Search, Destroy, and Confirm: How to Maximize the Benefit and Reduce the Unintended Consequences of Contact Precautions for Control of Methicillin-Resistant Staphylococcus aureus

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(See the Major Article by Shenoy et al on pages 176–84.)

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Methicillin-resistant Staphylococcus aureus (MRSA) remains a leading cause of healthcare-associated infections despite long-standing efforts to limit transmission in acute care facilities. Although the burden of community-acquired MRSA continues to increase, up to 85% of MRSA infections are associated with healthcare settings, and MRSA infections result in an estimated quarter-million hospitalizations and >10 000 deaths per year [1, 2]. Strategies to limit the risk of MRSA acquisition in healthcare facilities include the use of barrier precautions, hand hygiene, active surveillance cultures, decolonization, bundles, and enhanced environmental cleaning [3]. Evidence from systematic reviews shows that interventions that include isolation precautions can achieve major reductions in MRSA burden, even when MRSA is endemic [4]. Although questions remain about the optimal approaches to MRSA control, most acute care hospitals continue to isolate patients with MRSA from clinical or surveillance cultures using contact precautions, including gowns, gloves, and private room or cohorting with another patient with MRSA, for the duration of the incident and subsequent hospital admissions.

The primary benefit of contact precautions is to limit the risk of transmission of MRSA and other multidrug-resistant organisms to other patients, although the resulting improved compliance with hand hygiene and the use of barrier precautions have the potential to decrease the risk that a MRSA-colonized patient will develop subsequent infection. The benefit of protecting other patients from acquiring MRSA must be balanced with the cost of implementation to the facility, including increased resource utilization and limited bed availability, and the unintended consequences to the isolated patient, including decreased patient–provider interactions, quality of care practices, and patient satisfaction, as well as adverse psychological impact, including increased risk of delirium and depression [5, 6]. Potential strategies to mitigate the adverse consequences of contact precautions include provider education, monitoring of provider–patient contacts, and measures to reduce social isolation, but data regarding the effectiveness of these strategies are sparse.

The duration of MRSA colonization is variable, and depends on the setting and patient risk factors, including age, race, number of colonizing body sites, skin integrity, comorbidities, and frequency of contact with healthcare [7, 8]. In a general hospital population, there appear to be 2 distinct populations of patients with MRSA colonization: transient carriers who rapidly lose MRSA within 1–2 months of initial detection (approximately 40%–50%) and long-term carriers (approximately 50%–60%) in whom MRSA persists for months to years and is associated with ongoing risk of MRSA-related morbidity and mortality [8–10]. In the absence of high-quality evidence about the best practices to discontinue contact precautions for MRSA, there is substantial variation in infection control practices across US acute healthcare facilities. A national survey of >3000 infection preventionists identified a wide range of eligibility and screening practices, with 64 distinct MRSA discontinuation protocols, only 2 of which were used by >5% of respondents [11]. These institution-specific MRSA clearance policies are complex and administratively burdensome and result in

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the unnecessary isolation of some patients who are no longer colonized with MRSA, because of their failure to meet or complete the screening criteria.

In this issue of Clinical Infectious Diseases, Shenoy and colleagues report on the results of a single-center, randomized clinical trial comparing active screening by nasal culture or polymerase chain reaction (PCR) to passive clinician-initiated culture for MRSA clearance among hospitalized adult patients. Patients with MRSA detected within the prior 90 days were excluded to limit the proportion of study subjects with transient MRSA colonization. Not surprisingly, the authors found that a substantially greater proportion of patients who were actively screened using culture methods had contact precautions discontinued during the study hospitalization compared to passive screening. This resulted in reductions in both inappropriate isolation days and cost of isolation compared to the standard practice of passive culture. The overall prevalence of MRSA (8%) in the inpatient population, eligibility criteria, and screening practices roughly mirror those of many other acute care hospitals and improve the generalizability of the findings. The ineffectiveness of clinician-initiated passive screening was striking—only 6.6% of patients in the nonintervention arm had 3 negative cultures and were eligible for discontinuation of contact precautions during the study hospitalization.

In the intervention arm, active screening using a single PCR assay provided additional benefit compared to the series of 3 daily cultures. Despite a higher capital and per-test cost of PCR compared to culture, the high sensitivity, simplicity, and rapidity of screening with single PCR was the most effective approach, resulting in a >50% reduction in total MRSA contact isolation days and potential annual cost avoidance of >$1 million compared to the no MRSA discontinuation strategy. Electronic alerts to identify eligible patients and clinical decision support to facilitate order entry would enhance the effectiveness of the screening program. Other potential benefits that could result from active screening using a single PCR result to discontinue contact precautions include a decreased risk of reacquisition of MRSA from inappropriate isolation, improved patient safety and satisfaction, and a reduction in empirical vancomycin therapy; these possibilities warrant further study.

Whether mandated or voluntarily implemented, active surveillance screening to detect patients with MRSA colonization is increasingly utilized in acute care hospitals and has been targeted to special care units, other at-risk populations, or facility wide. However, the effectiveness of enhanced detection and earlier isolation of patients with MRSA has been questioned. In a large, multicenter, cluster randomized clinical trial of intensive care unit (ICU) patients, the intervention of universal screening for MRSA and vancomycin-resistant Enterococcus (VRE) on admission, universal gloving pending surveillance culture results, and contact precautions based on these results did not reduce MRSA or VRE transmission or infection compared to contact isolation based on isolation of MRSA or VRE from clinical culture results alone [12]. Compared to the strategy of active surveillance screening for MRSA followed by contact precautions if positive, screening and targeted decolonization of MRSA carriers using topical intranasal mupirocin twice daily for 5 days and daily bathing with chlorhexidine gluconate for the duration of ICU stay or universal decolonization without active surveillance screening were both more effective in reducing MRSA infection rates in a preliminary analysis of the REDUCE MRSA Trial, a large, cluster randomized clinical trial in 42 ICUs [13]. Regardless of the approach utilized to detect, isolate, and decolonize patients with MRSA, the investigation of Shenoy et al emphasizes that interventions to more effectively and efficiently detect hospitalized patients who are no longer colonized with MRSA will maintain the benefit of reducing MRSA transmission risk while limiting the cost and potential adverse consequences of inappropriate isolation.

Note

Potential conflicts of interest. Author certifies no potential conflicts of interest.

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