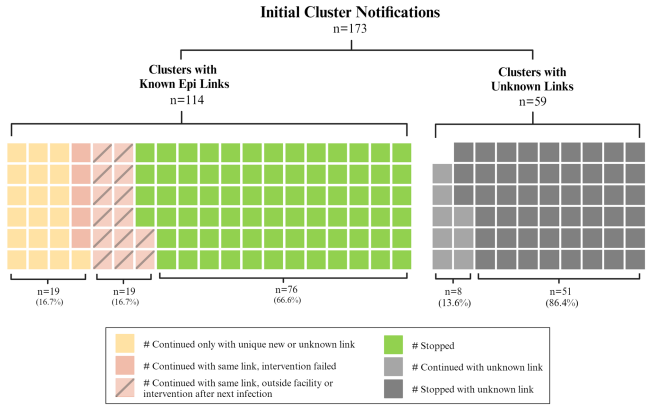

4,723 were deemed healthcare-associated and underwent WGS. EDS-HAT identified 478 (12.2%) isolates genetically related to ≥1 other isolate across 173 clusters. Epidemiological links were found in 278 (58.2%) isolates in 114 clusters, with the majority being unit-based (205 isolates, 71.9%); other epidemiological links included equipment or healthcare workers (32 isolates, 11.5%), external facilities (24 isolates, 8.6%), and shared endoscopes (17 isolates, 6.1%); all endoscope outbreaks were effectively contained at two patients. No epidemiological links could be identified for 200 (41.8%) isolates. Infection prevention initiated 134 interventions in 114 clusters, including 74 (55.2%) general staff notification and education, 25 (18.7%) enhanced cleaning efforts, 23 (17.2%) hand hygiene/personal-protective equipment compliance observations, 9 (6.7%) environmental cultures, and 3 (2.2%) enhanced microbiological surveillance. Following the detection of an epidemiological link and intervention, 94/101 (94.1%) outbreaks were effectively halted on the intervened route (Figure). **Conclusion:** This study demonstrates the feasibility and efficacy of EDS-HAT as an infection prevention tool. Early detection and intervention of outbreaks significantly enhance the capability of healthcare facilities to control and prevent the spread of HAIs. Investment in infrastructure and implementation costs will result in reducing pathogen transmission and improving patient safety in acute care settings.

Disclosure: Alexander Sundermann: Honoraria - Opgen

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Assessing chlorhexidine resistance in MRSA isolates from hospitals in Cleveland, OH and Detroit, MI

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Background: Methicillin-resistant Staphylococcus aureus (MRSA) is one of the most common causes of procedure-related, skin, and soft-tissue infections. Hospitalized patients who are colonized with MRSA are at a higher risk of developing invasive infections after discharge. Chlorhexidine, an antiseptic/disinfectant, has been used to reduce carriage and prevent infections in these patients. Studies have shown chlorhexidine resistance among MRSA strains. Chlorhexidine resistance is associated with qac genes, which encode multidrug efflux pumps that increase bacterial tolerance to disinfectant agents. The global distribution and prevalence of qacA and qacB genes are highly variable. One study reported that qacA and qacB genes could be found in 0.9% - 83.3% of clinical MRSA isolates worldwide. The goal of this study was to determine the prevalence of chlorhexidine resistance and identify the resistance-associated genes from our MRSA samples using whole genome sequencing (WGS). **Methods:** 474 MRSA samples were obtained from hospitals in Detroit, MI (287) and Cleveland, OH (187). Whole genome sequencing was performed using the NextSeq (Illumina Inc., CA) platform. The sequencing data was analyzed using ResFinder 4.1, a publicly available database that can be used to identify acquired genes and chromosomal mutations mediating antimicrobial resistance. The output was organized into a data sheet to visualize the presence of the genes of interest. **Results:** The qacA gene was present in only one MRSA sample from the Cleveland area hospital. In the samples from Detroit, 14 out of 287 showed disinfectant resistance genes. The qacA, qacB, and qacD were present in 1, 6, and 7 samples, respectively. The prevalence of any qac gene in the Cleveland area samples was 0.5%. Meanwhile, the prevalence of any qac gene in Detroit area samples was 4.9%. Among the 7 samples that have qacD gene, 6 samples have more than one copy of qacD. **Conclusions:** The prevalence of the "qac" gene varied widely based on the origin of the samples. Detroit area samples had more qac genes prevalence than Cleveland area samples. Chlorhexidine is a widely used antiseptic/disinfectant, and it plays a vital role in reducing carriage and preventing infection among hospitalized patients colonized with MRSA. Monitoring and addressing MRSA-reduced susceptibility to chlorhexidine is imperative for maintaining the effectiveness of infection control practices such as decolonization.

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Timesavers: Clinical Decision Support and Automation of MRSA and VRE Deisolation

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Background: Most healthcare facilities in the US apply contact precautions (CP) for patients with methicillin-resistant Staphylococcus aureus (MRSA) or vancomycin-resistant enterococci (VRE) infection and/or colonization. Most individuals with MRSA or VRE colonization will clear over time; however, frontline clinicians rarely evaluate for discontinuation of CP, resulting in increased burden on infection preventionists (IPs). Automation of time- and test-based evaluation using clinical decision support systems (CDSS) embedded in electronic health records (EHR) may increase evaluation and discontinuation of CP when appropriate, while preserving IP resources. **Methods:** This quality improvement initiative was implemented at Mass General Brigham (MGB), an integrated healthcare system, where patients with MRSA or VRE infection/colonization are identified in the EHR with a corresponding "infection status" and CP applied. Following MGB policy (Figure 1), CDSS features included: 1) automated time-based resolution from 2/15/2023-11/13/2023 and 2) automated ordering of screening assays for patients eligible for test-based evaluation from 6/20/2023-11/14/2023 (Figure 2). Counts of CP discontinuation and automated ordering were performed. IPs at one MGB facility performing manual review of patients self-recorded the time spent evaluating for CP discontinuation. Using these time reports, the average time to complete these tasks and the projected time savings were calculated over the implementation period. **Results:** Four IPs recorded the time to review patients for CP discontinuation, including reviewing recent antimicrobial administration, microbiology results, ordering screening test(s), and

Figure 1. Mass General Brigham Requirements for Resolution of MRSA and VRE Infection Statuses			
Infection Status[1]	**Time-Based Resolution**	**Test-Based Resolution (when not eligible for Time-Based resolution)**	**Antibiotics with activity against organism**
MRSA	No known MRSA-positive isolate in the preceding 2 years. Epic decision support will auto- resolve infection statuses after 2 years for patients who are not currently in emergency department or inpatient settings.	1. At least 90 days since any MRSA isolated **and** 2. Lack of receipt of antibiotics with activity against MRSA in the 48 hours preceding the tests obtained below **and** 3. Testing demonstrating clearance of colonization (choice and availability of culture or PCR is based on facility; if any test returns positive, stop screening protocol).	Ceftaroline (Teflaro); Clindamycin (Cleocin) PO, IV, susp; Dalbavancin (Dalvance) IV; Daptomycin (Cubicin); Delafloxacin (Baxdela) PO, IV; Doxycycline (Vibramycin, Doryx, Monodox) PO, IV; Eravacycline (Xerava) IV; Lefamulin (Xenleta) PO; Linezolid (Zyvox) PO and IV; Minocycline (Dynacin, Minocin, Solodyn, Myrac, Vectrin) PO; Mupirocin (Bactroban, Centany) Topical, Nasal; Omadacycline (Nuzyra) PO, IV; Oritavancin (Orbactiv) IV; Rifampin (Rifadin, Rimactane) PO, IV; Telavancin (Vibativ); Tetracycline (Sumycin, Achromycin, Tetracon, Actisite) PO, IV; Tigecycline (Tygacil); Trimethoprim-sulfamethoxazole (Bactrim, Septra, Sulfatrim) PO, IV, susp; Vancomycin (Vancocin) IV only (oral vancomycin for treatment of *C. difficile* is not considered an exclusion for the purpose of screening).
VRE	No known VRE-positive isolate in the preceding year. Epic decision support will auto-resolve infection statuses after 1 year for patients who are not currently in emergency department or inpatient settings.	1. At least 90 days since any VRE isolated **and** 2. Lack of receipt of antibiotics with activity against VRE in prior 48 hours of tests obtained below **and** 3. Testing demonstrating clearance of colonization (requires 3 screening cultures obtained on separate days resulting negative; if any test returns positive, stop screening).	Ampicillin PO and IV; Daptomycin (Cubicin); Doxycycline (Vibramycin, Doryx, Monodox) PO and IV; Levofloxacin (Levaquin) PO, IV; Linezolid (Zyvox) PO and IV; Oritavancin (Orbactiv) IV; Telavancin (Vibativ); Tigecycline (Tygacil); Nitrofurantoin PO.

[1] A display in the EHR of any active infection that the patient currently has. It may also include infections that the patient is being tested for.

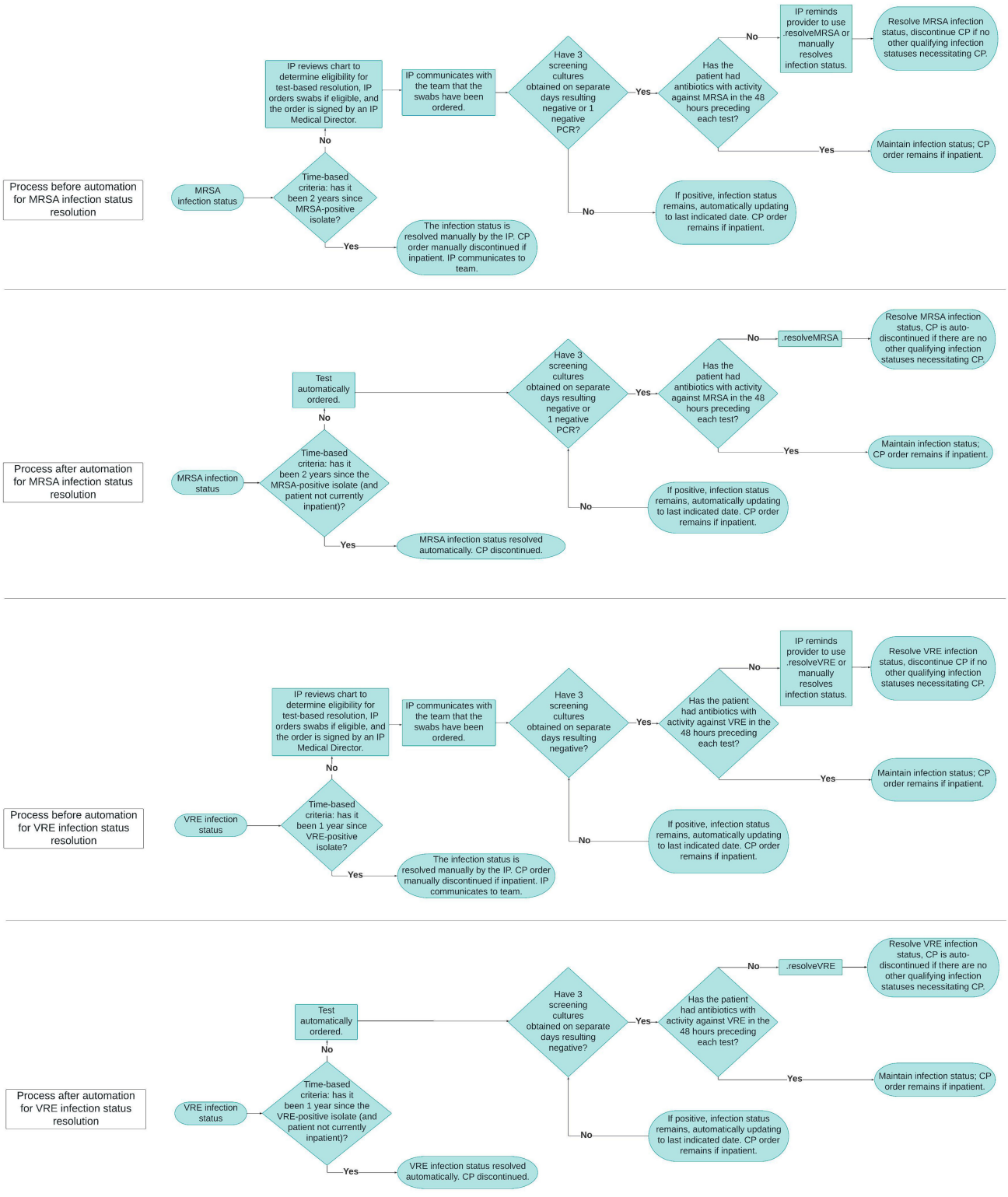

Figure 2. Process flow diagram of resolution of MRSA and VRE infection statuses, before and after CDSS automation

MRSA = methicillin-resistant *Staphylococcus aureus.* VRE = vancomycin-resistant *Enterococcus*. IP = infection preventionist. CP = contact precautions.

contacting the primary team. Twenty-five patient encounters were timed with a mean of 4.7 minutes documented per encounter. Over a 9-month period after initiation of the automated time-based resolution, the monthly mean number of patients with CP for MRSA and VRE which were automatically discontinued was 247 and 100, respectively. Projected IP time savings over the same 9-month period for MRSA and VRE were 174.1 and 70.5 hours, respectively. Over a 5-month period after initiation of automated ordering of MRSA polymerase chain reaction (PCR)/culture, as well as VRE culture for test-based evaluation, the monthly mean number of MRSA culture, MRSA PCR, and VRE culture automatically ordered for patients on CP for MRSA and VRE were 176, 24, and 145, respectively. Projected IP time savings over the same 5-month period for MRSA and VRE were 78.3 and 56.8 hours, respectively.
Conclusion: Healthcare systems that enhance their EHR with CDSS to automate CP evaluations may improve frontline clinician workflow, patient flow and bed capacity, while optimizing use of IP resources.

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Assessing Mupirocin Resistance in MRSA Isolates in Hospitals in Cleveland, OH and Detroit, MI

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Background: Methicillin-resistant Staphylococcus aureus (MRSA) is a common pathogen responsible for nosocomial and community-acquired infections with high morbidity and mortality1. MRSA nasal colonization is a major risk factor for developing infection in the hospital setting2,3. Decolonization of MRSA carriers is a strategy to decrease recurrence or to prevent new MRSA infections3,4. Decolonization with nasal mupirocin 2% and chlorhexidine baths has been shown to decrease the risk of MRSA infection after hospital discharge3. Mupirocin is an RNA synthetase inhibitor with activity against MRSA5. Resistance of MRSA isolates to mupirocin has been described previously6. As topical disinfectants play a crucial role in prevention of MRSA infection in a variety of settings, it is important to monitor the emergence of resistance. The goal of this study was to determine the prevalence of mupirocin resistance among MRSA samples isolated from two different regions in the United States (U.S). **Methods:** Our study had a total of 474 MRSA samples that were obtained from hospitals in Detroit, MI (287 samples) and Cleveland, OH (187 samples). After whole genome sequencing using NextSeq (Illumina Inc., CA) platform the data was analyzed using ResFinder 4.1, to identify antimicrobial resistance which can be either acquired or chromosomally mediated mutations. To visualize the presence of genes of interest the resistance genes were tallied on a spread sheet. **Results:** Mupirocin resistance gene was detected in five of 287 (1.74%) MRSA samples from the Detroit hospitals, all of which were associated with the mupA gene. Samples collected from the Cleveland area hospital demonstrated mupirocin resistance in seven samples of 187 (3.74%), all associated again with the mupA gene. One sample from the Detroit group showed resistance to both mupirocin and chlorhexidine. **Conclusions:** Prevalence of mupirocin resistance gene varied between the two hospital locations. Resistance to mupirocin has been documented in association with mutations in the mupA gene as well as chromosomal point mutations that can lead to either low or high-level resistance7,8. Although the mechanisms are not fully clear, mupA gene has been associated with high-level resistance9. Mupirocin resistance among MRSA isolates has increased over time9. MRSA infections remain an important etiology of nosocomial and community-acquired infections and common practice to combat this issue is universal decolonization with mupirocin10. It is critical to understand and monitor for development of mupirocin resistance as mupirocin remains one of the most effective tools to prevent invasive infection with MRSA in many patient populations.

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S. aureus Surveillance and Decolonization Associated with Decreased MRSA, but not MSSA, Infections in the Neonatal ICU

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Background: Invasive Staphylococcus aureus infections cause significant morbidity and mortality in neonatal intensive care unit (NICU) infants.1 Colonization (asymptomatic carriage in the nose, skin, or gut) is a risk factor for subsequent invasive infection (e.g., pneumonia, bone infections, bloodstream infections, etc.). Active surveillance and decolonization measures for S. aureus-colonized infants have been associated with decreased invasive infection rates. 2-4 **Methods:** A methicillin-resistant S. aureus (MRSA) surveillance and decolonization program, consisting of admission and weekly MRSA nasal cultures followed by intranasal mupirocin plus chlorhexidine baths for colonized infants, was implemented in our level IV NICU with 150 beds in 2006.5 Due to poor compliance with decolonization protocols5, existing practices were reviewed and multiple interventions to increase compliance were implemented in 2018. These renewed efforts included revision of the existing MRSA decolonization protocol, updating the associated electronic medical record order set, re-education of unit staff, and weekly review by the Infection Prevention (IP) and NICU leadership teams to ensure the decolonization protocol was followed for newly colonized infants. Mean MRSA bloodstream infection (BSI) rates were calculated quarterly pre- (January 2014-December 2017) and post- (January 2018-December 2023) implementation of renewed efforts and compared via unpaired t-test. In July 2020 a similar methicillin-susceptible S. aureus (MSSA) surveillance and decolonization program was implemented with an associated revision of existing documents, education campaign, and weekly review of infants with new MSSA colonization. Mean MSSA BSI rates pre- (July 2018-June 2020) and post- (July 2020-December 2023) implementation were compared via unpaired t-test. **Results:** Renewed implementation of MRSA surveillance and decolonization was associated with a sustained decrease in the mean MRSA BSI rate (Figure 1): 0.10 per 1000 patient-days pre-implementation, 0.03

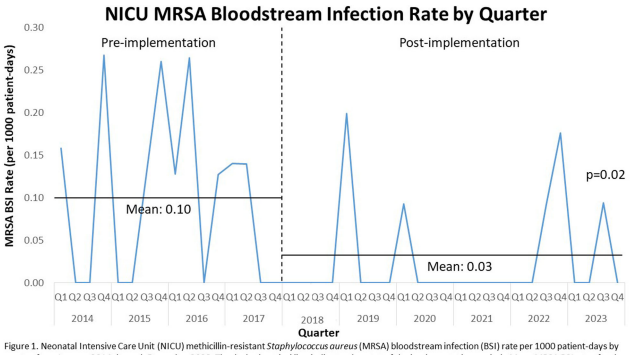

Figure 1. Neonatal Intensive Care Unit (NICU) methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infection (BSI) rate per 1000 patient-days by quarter from January 2014 through December 2023. The dashed vertical line indicates the start of the implementation period. Mean MRSA BSI rates for the pre- and post-implementation periods are indicated by the horizontal lines.