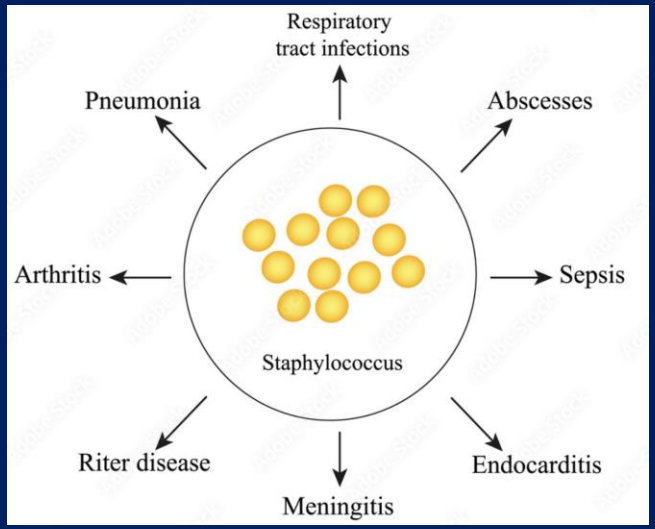
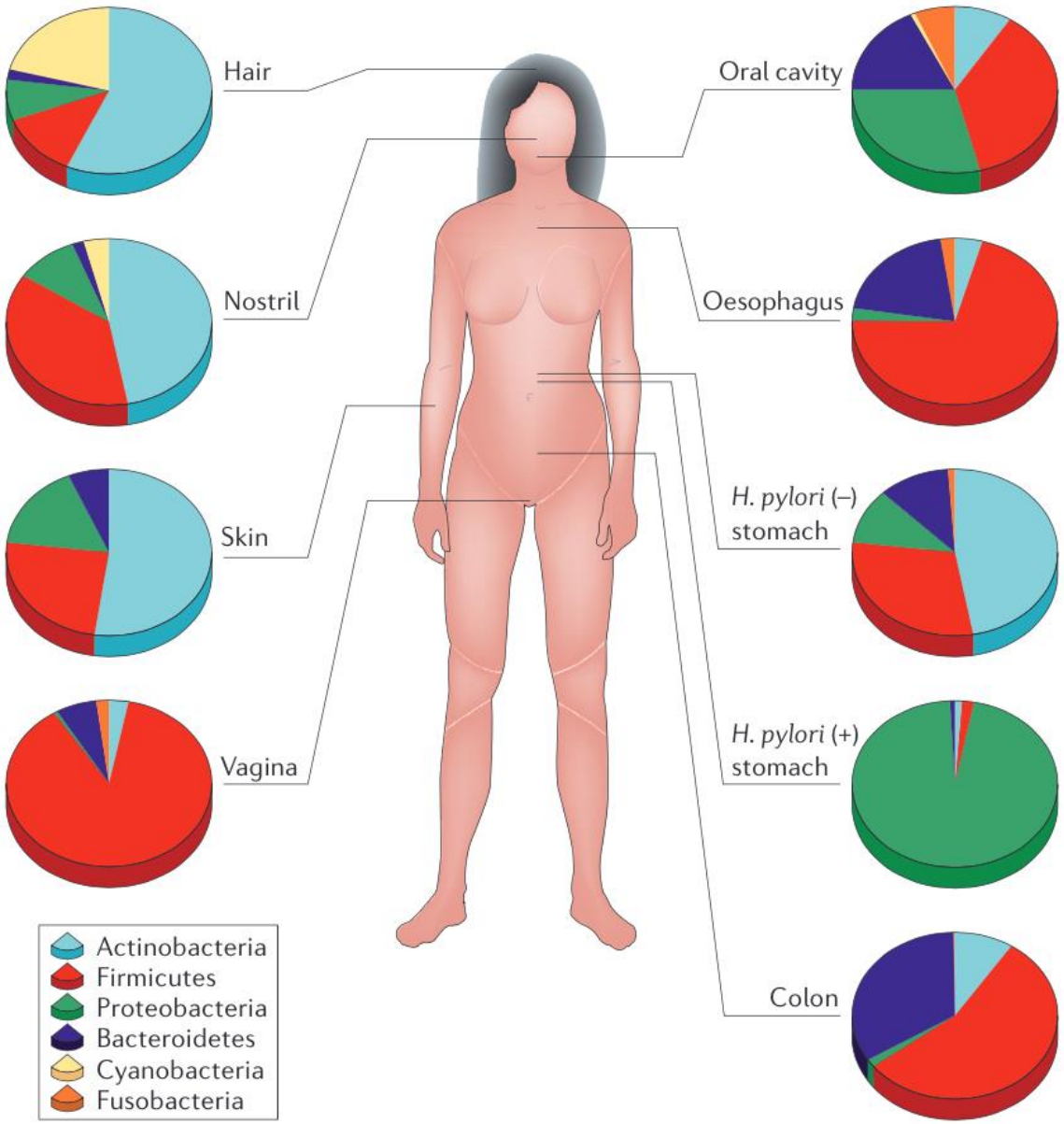
UWTASP
tele-antimicrobial stewardship program

September 18, 2023



Agenda

- MRSA Decolonization
- Community Case and Discussion



doi: 10.1038/nrg3182

Infection Control & Hospital Epidemiology (2023), **44**, 1039–1067
doi:10.1017/ice.2023.102

SHEA

SHEA/IDSA/APIC Practice Recommendation

SHEA/IDSA/APIC Practice Recommendation: Strategies to prevent methicillin-resistant *Staphylococcus aureus* transmission and infection in acute-care hospitals: 2022 Update

Kyle J. Popovich MD, MS[1], Kathy Aureden MS, MT, CIC[2], D. Cal Ham MD, MPH[3], Anthony D. Harris MD, MPH[4], Amanda J. Hessels PhD, MPH, RN, CIC[5,6], Susan S. Huang MD, MPH[7], Lisa L. Maragakis MD, MPH[8], Aaron M. Milstone MD, MHS[9], Julia Moody MS[10], Deborah Yokoe MD, MPH[11,12] and David P. Calfee MD, MS[13,14]

Section 1: Rationale and statements of concern

Burden of MRSA infection

1. HAIs caused by MRSA are common in acute-care facilities.
   a. Worldwide, an estimated 15% of ICU infections are caused by *Staphylococcus aureus*, and nearly one-third of those (31%) are due to MRSA.[3] In North America, an estimated 23% of ICU infections are caused by *S. aureus*, and nearly half of those (44%) are due to MRSA.
   b. In the United States, *S. aureus* remains one of the most common pathogens associated with HAI.

Section 1: Rationale and statements of concern

Burden of MRSA infection

2. Outcomes associated with MRSA HAIs
   a. MRSA infections are associated with significant morbidity and mortality.
   b. An estimated 80,461 invasive MRSA infections occurred in the United States in 2011, with an all-cause in-hospital mortality rate of 14%.[9]
   c. Another US study reported an unadjusted in-hospital mortality rate of 29% for hospital-onset MRSA bloodstream infections occurring between 2012 and 2017.[7]
   d. A recent study using 2010–2014 data from the National Inpatient Sample from the Agency for Healthcare Research and Quality compared costs of hospitalization between MSSA and MRSA infections and noted that costs associated with MSSA infection approach those for MRSA infection. However, a higher adjusted mortality rate for MRSA-related hospitalizations was observed.[10]

Summary of Recommendations to Prevent MRSA Infection and Transmission

Essential Practices

1. Implement a MRSA monitoring program.
2. Conduct a MRSA risk assessment.
3. Promote compliance with the CDC or WHO hand hygiene recommendations.
4. Use contact precautions for MRSA-colonized and MRSA-infected patients. A facility that chooses or has already chosen to modify the use of contact precautions for some or all of these patients should conduct a MRSA-specific risk assessment to evaluate the facility for transmission risks and to assess the effectiveness of other MRSA risk mitigation strategies and establish a process for ongoing monitoring, oversight, and risk assessment.
5. Ensure cleaning and disinfection of equipment and the environment.
6. Implement a laboratory-based alert system that notifies HCP of new MRSA-colonized or MRSA-infected patients in a timely manner.
7. Implement an alert system that identifies readmitted or transferred MRSA-colonized or MRSA-infected patients.
8. Provide MRSA data and outcome measures to key stakeholders, including senior leadership, physicians, nursing staff, and others.
9. Educate healthcare personnel about MRSA.
10. Educate patients and families about MRSA.
11. Implement an antimicrobial stewardship program.

Additional Practices

Active surveillance testing (AST)

1. Implement a MRSA AST program for select patient populations as part of a multifaceted strategy to control and prevent MRSA. Note: Specific populations may have different evidence ratings.
2. **Active surveillance for MRSA in conjunction with decolonization can be performed in targeted populations prior to surgery to prevent post-surgical MRSA infection. (Active surveillance with contact precautions is inferior to universal decolonization for reduction of MRSA clinical isolates in adult ICUs. (Quality of evidence: HIGH)**
3. Hospital-wide active surveillance for MRSA can be used in conjunction with contact precautions to reduce the incidence of MRSA infection.
4. Active surveillance can be performed in the setting of a MRSA outbreak or evidence of ongoing transmission of MRSA within a unit as part of a multifaceted strategy to halt transmission.

Nasal swab only: Sn 48%-93%, need 1 added site for >90%

BMJ

BMJ 2013;346:f2743 doi: 10.1136/bmj.f2743 (Published 13 June 2013)

Effectiveness of a bundled intervention of decolonization and prophylaxis to decrease Gram positive surgical site infections after cardiac or orthopedic surgery: systematic review and meta-analysis

Marin Schweizer *assistant professor*[1 2 3], Eli Perencevich *professor*[1 2 3 4], Jennifer McDanel *student research assistant*[2], Jennifer Carson *research assistant*[1], Michelle Formanek *student research assistant*[2 3], Joanne Hafner *associate project director*[5], Barbara Braun *project director*[5], Loreen Herwaldt *professor*[1 2 4]

Effectiveness of a bundled intervention of decolonization and prophylaxis to decrease Gram positive surgical site infections after cardiac or orthopedic surgery: systematic review and meta-analysis

Marin Schweizer *assistant professor*[1 2 3], Eli Perencevich *professor*[1 2 3 4], Jennifer McDanel *student research assistant*[2], Jennifer Carson *research assistant*[1], Michelle Formanek *student research assistant*[2 3], Joanne Hafner *associate project director*[5], Barbara Braun *project director*[5], Loreen Herwaldt *professor*[1 2 4]

Objective To evaluate studies assessing the effectiveness of a bundle of nasal decolonization and glycopeptide prophylaxis for preventing surgical site infections caused by Gram positive bacteria among patients undergoing cardiac operations or total joint replacement procedures.

Effectiveness of a bundled intervention of decolonization and prophylaxis to decrease Gram positive surgical site infections after cardiac or orthopedic surgery: systematic review and meta-analysis

Marin Schweizer *assistant professor*[1 2 3], Eli Perencevich *professor*[1 2 3 4], Jennifer McDanel *student research assistant*[2], Jennifer Carson *research assistant*[1], Michelle Formanek *student research assistant*[2 3], Joanne Hafner *associate project director*[5], Barbara Braun *project director*[5], Loreen Herwaldt *professor*[1 2 4]

Objective To evaluate studies assessing the effectiveness of a bundle of nasal decolonization and glycopeptide prophylaxis for preventing surgical site infections caused by Gram positive bacteria among patients undergoing cardiac operations or total joint replacement procedures.

Results 39 studies were included. Pooled effects of 17 studies showed that nasal decolonization had a significantly protective effect against surgical site infections associated with *Staphylococcus aureus* (pooled relative risk 0.39, 95% confidence interval 0.31 to 0.50) when all patients underwent decolonization (0.40, 0.29 to 0.55) and when only *S aureus* carriers underwent decolonization (0.36, 0.22 to 0.57). Pooled effects of 15 prophylaxis studies showed that glycopeptide prophylaxis was significantly protective against surgical site infections related to methicillin (meticillin) resistant *S aureus* (MRSA) compared with prophylaxis using β lactam antibiotics (0.40, 0.20 to 0.80), and a non-significant risk factor for methicillin susceptible *S aureus* infections (1.47, 0.91 to 2.38). Seven studies assessed a bundle including decolonization and glycopeptide prophylaxis for only patients colonized with MRSA and found a significantly protective effect against surgical site infections with Gram positive bacteria (0.41, 0.30 to 0.56).

Additional Practices

1. MRSA decolonization therapy
2. **Use universal decolonization (daily CHG bathing plus 5 days of nasal decolonization) for all patients in adult ICUs to reduce endemic MRSA clinical cultures. (Quality of evidence: HIGH)**
3. Perform preoperative nares screening with targeted use of CHG and nasal decolonization in MRSA carriers to reduce MRSA SSI, in surgical procedures involving implantation of hardware. (Quality of evidence: MODERATE)
4. Screen for MRSA and provide targeted decolonization with CHG bathing and nasal decolonization to MRSA carriers in surgical units to reduce postoperative MRSA inpatient infections. (Quality of evidence: MODERATE)
5. Provide CHG bathing plus nasal decolonization to known MRSA carriers outside the ICU with medical devices, specifically central lines, midline catheters, and lumbar drains, to reduce MRSA clinical cultures. (Quality of evidence: MODERATE)

Additional Practices

MRSA decolonization therapy

5. Consider post-discharge decolonization of MRSA carriers to reduce post discharge MRSA infection and readmission. (Quality of evidence: HIGH)

6. Neonatal ICUs should consider targeted or universal decolonization during times of above-average MRSA infection rates or targeted decolonization for
patients at high risk of MRSA infection (eg, low birthweight, indwelling devices, or prior to high-risk surgeries).

7. Burn units should consider targeted or universal decolonization during times of above average MRSA infection rates.

8. Consider targeted or universal decolonization of hemodialysis patients.

9. Decolonization should be strongly considered as part of a multimodal approach to control MRSA outbreaks.

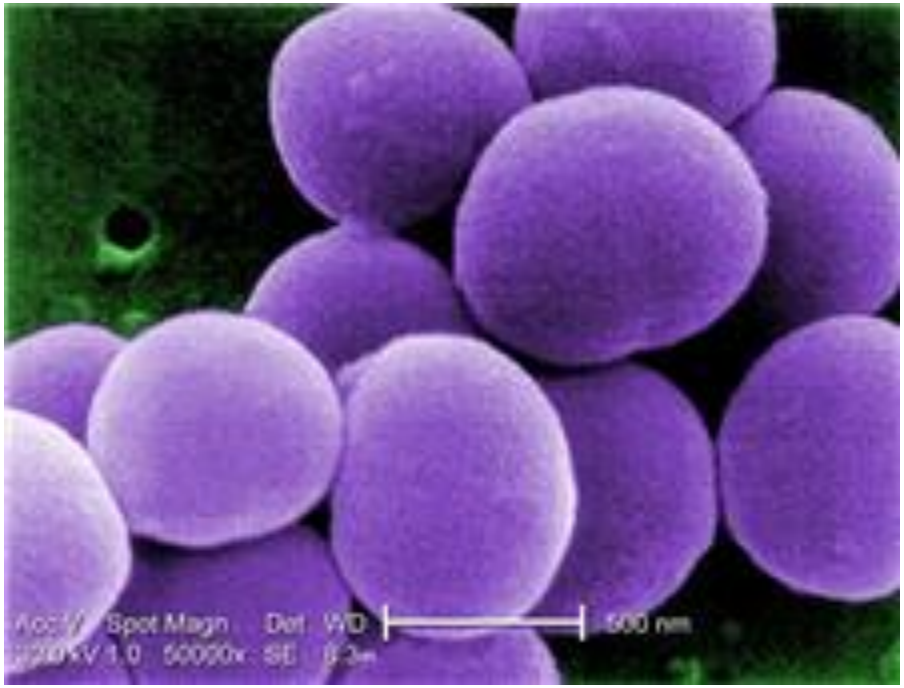
The NEW ENGLAND JOURNAL of MEDICINE

February 14, 2019
N Engl J Med 2019; 380:638-650
DOI: 10.1056/NEJMoa1716771
Chinese Translation 中文翻译

ORIGINAL ARTICLE

Decolonization to Reduce Postdischarge Infection Risk among MRSA Carriers

Susan S. Huang, M.D., M.P.H, Raveena Singh, M.A., James A. McKinnell, M.D., Steven Park, M.D., Ph.D., Adrijana Gombosev, M.S., Samantha J. Eells, M.P.H., Daniel L. Gillen, Ph.D., Diane Kim, B.S., Syma Rashid, M.D., Raul Macias-Gil, M.D., Michael A. Bolaris, M.D., Thomas Tjoa, M.P.H., M.S., et al., for the Project CLEAR Trial



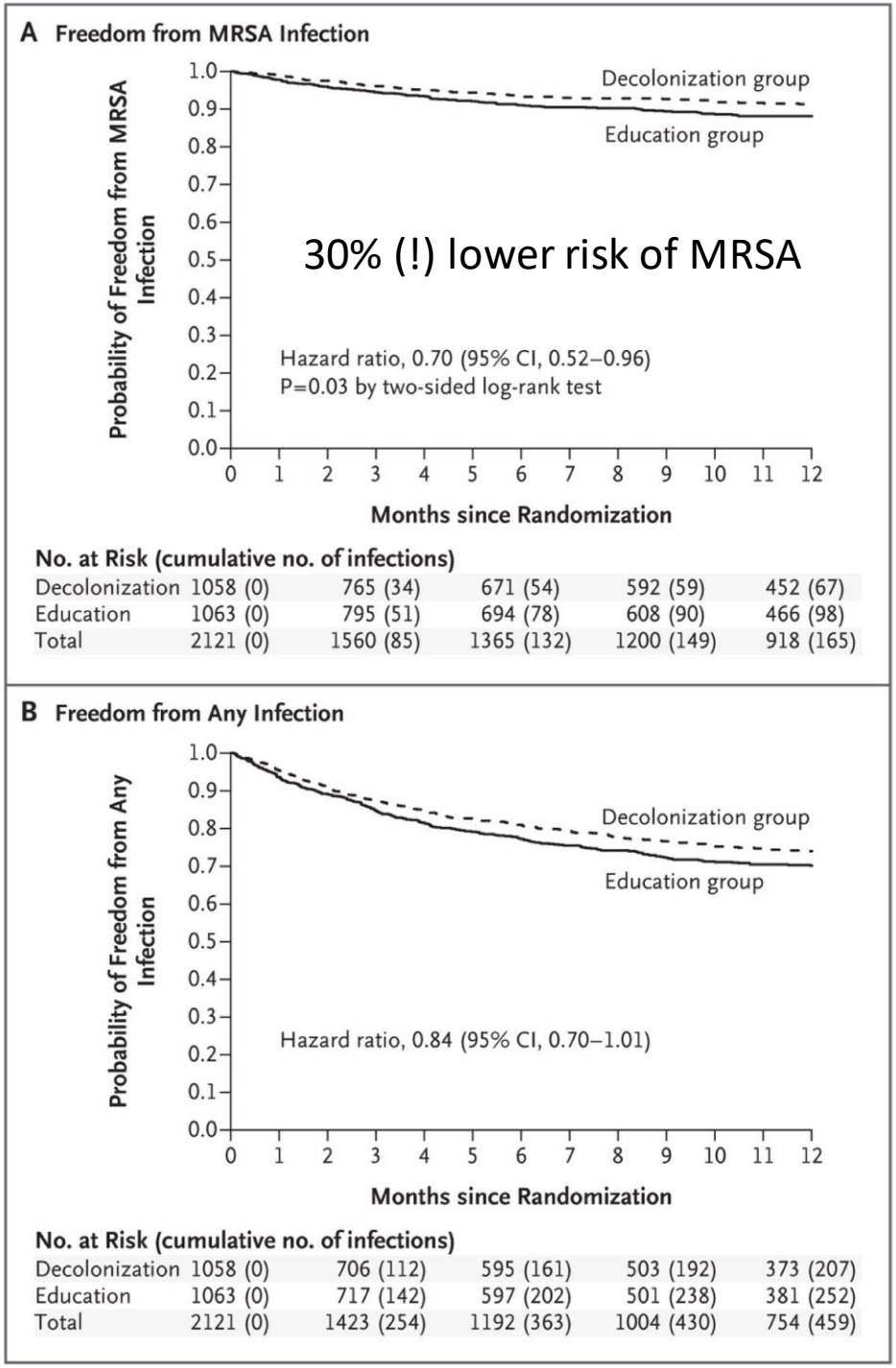
The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

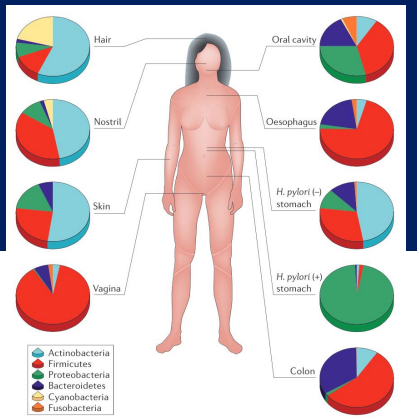
Decolonization to Reduce Postdischarge Infection Risk among MRSA Carriers

Susan S. Huang, M.D., M.P.H., Raveena Singh, M.A., James A. McKinnell, M.D., Steven Park, M.D., Ph.D., Adrijana Gombosev, M.S., Samantha J. Eells, M.P.H., Daniel L. Gillen, Ph.D., Diane Kim, B.S., Syma Rashid, M.D., Raul Macias-Gil, M.D., Michael A. Bolaris, M.D., Thomas Tjoa, M.P.H., M.S., et al., for the Project CLEAR Trial

Decolonization involved chlorhexidine mouthwash, baths or showers with chlorhexidine, and nasal mupirocin for 5 days twice per month for 6 months. Participants were followed for 1 year.



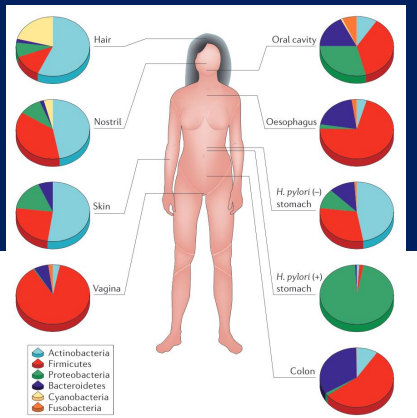
MRSA Decolonization



What is it?

"MRSA decolonization is considered to be intranasal antimicrobial and/or antiseptic treatment with chlorhexidine (CHG) skin antisepsis"

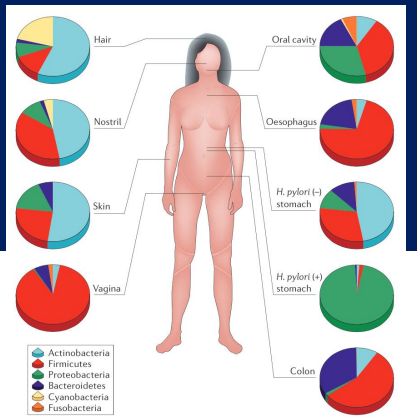
MRSA Decolonization



Who should get it?

1. Use universal decolonization(daily CHG bathing plus 5 days of nasal decolonization) for all patients in adult ICUs to reduce endemic MRSA clinical cultures. **(Quality of evidence: HIGH)**

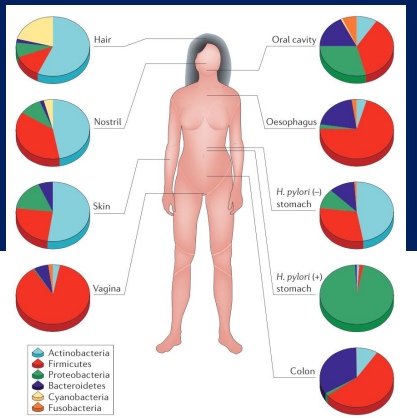
MRSA Decolonization



Who should get it?

2. Perform preoperative nares screening with targeted use of CHG and nasal decolonization in MRSA carriers to reduce MRSA SSI in surgical procedures involving implantation of hardware. (Quality of evidence: MODERATE)

MRSA Decolonization

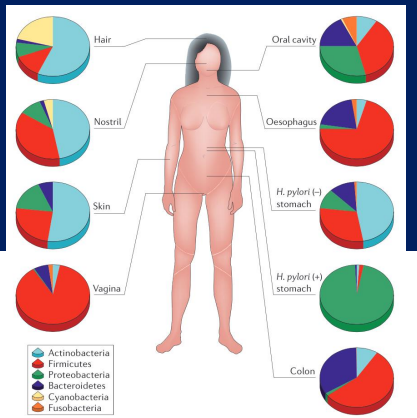


Who should get it?

3. Screen for MRSA and provide targeted decolonization with CHG bathing and nasal decolonization to MRSA carriers in surgical units to reduce postoperative MRSA inpatient infections. (Quality of evidence: MODERATE)

*Note that decolonization can be applied universally as an alternative.

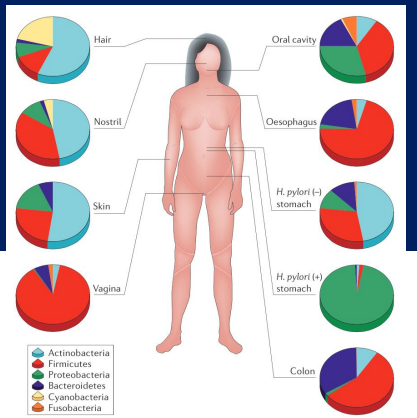
MRSA Decolonization



Who should get it?

4. Provide CHG bathing plus nasal decolonization to known MRSA carriers outside the ICU with medical devices, specifically central lines, midline catheters, and lumbar drains, to reduce MRSA-positive clinical cultures. (Quality of evidence: MODERATE)

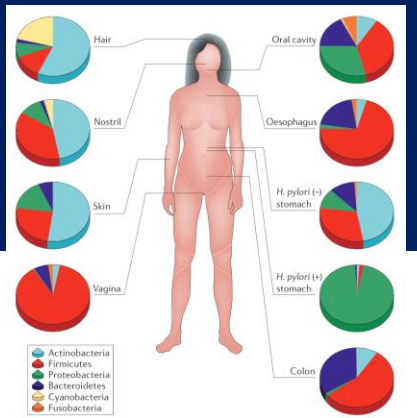
MRSA Decolonization



Who should get it?

5. Consider post-discharge decolonization of MRSA carriers to reduce post-discharge MRSA infections and readmission. **(Quality of evidence: HIGH).**

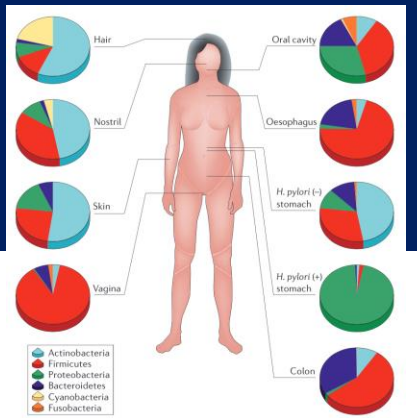
MRSA Decolonization



Who should get it?

6. Consider targeted or universal decolonization of hemodialysis patients. (Quality of evidence: MODERATE)

MRSA Decolonization



Who should get it?

7. Decolonization should be strongly considered as part of a multimodal approach to control MRSA outbreaks. (Quality of evidence: MODERATE)

Decolonization Therapy I

1. Conduct a risk assessment to identify populations with high rates of MRSA infection that might benefit from decolonization.
2. Determine whether targeted or universal decolonization will be utilized.
   - Targeted decolonization includes AST to identify colonized individuals followed by decolonization for those with MRSA colonization.
   - Universal decolonization avoids testing and provides treatment to the entire at-risk population. This approach may provide added benefit of reducing MSSA disease in addition to MRSA disease, and it may help address concern that a single screening of limited body sites is insufficient to identify all MRSA carriers.
3. Select a decolonization regimen. (Note: Decolonization regimens typically include a combination of nasal and skin antisepsis.)
4. Consider developing standardized or protocol-based order sets to optimize compliance.

Decolonization Therapy II

5. Standardize care processes.
6. Ensure adequate supplies of products used for decolonization (eg, chlorhexidine bottles or cloths) to reduce barriers to implementation.
7. Review chlorhexidine compatibility of patient hygiene and skin-care products and remove incompatible products that are used on the body below the neckline.
8. HCP responsible for implementing MRSA decolonization programs should receive competency-based training with return demonstration for the application of intranasal antimicrobials or antiseptics and topical CHG.178,179
9. Consider use of existing tool kits with protocols, education and training materials, skills assessments, and FAQs.