



Comparison of Environmental MRSA Levels on High Touch Surfaces in Contact Isolation and Non-Contact Isolation Patient Rooms: A Veterans Hospital Study

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Background

- Nosocomial Methicillin-resistant *Staphylococcus aureus* (MRSA) infections in hospitalized patients cause significant morbidity and mortality^{1,2}.
- Hospital environmental surfaces play an important role in transmission of healthcare associated MRSA³.
- Evidence suggests that there is a 2-3 percent increased risk of acquisition of MRSA in a patient who occupied a room previously contaminated by MRSA^{4,5}.
- In our hospital, patients who have MRSA colonization by anterior nares screening or clinical infection or had MRSA colonization or infection within the last 12 months are usually placed in contact isolation rooms. The rest are placed in regular rooms with no contact isolation signage.
- However, the burden of environmental MRSA in non-contact isolation rooms has not been studied well in Veterans hospital setting.

Objective

- Assess the MRSA burden in non-contact isolation patient rooms and their role in nosocomial transmission within a hospital environment.

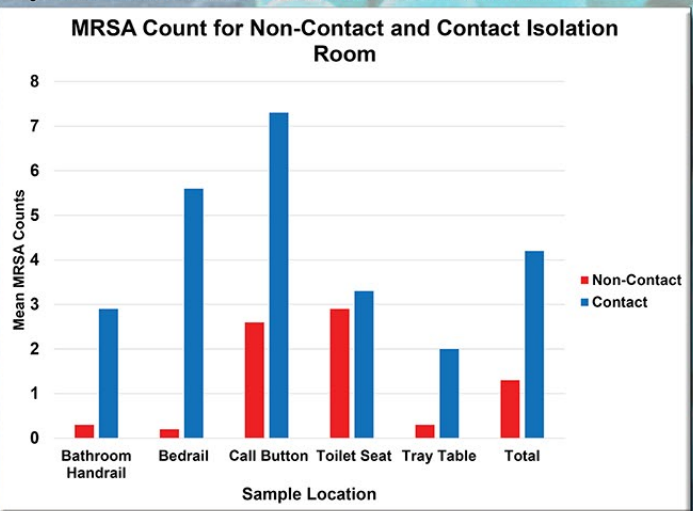
Methods

- 32 non-contact isolation and 68 contact-isolation patient rooms that were occupied for a minimum of 48 hours were identified by using infection control database.
- A total of 5 surfaces (call button, bedrail, tray table, bathroom handrail and toilet seat) were sampled in contact-isolation and non-contact isolation patient rooms.
- The samples were collected using Rodac plates (Hardy Diagnostics, Santa Maria, CA) that contained Tryptic Soy Agar (TSA) supplemented with lecithin and tween 80.
- The plates were incubated for 48±4 hours at 32±2°C and deep pink or mauve colored colonies were identified as MRSA and the total colony counts were recorded.
- Further, these colonies were identified as MRSA by using standard methods.

Table 1. MRSA count for Non-contact and Contact isolation rooms before cleaning

Location	Non-Contact Isolation Rooms		Contact Isolation Rooms		P-value
	No. of Rooms	MRSA Count Mean Median (Min, Max)	No. of Rooms	MRSA Count Mean Median (Min, Max)	
Bathroom Handrail	32	0.3± 0.30 (0, 9)	68	2.9± 0.20 (0, 101)	0.03
Bedrail	32	0.2± 0.10 (0, 4)	67	5.6± 0.90 (0, 200)	0.04
Call Button	32	2.6± 0.10 (0, 36)	68	7.3± 0.90 (0, 200)	0.48
Toilet Seat	32	2.9± 2.60 (0, 90)	67	3.3± 0.50 (0, 98)	0.85
Tray Table	32	0.3± 0.10 (0, 5)	68	2.0± 0.40 (0, 47)	0.15
Total	160	1.3± 0.00 (0, 90)	338	4.2±2.10 (0, 200)	0.01

Fig. 1. MRSA Count for Non-Contact and Contact Isolation Rooms



Results

- The total number of colonies identified were 202 (non-contact isolation arm) and 1430 (contact-isolation arm).
- The surfaces with the highest colony counts were the call button and toilet seat in both the arms (Fig. 1).
- The average colony count per surface was 1.26 and 4.23 respectively for non-contact isolation and contact-isolation arms (Table 1).

Conclusions

- Our result showed that non-contact isolation rooms have MRSA, but the burden is far lower than contact-isolation rooms.
- This may further provide insight into the transmission cycle of MRSA in a hospital setting, especially in closed systems like veterans hospital where active screening programs and isolation exist.
- The MRSA in non-contact isolation rooms may be secondary to intermittent colonizers, lack of proper hand hygiene, and left over contamination.

References

- Fowler VG Jr, Miro JM, Hoen B, et al. Staphylococcus aureus endocarditis: a consequence of medical progress. JAMA 2005; 293:3012-21.
- Cosgrove SE, Sakoulas G, Perencevich EN, Schwaber MJ, Karchmer AW, Carmeli Y. Comparison of mortality associated with methicillin-resistant and methicillin-susceptible Staphylococcus aureus bacteremia: a meta-analysis. Clin Infect Dis 2003;36:53-9.
- Lescure FX, Biendo M, Douadi Y, Schmit JL, Eveillard M. Changing epidemiology of methicillin-resistant Staphylococcus aureus and effects on cross-transmission in a teaching hospital. Eur J Clin Microbiol Infect Dis 2006;25:205-7.
- Ottler JA, Yazdi S, French GL. The role played by contaminated surfaces in the transmission of nosocomial pathogens. Infection Control and Hospital Epidemiology. 2011;32(7):687-699.
- Huang SS, Datta R, Platt R. Risk of acquiring antibiotic-resistant bacteria from prior room occupants. Archives of Internal Medicine. 2006;166(18):1945-1951.