

# Lifting Contact Precautions for Methicillin Resistant *Staphylococcus aureus* (MRSA) Isolation: Effect on MRSA Infection Measures

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## Abstract (updated)

**Background:** Despite widespread utilization of contact precautions for endemic MRSA control, there is no direct evidence available regarding the efficacy of this measure to reduce HAIs. This study reports the findings of replacing MRSA contact with standard precautions and introducing chlorhexidine-gluconate (CHG) bathing for all inpatients.

**Methods:** The impact of discontinuing MRSA contact precautions was assessed in a pre/post design over a 23 month time period in a tertiary care hospital. MRSA outcome measures were NHSN LabID events, clinical bacteremia, CLABSI, CAUTI, pVAP, SSI, healthcare associated pneumonia (HAP), and MRSA high risk patient surveillance screening (admission and transfer screening to ICUs). Projected cost savings were calculated.

**Results:** MRSA contact precautions were lifted mid-September 2015 (month not included in analysis). No increases in NHSN LabID event and clinical MRSA bacteremia (OR: 1.12 [95%CI: 0.71, 1.77]; p=0.66; OR: 0.92 [95%CI: 0.49, 1.72]; p=0.88), CLABSI (OR: 1.53 [0.64, 3.94]; p=0.32), Colon SSI (deep, organ space) (OR: 1.02 [0.07, 14.10]; p>0.99), HAP (OR: 1.05 [0.56, 1.99]; p=0.88), and pVAP (OR: 3.32 [0.58, 32.80]; p=0.17) were observed in the following eleven months. There were no MRSA CAUTI pre and one CAUTI post intervention reported (p>0.99). No MRSA abdominal hysterectomy SSI were detected. Surveillance screening revealed a non-significant increase in MRSA conversion rate (OR: 1.27 [0.86, 1.85]; p=0.22). Based on an isolation rate of 10% for MRSA in the pre intervention phase and an estimated average of 25 room entries/day requiring gowns and gloves, a total annual savings of \$80,000 to \$230,000 were calculated taking into account different gown and gloves types and subtracting the additional costs of CHG soap.

**Conclusion:** Replacement of contact with standard precautions for MRSA combined with the introduction of CHG bathing of all inpatients did not negatively affect occurrence of MRSA HAIs. Besides substantial cost savings, this may improve patient satisfaction by easier access and less stigmatization, and reduce personnel time used for donning and removal of gowns and gloves.

## Introduction

The Centers for Disease Control and Prevention recommends the implementation of specific infection prevention measures based on transmission risk.<sup>1</sup> Standard precautions include hand hygiene at room entry and exit and after touching the environment or before touching a sterile site. In addition, gloves, gowns or both are to be used if exposure to body fluids, mucous membranes, or non-intact skin is expected. Contact precautions require the use of gloves and gowns for any patient interaction, a single patient room, and dedicated multidrug-resistant organisms, including MRSA. Contact isolation may also be associated with reduced patient care activities, decrease in patient satisfaction, and adverse outcomes such as falls. However, strong evidence supporting these observations is lacking.<sup>2,3</sup>

Despite widespread utilization of contact precautions for endemic MRSA control, there is no evidence available regarding the efficacy of this measure to reduce HAIs.<sup>4</sup> Morgan et al. make a compelling argument that contact precautions can only prevent a rather small fraction of HAI associated with MRSA (<0.2%).<sup>5</sup> The question has been raised if improved compliance with standard precautions may result in similar or even lower HAI rates than contact precautions.<sup>5</sup>

We hypothesize that the discontinuation of MRSA contact precaution will not negatively affect HAI linked to MRSA.

## Methods

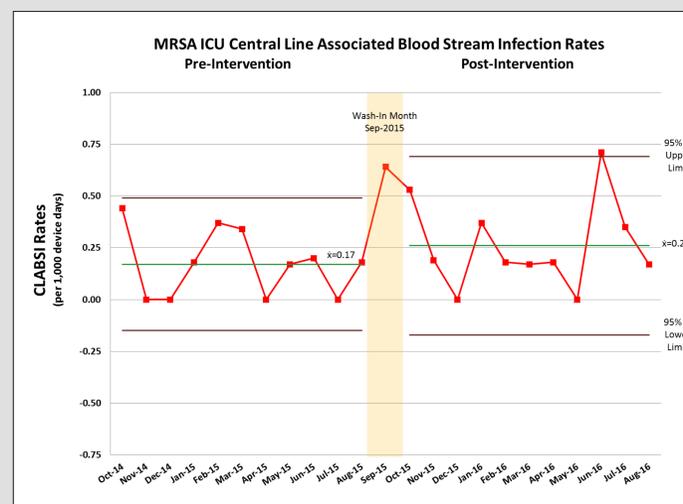
- **Setting:** 885 bed tertiary care teaching hospital; ~36,000 inpatient admissions and >89,000 ED visits annually (pediatric and adult patients)
- **Design:**
  - Quasi-experimental (before/after) design
- **Methodology:**
  - Comparison of Healthcare-Associated Infections (HAI) collected for routine surveillance
- **Study duration:** 23 months (11 months before and 11 months after switch; month of isolation discontinuation excluded from analysis)
- **Main Outcomes and Measures:** Comparison of HAI frequencies and MRSA conversions before and after MRSA contact isolation discontinuation
- **Analysis:** Fisher's Exact Test to assess significance of observed rates; odds ratios and 95% confidence calculated to provide an estimate of the odds of the post- vs. pre-intervention period

## Results

- **Comparison of HAI Event Rates – Pre-/Post MRSA Contact Isolation Discontinuation**

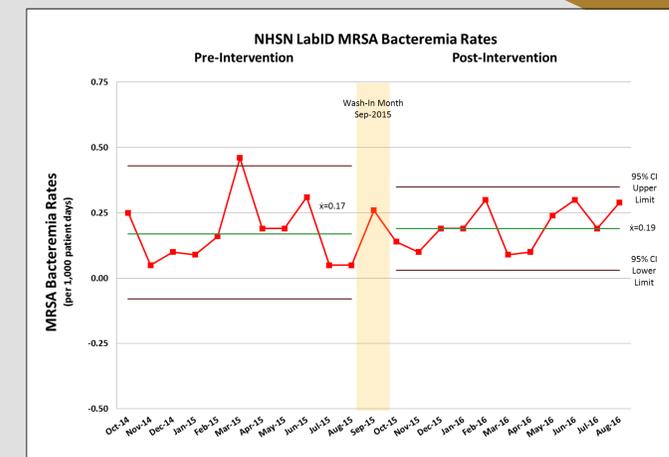
Metrics	Pre-Isolation Lift		Post-Isolation Lift		Comparison		
	Events (Denominator)	Rate	Events (Denominator)	Rate	p-value	Odds Ratio	95% CI
NHSN LabID MRSA Bacteremia	38 (220,267)	0.0173%	44 (22,8030)	0.0193%	0.66	1.12	(0.71, 1.77)
Clinical MRSA Bacteremia	24 (239,644)	0.0100%	21 (228,030)	0.0092%	0.88	0.92	(0.49, 1.72)
MRSA CLABSI	9 (52,810)	0.0170%	16 (61,180)	0.0262%	0.32	1.53	(0.64, 3.94)
MRSA CAUTI	0 (49,859)	0%	1 (54,865)	0.0018%	p>0.99	NA	NA
MRSA HAP	22 (239,644)	0.0092%	22 (228,030)	0.0096%	0.88	1.05	(0.56, 1.99)
MRSA pVAP	2 (15,974)	0.013%	4 (14,826)	0.027%	0.17	3.23	(0.58, 32.8)
MRSA COLON SSI	2 (464)	0.43%	2 (455)	0.44%	p>0.99	1.02	(0.07, 14.1)
MRSA HYST SSI	3 (238)	1.26%	0 (223)	0%	0.25	NA	NA
MRSA CONVERSION	65 (1,978)	3.29%	56 (1,356)	4.13%	0.22	1.27	(0.86, 1.85)

- **MRSA ICU Central Line Associated Blood Stream Infections Rates – Pre-/Post Intervention**



## Results

- **NHSN LabID MRSA Bacteremia Rates - Pre-/Post Intervention**



- **Material Cost Analysis**

	Cost of Gown and Glove Combo	Cost per day (Patient Room Entry n=25/day)	Cost per Month based on MRSA Patient Isolation Days*	Costs per Month Institution wide CHG Bathing**	Estimated Monthly Cost Savings	Estimated Annual Cost Savings
Gown and Gloves Combo (plastic gown)	\$0.49	\$12.25	\$25,725	\$19,051	\$6,674	\$80,088
Gown and Gloves Combo (fabric gown)	\$0.73	\$18.25	\$38,325	\$19,051	\$19,274	\$231,288

\*Adjusted for time of isolation onset (2,100 patient days/months)  
\*\*12 month average (11/2013 to 10/2014): 18,318 Patient Days

## Conclusions

- Discontinuation of MRSA contact precautions and introduction of regular CHG patient bathing did not negatively affect MRSA bacteremia (clinical), NHSN LabID MRSA bacteremia, MRSA CLABSI, CAUTI, Colon SSI, HAP, and pVAP rates.
- MRSA conversion rates detected by high-risk unit admission and transfer screening did not significantly increase.
- Total annual savings amounted to \$80,000 up to \$230,000 not taking into account personnel time savings stemming from absence of donning/removal of PPE.
- Discontinuation of MRSA contact isolation may improve patient satisfaction by easier access and less stigmatization, and reduce personnel time used for donning and removal of gowns and gloves.

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