**Table 1.** Mixed-effects Poisson regression analysis for MDRO infection or colonization

| Variable | Bivariable IRR (95% CI) | P-Value | Multivariable IRR (95% CI) | P-Value |
|---|---|---|---|---|
| UV/F | 1.103 (0.955 - 1.274) | 0.18 | | |
| ATP | 0.923 (0.863 -0.988) | 0.02 | 0.887 (0.811 -0.969) | 0.008 |
| SICU[a] | 1.229 (1.033 -1.463) | 0.02 | 1.228 (1.031 -1.463) | 0.02 |
| Time from study start | 1.001 (0.989 -1.013) | 0.88 | | |
| Time from intervention start | 0.983 (0.967 -1.000) | 0.047 | 0.979 (0.961 -0.997) | 0.03 |
| Contact precautions[b] | 0.869 (0.412 -1.830) | 0.71 | | |

NOTE. MDRO, multi-drug resistant organisms, IRR, incidence rate ratio; CI, confidence interval; ATP, adenosine triphosphate; UV/F, ultraviolet fluorescent marker; SICU, surgical intensive care unit

[a]Compared with medical intensive care units (MICUs)

[b]Percentage of occupied rooms utilizing contact precautions per month

***Conclusion.*** Intensive monitoring of ICU terminal room cleaning with an ATP modality is associated with a relative reduction of infection and colonization with MDROs with a negligible impact on TAT.

***Disclosures.*** **Hilary Babcock, MD, MPH, FIDSA, FSHEA** (nothing to disclose), **David K. Warren, MD, MPH**, **Homburg & Partner** (consultant), **Ebbing Lautenbach, MD, MPH, MSCE** (nothing to disclose), **Jennifer Han, MD, MSCE**, **GlaxoSmithKline** (employee, shareholder).

## 4. 137 Hospital Cluster-Randomized Trial of Mupirocin-Chlorhexidine vs Iodophor-Chlorhexidine for Universal Decolonization in Intensive Care Units (ICUs) (Mupirocin Iodophor Swap Out Trial)

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**Session:** O-01. Addressing MDRO Colonization and Infection

***Background.*** ICU universal decolonization with daily chlorhexidine (CHG) baths plus mupirocin nasal decolonization reduces all-cause bloodstream infections (BSI) and MRSA clinical cultures. We assessed nasal iodophor, an antiseptic less susceptible to resistance, in place of mupirocin.

***Methods.*** We conducted a cluster randomized non-inferiority trial in ICUs, comparing universal decolonization with: 1) **Mupirocin-CHG:** daily CHG baths and 5 days of twice daily nasal mupirocin, to 2) **Iodophor-CHG:** same regimen, substituting twice daily 10% povidone-iodine for mupirocin. All adult ICUs in a hospital were assigned to the same strategy. We compared each hospital's outcomes during the 18-month intervention (Nov 2017-Apr 2019) to its own baseline (May 2015-Apr 2017), during which all hospitals used mupirocin-CHG. The primary outcome was ICU-attributable *S. aureus* clinical isolates. Secondary outcomes included ICU-attributable MRSA clinical isolates and all-cause BSI. As randomized and as treated analyses used unadjusted proportional hazards models assessing differences in outcomes between baseline and intervention periods across the two groups, accounting for clustering by hospital and patient.

***Results.*** We randomized 137 hospitals with 233 ICUs in 18 states. There were 442,544 admissions in the baseline period and 349,262 in the intervention period. Median ICU length of stay was 4 days. ICU types included mixed medical surgical (56%), medical (9%), surgical (11%), cardiac (15%), and neurologic (9%). CHG adherence was similar in both arms (85%), but adherence was greater for mupirocin (90%) than iodophor (82%). Primary as-randomized results (Table, Figure) exceeded the non-inferiority margin in favor of mupirocin, for *S. aureus* clinical cultures (21% superiority, P< 0.001) and for MRSA clinical cultures (20% superiority, P< 0.001). The regimens had similar BSI hazards. Analyses of fully adherent patients are in progress.

**Table. As-Randomized Group Comparisons for Outcomes of Mupirocin Iodophor Swap Out Trial**

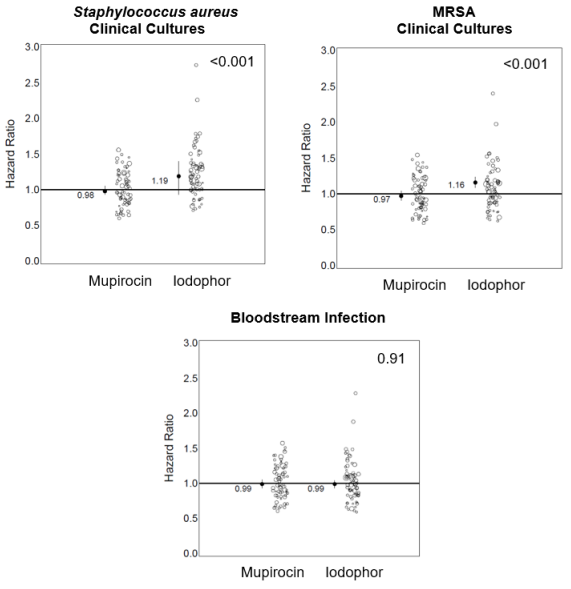
| Strategy | Baseline period Events/1,000 ICU Attributable Admissions | Intervention period Events/1,000 ICU Attributable Admissions | Hazard Ratio[1] | Difference in Differences | P-value |
|---|---|---|---|---|---|
| **AS RANDOMIZED ANALYSIS** | | | | | |
| **PRIMARY OUTCOME: ICU-Attributable *Staphylococcus aureus* Clinical Cultures** | | | | | |
| Mupirocin-CHG | 16.9 | 16.3 | 0.98 (0.94 - 1.03) | Mupirocin-CHG with 21% greater reduction | <0.001 |
| Iodophor-CHG | 17.9 | 20.7 | 1.19 (1.14 - 1.24) | | |
| **SECONDARY OUTCOME: ICU-Attributable MRSA Clinical Cultures** | | | | | |
| Mupirocin-CHG | 8.8 | 8.3 | 0.97 (0.91 - 1.04) | Mupirocin-CHG with 20% greater reduction [2] | 0.002 |
| Iodophor-CHG | 8.8 | 10.0 | 1.16 (1.1 - 1.24) | | |
| **SECONDARY OUTCOME: ICU-Attributable Bloodstream Infections** | | | | | |
| Mupirocin-CHG | 11.8 | 11.2 | 0.99 (0.93 - 1.05) | No difference between groups | 0.91 |
| Iodophor-CHG | 12.3 | 11.8 | 0.99 (0.93 - 1.04) | | |

[1] HR = Hazard Ratio from unadjusted proportional hazard model analyses; model estimates are not equal to ratio of raw risk due to differential length-of-stay and effect of clustering within hospital

[2] 20% reflects rounding error when calculating the difference between hazard ratios (1.16-0.97)

Figure - Primary and Secondary Outcomes of Mupirocin Iodophor Swap Out Trial

**Figure.** Group-specific hazard ratios (HR) and 95% confidence intervals (vertical lines) comparing trial outcomes during the intervention versus baseline period. Bubble plots of HRs from individual hospitals relative to their group effects are shown. Bubble size indicates relative number of ICU patients contributing data.




***Conclusion.*** Universal iodophor-CHG was equivalent to mupirocin-CHG for ICU BSI prevention. Mupirocin-CHG was superior to iodophor-CHG for *S. aureus* and MRSA clinical isolates, potentially due to greater adherence to mupirocin.

***Disclosures.*** **Susan S. Huang, MD, MPH**, **Medline** (Other Financial or Material Support, Conducted studies in which participating hospitals and nursing homes received contributed antiseptic and cleaning products)**Molnlycke** (Other Financial or Material Support, Conducted studies in which participating hospitals and nursing homes received contributed antiseptic and cleaning products)**Stryker (Sage)** (Other Financial or Material Support, Conducted studies in which participating hospitals and nursing homes received contributed antiseptic and cleaning products)**Xttrium** (Other Financial or Material Support, Conducted studies in which participating hospitals and nursing homes received contributed antiseptic and cleaning products) **Edward Septimus, MD**, **Medline** (Other Financial or Material Support, Conducted studies in which participating hospitals received contributed antiseptic products)**Molnlycke** (Other Financial or Material Support, Conducted studies in which participating hospitals received contributed antiseptic products) **Ken Kleinman, PhD**, **Medline** (Other Financial or Material Support, Conducted studies in which participating hospitals received contributed antiseptic products)**Molnlycke** (Other Financial or Material Support, Conducted studies in which participating hospitals received contributed antiseptic products) **Lauren Heim, MPH**, **Medline** (Other Financial or Material Support, Conducted clinical trials and studies in which participating hospitals and nursing homes received contributed antiseptic and cleaning products)**Molnlycke** (Other Financial or Material Support, Conducted studies in which participating hospitals received contributed antiseptic product)**Stryker (Sage)** (Other Financial or Material Support, Conducted clinical trials and studies in which participating hospitals and nursing homes received contributed antiseptic product)**Xttrium** (Other Financial or Material Support, Conducted clinical trials and studies in which participating hospitals and nursing homes received contributed antiseptic product) **Julia Moody, MS**, **Medline** (Other Financial or Material Support, Conducted studies in which participating hospitals received contributed antiseptic product)**Molnlycke** (Other Financial or Material Support, Conducted studies in which participating hospitals received contributed antiseptic product) **Taliser R. Avery, MS**, **Medline** (Other Financial or Material Support, Conducted studies in which participating hospitals received contributed antiseptic product)**Molnlycke** (Other Financial or Material Support, Conducted

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**5. The PROTECT Trial: A Cluster Randomized Clinical Trial of Universal Decolonization with Chlorhexidine and Nasal Povidone Iodine Versus Standard of Care for Prevention of Infections and Hospital Readmissions among Nursing Home Residents**

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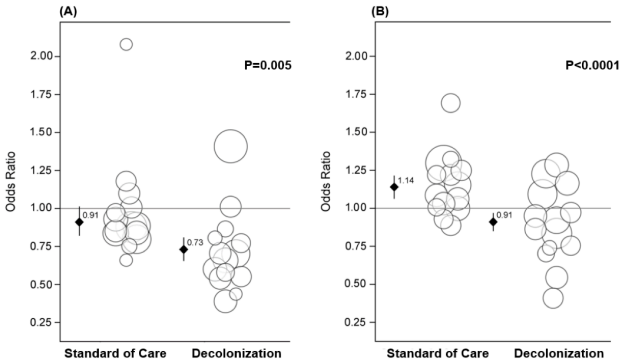
**Session:** O-01. Addressing MDRO Colonization and Infection

***Background.*** Nursing home (NH) residents are at high infection and hospital readmission risk. Colonization with multidrug-resistant organisms (MDROs) is common. In ICU and post-hospital discharge settings, decolonization has reduced infection rates. However, the effectiveness of this strategy in NHs is unclear.

***Methods.*** We performed a cluster randomized trial of 1:1 universal decolonization (decol) vs standard of care bathing (control) in 28 California NHs. After an 18 month baseline evaluation of hospitalization rates due to infection and MDRO prevalence, NHs were randomized to decol or control. Decol consisted of 1) chlorhexidine bathing; 2) nasal povidone iodine bid on admission x 5d and then M-F biweekly x 18 mo. Primary outcome was the probability that a transfer to a hospital was due to infection. Secondary outcome was the probability that a NH discharge was to a hospital.

***Results.*** Four of 28 NHs dropped from the trial (3 decol, 1 control). Mean facility baseline of hospital transfers due to infection was 58% and 57% in the control and decol groups. In the intervention period, proportions were 57% and 48% in the control and decol groups. When accounting for clustering within NHs, hospital transfers due to infection had an OR of 0.91 (95% CI: 0.82-1.02) in the control group and an OR of 0.73 (95% CI: 0.56-0.95) in the decol group when comparing intervention to baseline period. For the primary outcome, decol had a 18% greater impact v. control (P=0.005, Fig. A). Baseline proportion of NH discharges due to hospitalization was 37% and 39% in the control and decol groups. In the intervention period, proportions were 36% and 33%. When accounting for clustering within NHs, the proportion of discharges due to hospitalization had an OR of 1.14 (95% CI: 1.06-1.22) in the control group and 0.91 (CI: 0.77-1.07) in the decol group when comparing the intervention period to the baseline period. For the secondary outcome, decol had a 23% greater impact v. control (P< 0.0001, Fig. B).




In this figure, each nursing home is represented by a circle. The size of the circle represents the amount of contributed patient days to the trial. The groups represent "as randomized" categories. Panel A) compares the probability that a transfer to a hospital was due to infection; panel B) compares the probability that a nursing home discharge was to a hospital. The y-axis represents the odds ratio of these probabilities comparing the baseline to the intervention period. The p values represent the significance of the difference between groups (the trial effect).

***Conclusion.*** Universal NH decolonization with chlorhexidine and nasal iodophor significantly reduced the proportion of transfers to hospitals due to infection and discharges due to hospitalization. Our findings suggest that NH decolonization reduces serious infections and can decrease morbidity in this vulnerable population.

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