efficacy of skin disinfection with chlorhexidine gluconate compared with povidone-iodine solution in preventing catheter-related bloodstream infection.

Data Sources: Multiple computerized databases (1966 to 2001), reference lists of identified articles, and queries of principal investigators and antiseptic manufacturers.

Study Selection: Randomized, controlled trials comparing chlorhexidine gluconate with povidone-iodine solutions for catheter-site care.

Data Extraction: Using a standardized form, two reviewers abstracted data on study design, patient population, intervention, and incidence of catheter-related bloodstream infection from all included studies.

Data Synthesis: Eight studies involving a total of 4143 catheters met the inclusion criteria. All studies were conducted in a hospital setting, and various catheter types were used. The summary risk ratio for catheter-related bloodstream infection was 0.49 (95% CI, 0.28 to 0.88) in patients whose catheter sites were disinfected with chlorhexidine gluconate instead of povidone-iodine. Among patients with a central vascular catheter, chlorhexidine gluconate reduced the risk for catheter-related bloodstream infection by 49% (risk ratio, 0.51 [CI, 0.27 to 0.97]).

Conclusions: These results suggest that incidence of bloodstream infections is significantly reduced in patients with central vascular lines who receive chlorhexidine gluconate versus povidone-iodine for insertion-site skin disinfection. Use of chlorhexidine gluconate is a simple and effective means of reducing vascular catheter-related infections.

CDC Recommendations: CHG Use to Prevent Intravascular Catheter-Related Infections

- Provide evidence-based recommendations
- Categorized on the basis of existing scientific data and theoretical rationale
  - Category IA. Strongly recommended for implementation and strongly supported by well designed experimental, clinical, or epidemiologic studies.
  - Category IB. Strongly recommended for implementation and supported by some experimental, clinical, or epidemiologic studies and a strong theoretical rationale; or an accepted practice e.g., aseptic technique) supported by limited evidence.
  - Category IC. Required by state or federal regulations, rules, or standards.
  - Category II. Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale.
  - Unresolved issue. Represents an unresolved issue for which evidence is insufficient or no consensus regarding efficacy exists.


O’Grady NP et al.
CDC Recommendations: CHG Use to Prevent Intravascular Catheter-Related Infections

Cutaneous antisepsis:

- Prepare clean skin with a >0.5% chlorhexidine preparation with alcohol before central venous catheter and peripheral arterial catheter insertion and during dressing changes. If there is a contraindication to chlorhexidine, tincture of iodine, an iodophor, or 70% alcohol can be used as alternatives. Category 1A
CDC Recommendations: Best Practices Checklist

Checklist for Prevention of Central Line Associated Blood Stream Infections

Based on 2011 CDC guideline for prevention of intravascular catheter-associated bloodstream infections: https://www.cdc.gov/infectioncontrol/guidelines/bsi/index.html


For Clinicians:
Follow proper insertion practices
- Perform hand hygiene before insertion.
- Adhere to aseptic technique.
- Use maximal sterile barrier precautions (i.e., mask, cap, gown, sterile gloves, and sterile full body drape).
- Choose the best insertion site to minimize infections and noninfectious complications based on individual patient characteristics.
  - Avoid femoral site in obese adult patients.
- Prepare the insertion site with ≥0.5% chlorhexidine with alcohol.
- Place a sterile gauze dressing or a sterile, transparent, semipermeable dressing over the insertion site.
- For patients 18 years of age or older, use a chlorhexidine impregnated dressing with an FDA cleared label that specifies a clinical indication for reducing CLABSI for short term non-tunneled catheters unless the facility is demonstrating success at preventing CLABSI with baseline prevention practices.
CDC Recommendations: CLIP Adherence Monitoring

Central Line Insertion Practices Adherence Monitoring

*Skin preparation (check all that apply)  □ Chlorhexidine gluconate  □ Povidone iodine  □ Alcohol
□ Other (specify): _______________________

If skin prep choice was not chlorhexidine, was there a contraindication to chlorhexidine?  □ Y  □ N  □ U

If there was a contraindication to chlorhexidine, indicate the type of contraindication:

□ Patient is less than 2 months of age - chlorhexidine is to be used with caution in patients less than 2 months of age
□ Patient has a documented/known allergy/reaction to CHG based products that would preclude its use
□ Facility restrictions or safety concerns for CHG use in premature infants precludes its use
CHG: Preventing Intraluminal Entry of Microorganisms: Scrub the Hub

- Disinfection of hubs before every access is recommended to reduce hub contamination
- Optimal disinfectant and hub scrub time are not known
CDC Recommendations: CHG Use to Prevent Intravascular Catheter-Related Infections

Needleless Intravascular Catheter Systems:

- Minimize contamination risk by scrubbing the access port with an appropriate antiseptic (chlorhexidine, povidone iodine, an iodophor, or 70% alcohol) and accessing the port only with sterile devices. **Category 1A**
CHG: Preventing Intraluminal Entry of Microorganisms: Scrub the Hub

epic3: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England

- IVAD30
- A single-use application of 2% CHG in 70% IPA (or PVP/IPA for patients with CHG sensitivity) should be used to decontaminate the access port or catheter hub
- The hub should be cleaned for a minimum of 15 s and allowed to dry before accessing the system
- Class D/GPP
# Summary of US Clinical Guidelines for Disinfection of Needleless Access Devices

<table>
<thead>
<tr>
<th>ORGANIZATION AND GUIDELINE</th>
<th>PORT/HUB CLEANSING RECOMMENDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centers for Disease Control and Prevention: Guidelines for the Prevention of Intravascular Catheter-Related Infections, 2011 <a href="http://www.cdc.gov">www.cdc.gov</a></td>
<td>Minimize contamination risk by scrubbing the access port with an appropriate antiseptic (chlorhexidine, povidone iodine, an iodophor, or 70% alcohol) and accessing the port only with sterile devices. Appropriate disinfectants must be used to prevent transmission of microbes through connectors. Some studies have shown that disinfection of the devices with chlorhexidine/alcohol solutions appears to be most effective in reducing colonization.</td>
</tr>
<tr>
<td>Infusion Nurses Society (INS): Infusion Nursing Standards of Practice, 2011 <a href="http://www.ins1.org">www.ins1.org</a></td>
<td>The needless connector should be consistently and thoroughly disinfected using alcohol, tincture of iodine, or chlorhexidine gluconate/alcohol combination prior to each access. The optimal technique or disinfection time frame has not been identified.</td>
</tr>
<tr>
<td>Society for Healthcare Epidemiology of America (SHEA): Strategies to Prevent Central-Line Associated Bloodstream Infections in Acute Care Hospitals, 2014 <a href="http://www.shea-online.org">www.shea-online.org</a></td>
<td>Before accessing catheter hubs, needleless connectors, or injection ports, vigorously apply mechanical friction with an alcohol chlorhexidine preparation, 70% alcohol, or povidone iodine. Alcoholic chlorhexidine may have additional residual activity compared with alcohol for this purpose. Apply mechanical friction for no less than 5 seconds to reduce contamination.</td>
</tr>
<tr>
<td>Infectious Diseases Society of America (IDSA): Clinical Practice Guidelines for the Diagnosis and Management of Intravascular Catheter-Related Infection: 2009 Update by the Infectious Diseases Society of America. <a href="http://www.idssociety.org">www.idssociety.org</a></td>
<td>If a blood sample is obtained through a catheter, clean the catheter hub with either alcohol or tincture of iodine or alcoholic chlorhexidine (&gt;0.5%), allowing adequate drying to mitigate blood culture contamination (A-1).</td>
</tr>
<tr>
<td>APIC Guide to the Elimination of Infections in Hemodialysis, 2010 <a href="http://www.apic.org">www.apic.org</a></td>
<td>Disinfect IV ports prior to accessing, using friction and 70% alcohol, iodophor, or chlorhexidine/alcohol agent. Allow to dry prior to accessing.</td>
</tr>
</tbody>
</table>
CHG: Preventing Intraluminal Entry of Microorganisms: Catheter Hub Disinfection

Current Evidence – Published *In Vitro* and Clinical Studies
Disinfection of needleless connectors with chlorhexidine-alcohol provides long-lasting residual disinfectant activity

Haeyeon Hong BA\textsuperscript{a}, Debra Forbes Morrow RN, BSN\textsuperscript{b}, Thomas J. Sandora MD, MPH\textsuperscript{c,d}, Gregory P. Priebe MD\textsuperscript{a,c,e,*}

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\textsuperscript{b} Department of Nursing, Boston Children’s Hospital and Harvard Medical School, Boston, MA
\textsuperscript{c} Division of Infectious Diseases, Department of Medicine, Boston Children’s Hospital and Harvard Medical School, Boston, MA
\textsuperscript{d} Department of Laboratory Medicine, Boston Children’s Hospital and Harvard Medical School, Boston, MA
\textsuperscript{e} Division of Critical Care Medicine, Department of Anesthesiology, Perioperative and Pain Medicine, Boston Children’s Hospital and Harvard Medical School, Boston, MA

\textbf{Key Words:}
Central line-associated bloodstream infection
Line maintenance bundle

The optimal disinfection method for needleless connectors (NCs) is unclear. We used an experimental model of microbial NC contamination to test different scrub times (swipe, 5, 15, 30 seconds) of chlorhexidine-alcohol versus alcohol and for residual disinfectant activity. \textit{Swipe with alcohol did not adequately disinfect NCs, particularly when contaminated with Staphylococcus aureus or Pseudomonas aeruginosa. With \geq 5-second scrub, chlorhexidine-alcohol and alcohol performed similarly, but chlorhexidine-alcohol showed residual disinfectant activity for up to 24 hours.}

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CHG: Preventing Intraluminal Entry of Microorganisms: Scrub the Hub

• **Background:**
  - Inadequate needleless connector decontamination can result in microbial contamination of the internal lumen of the central venous access device resulting in colonization and CLABSI

• **Methods:**
  - Microbial *in vitro* study investigating the comparative efficacy of 3 needleless connector decontamination methods and 3 connector types with different durations of application; 648 procedures; *S. aureus*, *S. epidermidis*, *Pseudomonas aeruginosa*, and *Candida albicans* as test organisms. 324 connectors pre-coated with sterile human serum

• **Findings:**
  - Even a 5-sec CHG swabbing (2% CHG/70% alcohol) outperformed other methods with or without human serum exposure: ideal method is 30 seconds with CHG swabs
  - Poor compliance with swabbing may negate the efficacy

Alcohol Caps or Alcohol Swabs With and Without Chlorhexidine: An *In Vitro* Study of 648 Episodes of Intravenous Device Needleless Connector Decontamination

CHG: Preventing Intraluminal Entry of Microorganisms: Scrub the Hub

A fall in bloodstream infections followed a change to 2% chlorhexidine in 70% isopropanol for catheter connection antisepsis: A pediatric single center before/after study on a hemopoietic stem cell transplant ward

Methods:

- Observational before/after study; change from catheter connector antisepsis with 70% alcohol to 2% CHG/70% alcohol
- Primary outcome of CRBSI
- CRBSI rate declined from 12/1000 CL days to 3/1000 CL days (p= 0.004)
- Similar declines seen with introduction on other wards
CHLORHEXIDINE GLUCONATE

CHG: Preventing Intraluminal Entry of Microorganisms: Scrub the Hub

Prospective, randomized, blinded crossover clinical trial in a 24-bed MICU

Findings:

- 113/509 (22%) hubs contaminated
- Use of a 3.15% CHG/70% IPA prep pad was associated with less CVC hub contamination compared to disinfection with 70% IPA alone
- Statistical significance only for a shorter scrub time

<table>
<thead>
<tr>
<th>Study Arm</th>
<th>No. Hubs</th>
<th>No. (%) Contaminated Hubs</th>
<th>Risk Ratio</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHG 5s</td>
<td>112</td>
<td>14 (12)</td>
<td>0.32</td>
<td>0.19, 0.56</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Alcohol 5s</td>
<td>101</td>
<td>39 (39)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHG 15s</td>
<td>102</td>
<td>18 (18)</td>
<td>0.82</td>
<td>0.50, 1.34</td>
<td>0.45</td>
</tr>
<tr>
<td>Alcohol 15s</td>
<td>194</td>
<td>42 (22)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hayden, M. K., et. al. . A Randomized Cross-Over Clinical Trial to Compare 3.15% Chlorhexidine/70% Isopropyl Alcohol (CHG) vs 70% Isopropyl Alcohol Alone (Alcohol) and 5s vs 15s Scrub for Routine Disinfection of Needleless Connectors (NCs) on Central Venous Catheters (CVCs) in an Adult Medical Intensive Care Unit (ICU), Oral Abstract Presented at 2014 ID Week Conference, October 11, 2014, Philadelphia, PA.
CHG: Preventing Intraluminal Entry of Microorganisms: Catheter Hub Disinfection

Quality Improvement Projects presented at Professional Meetings
Changing Port/Hub Disinfection Product Decreases Catheter Related Bloodstream Infections in a Pediatric Intensive Care Unit
Shannon Duffy, RN, BSN; Children’s Hospital, St. Louis, MO.

• BACKGROUND
  • The pediatric intensive care unit (PICU) unable to obtain a zero CLABSI rate.
  • PICU using 70% isopropyl alcohol (IPA) swab for 15-seconds for each central line access; practice not consistent with the NICU where a 3.15% chlorhexidine/70% isopropyl alcohol (CHG/IPA) swab with a 15-second scrub duration was implemented.
  • Approval sought from key stakeholders for trial of the CHG/IPA swab in the PICU.

• METHODS
  • Implemented the CHG/IPA swab for a 6-month trial; historical 12-month CLABSI rates used for the pre-intervention baseline dataset.
  • Education provided to the nursing staff prior to and four months following the implementation.
  • Outcome metric: CLABSI rates; Process metric: compliance with scrub duration; Qualitative assessment of nursing satisfaction with the product.
Changing Port/Hub Disinfection Product Decreases Catheter Related Bloodstream Infections in a Pediatric Intensive Care Unit
Shannon Duffy, RN, BSN; Children’s Hospital, St. Louis, MO.

• FINDINGS
  CLABSI rates decreased from 2.8 infections/1000 CL days to 0.48 infections/1000 CL days
  • Scrubbing compliance consistent throughout the trial.
  • CHG/IPA swab implemented as standard practice for hub disinfection; PICU went 294 days without a CRBSI.

• CONCLUSIONS
  Collaboration with key stakeholders and implementing a new catheter maintenance protocol supported by the literature led to acceptance of the practice change.
Changing Port/Hub Disinfection Product Decreases Catheter Related Bloodstream Infections in a Pediatric Intensive Care Unit

Shannon Duffy, RN, BSN; Children’s Hospital, St. Louis, MO.

<table>
<thead>
<tr>
<th></th>
<th>Average 12 months prior to change</th>
<th>Average 5 months following change</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>April</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSI rate per 1000 line days</td>
<td>2.8</td>
<td>0.42</td>
<td>0</td>
<td>0</td>
<td>2.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total BSIs</td>
<td>12</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Compliance with 15-second scrub</td>
<td>60.1%</td>
<td>79.3%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>0%*</td>
<td>85%</td>
<td>90.9%</td>
</tr>
</tbody>
</table>

* Based on 3 observations made this month

NURSING FEEDBACK

DO YOU LET THE HUB DRY AFTER SCRUBBING?

Always: 46%
Sometimes: 51%
Never: 3%

HOW EFFECTIVELY DO YOU FEEL YOU CAN “SCRUB THE HUB”?

- Completely: 5%
- Partially: 29%
- Not at all: 66%
Our NICU Journey to Zero Central Line-Associated Bloodstream Infections: Special Patients Require Special Interventions
Janet Pettit, MSN, NNP-BC, CNS, Neonatal Nurse Practitioner, Doctor’s Medical & Kaiser Permanente Medical Center

• BACKGROUND
- Neonates at high-risk for central line-associated bloodstream infections
- Challenge is lack of well-documented, evidence-based practice guidelines.
- Use of chlorhexidine gluconate (CHG) solutions are best practice for skin antisepsis for central line insertion and maintenance in the adult population, but no CHG containing solutions have FDA approval for infants <2 months of age.
- The extended antimicrobial persistence of CHG/ALC beneficial in reducing the number of potential dressing changes preserving the integrity of the neonate's skin.
- Cost per CLABSI in NICU estimated at $40K.

• METHODS
- Internal assessment of practices: catheter insertion, catheter site and hub maintenance.
- 3.15% CHG /70% IPA implemented for skin preparation for catheter insertion/dressing changes and hub and connector set disinfection.

Presented at the Association for Professionals in Infection Control and Epidemiology Annual Conference, June 27-29, 2011. Baltimore, MD. Abstract 7-062
Our NICU Journey to Zero Central Line-Associated Bloodstream Infections: Special Patients Require Special Interventions
Janet Pettit, MSN, NNP-BC, CNS, Neonatal Nurse Practitioner, Doctor’s Medical & Kaiser Permanente Medical Center

• RESULTS
  Sustained zero CLABSI for twenty (24) months consecutively
  • Zero incidence of skin breakdown or erythema associated with the use of the CHG

• CONCLUSIONS
  CLABSIs can be prevented and is sustainable in the NICU
  • The CHG/ALC swab for disinfecting hubs and needleless connectors was the crucial intervention.
  • Evolving clinical evidence suggests the use of CHG/ALC as best practice for needleless connectors
  • Staff buy-in along with clinical best practices make zero possible.

BSI criteria per VON & CLABSI per CDC Criteria for diagnosis

Presented at the Association for Professionals in Infection Control and Epidemiology Annual Conference, June 27-29, 2011. Baltimore, MD. Abstract 7-062
Getting to Zero: Outpatient Hemodialysis Catheter-Associated Bloodstream Infections
Bren, Virginia R., et al. Altru Health System, Grand Forks, ND,

BACKGROUND
- Relative risk for bacteremia for patients with permanent (cuffed) hemodialysis catheters is sevenfold the risk for patients with AV fistulas.
- High utilization of catheter use -72% - exceeding regional and national percentages.
- In 2007, 11 CLABSIs : 1.7 per 100 patient months; increased to 2.4 BSIs per 100 patient months in first 4 months of 2008.
- Multi-drug resistant organism (MDRO) colonization increasing (8% in 2005 to >35% in 2007)
- Noncompliance with the CDC’s 2001 recommendations for prevention of infection in hemodialysis observed.
  • hand hygiene was omitted between touching machines or when performing non-invasive procedures.
  • environmental surfaces were not cleaned between patients.
  • catheter manipulations performed without hub disinfection.

METHODS
A bundle of best practices were applied simultaneously:
• Catheter hub disinfection prior to each accession with CHG 3.15%/70% IPA, hand hygiene plus gloving prior to patient care and machines, chlorhexidine gluconate impregnated sponge dressings on exit sites of those catheters deemed high risk
RESULTS

- Catheter associated BSI rate dropped from 2.4 per 100 patient months to 0, which was sustained for 15 months. 24 BSIs were prevented during that period with an estimated $480,000 in cost savings.

CONCLUSIONS

- A bundle of best practices was effective in reducing and sustaining CLABSIs.
- No change in MDRO prevalence.
- Dialysis catheter care is challenging because guidelines are somewhat inconsistent.
- Sustaining the infection rate at zero is directly related to reduced utilization of catheter accesses.

Presented at the Fifth Decennial International Conference on Healthcare-Associated Infections; March 18-22, 2010; Atlanta, GA. Abstract 181
CHG Resistance
CHG Resistance – Clinical significance?

• In vitro studies suggest that chlorhexidine exposure may cause reduced susceptibility to antibiotics and biocides via intrinsic or acquired mechanisms of resistance.¹

• Strains of *K. pneumoniae* with increased tolerance to CHG acquired by genetic mutations identified; these mutations also resulted in increased tolerance to colistin.²

✔ At present, insufficient scientific evidence exists to evaluate these risks and additional studies are needed.

CHG Resistance

- Healthcare-associated *S. aureus* bloodstream isolates prior to and after implementation of facility-wide CHG bathing tested for chlorhexidine susceptibility over a 7.5 year period
- Bed baths with 4% CHG: 2 time periods preceded by at least a year of non-CHG use
- No decrease in CHG susceptibility observed: minimal inhibitory concentration (MIC) testing using CLSI guidelines
- None of the isolates tested contained resistance-promoting genes (*qacA* or *qacB*): PCR detection method
- Concluded that the broad use of chlorhexidine in hospitalized patients does not easily prompt the development of resistance

Summary

- Chlorhexidine gluconate’s broad spectrum of antimicrobial activity makes “it” an ideal agent for many infection prevention applications.
- The rapid antimicrobial activity of CHG with alcohol in addition to the persistent and residual antibacterial effect on the skin has led to strong recommendations for its use as a cutaneous antiseptic and catheter hub disinfectant.
- More research is needed to evaluate the clinical significance of CHG resistance to antibiotics.
Questions?

Thanks for your attention!