3-12-2024

Project #15: A Tale of Two Nasal Swabs: Impact of Process Improvement in Testing for MRSA Pneumonia

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P Background

- Pneumonia (PNA) is a leading cause of infectious-related hospitalization in United States. Close to a third of patients receive inappropriate anti-methicillin-resistant *Staphylococcus aureus* (MRSA) coverage for pneumonia ➔ **This can increase length of stay, health care cost, and cause harm to patients**
- **MRSA nasal swab (via MRSA culture or PCR) can aid in ruling out MRSA pneumonia, facilitating the reduction of anti-MRSA treatment**
- In 2018, via delegated authority, pharmacists were able to order MRSA nasal culture in patients with community-acquired PNA (CAP)

AIM outline a comprehensive, evidence-driven, multi-year (2018-2023), interdisciplinary, and cost-conscious system-wide strategies aimed at enhancing quality of care by optimizing the use of diagnostics and anti-MRSA antibiotics.

D Interventions

Multidisciplinary, IRB-approved, and system-wide approach

Phase 1: MRSA Culture

Examined the impact of pharmacist-driven, hard-stop MRSA culture protocol on duration of anti-MRSA therapy in patients with CAP

April – May 2021 **Pre-hard stop group** → **Hard stop implemented June 23, 2021** → Aug. – Aug. 2021 **Post-hard stop group**

Example of the Hard stop (on Epic)

Phase 2: MRSA PCR

Compared MRSA PCR and MRSA culture on vancomycin usage in patients with CAP and HAP (hospital-acquired PNA)

Sept. – Dec. 2021 **Pre-hard stop group** → **MRSA PCR implemented June 22, 2022** → Sept. – Dec. 2022 **Post-hard stop group**

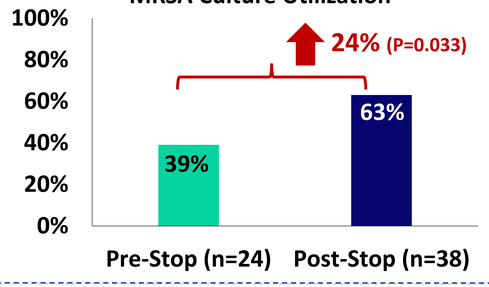
Outcomes	Culture (n=100)	PCR (n=100)	P-value
Vancomycin duration, days	3 (2-4)	2 (1-3)	P<0.001
No vancomycin level ordered	33 (33%)	48 (48%)	P=0.031

Phase 3: Quality Improvement

- The Nozin analysis showed **approximately $33,280 of unnecessary testing annually**
- In collaboration with Epic Willow team, an Epic hard stop was created to ensure appropriate use of MRSA PCR
- The impact of this hard stop was evaluated

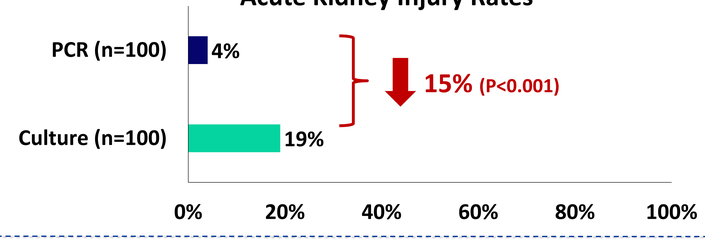
C Results

MRSA Culture Utilization



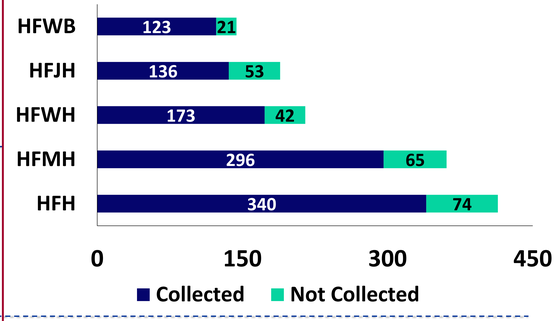
Similar outcomes were observed on:
- Duration of therapy
- De-escalation rates

Acute Kidney Injury Rates



- From May-Oct. 2023, the hard stop fired 310 times system wide
- At $40 per MRSA nares test and annualized, **that is $24,800 in waste prevented per year**
- Continued analysis of uncovered **missed opportunities of up to 39% in collecting MRSA PCR (Sept.-Nov. 2023)**

MRSA PCR Orders



A Sustained/Spread

- The collaboration effort led to an increase usage of MRSA culture. Results were presented at a pharmacy conference
- However, it did not improve appropriate anti-MRSA antibiotic use. This might be due to the slow turnaround of MRSA culture.

- MRSA PCR significantly enhanced quality of care and patient safety
- With vancomycin levels costing $70 per test for processing, MRSA PCR is anticipated to decrease costs, minimize patient blood draws, and save time for nurses, laboratory technicians, and pharmacists

Debrief Lessons Learned

- This led to switching from MRSA culture to MRSA PCR

	MRSA PCR	MRSA Culture
Turnaround Time	< 12-24 hours	~48 hours
Cost	$$$	$

- We continue to periodically assess MRSA PCR's proper utilization, accompanying costs, and missed opportunities to collect MRSA PCR
- In Fall 2022, we noticed MRSA nares were being collected after ethyl alcohol (Nozin®) nasal spray administration, which can lead to a false negative MRSA nares test result

- Pharmacy antimicrobial stewardship's support alongside key collaborators were vital in investigating and implementing these longitudinal, cost-conscious, and multi-step strategies to improve patient outcome