

VIEWPOINT

Reconsidering Isolation Precautions for Endemic Methicillin-Resistant *Staphylococcus aureus* and Vancomycin-Resistant *Enterococcus*

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Gowns, gloves, and hand hygiene are primary tools for preventing transmission of pathogens in health care settings.¹ The Centers for Disease Control and Prevention (CDC) recommends that these approaches be used for all patients as a part of standard precautions, which include hand hygiene on room entry and exit and after touching the environment or before touching a sterile site, and the addition of gloves, gowns, or both for patient care that involves risk for exposure to body fluids, mucous membranes, or nonintact skin.

Additional measures, known as contact precautions, are recommended by the CDC in acute-care hospitals "for all patients infected with target multidrug-resistant organisms (MDROs) and for patients that have been previously identified as being colonized with target MDROs."¹ The primary indications for contact precautions in the United States are colonization or infection with methicillin-resistant *Staphylococcus aureus* (MRSA) or vancomycin-resistant *Enterococcus* (VRE).¹ Contact precautions require single-patient rooms, dedicated equipment, and that health care personnel wear gowns and gloves for patient care.

Contact precautions are applied to a substantial proportion of hospitalized patients. The exact percentage of patients receiving contact precautions for MRSA or VRE varies by hospital and the methods used to identify MRSA or VRE. If samples obtained during routine clinical care are the basis for identifying MRSA or VRE, approximately 5% to 10% of patients in an acute-care facility are placed in contact precautions, as compared with 20% to 25% if active surveillance testing for MRSA or VRE is used to identify asymptomatic colonization.¹⁻³

Wearing gowns and gloves for each patient contact requires effort on the part of health care personnel. To achieve levels of adherence as high as 80% requires training and monitoring.^{1,4} Contact precautions also require use of large numbers of gloves and gowns, which increases the financial and environmental costs of health care. Contact precautions also may be associated with unintended consequences for patients. Health care personnel visit patients placed in contact precautions about 25% to 50% less frequently than those not receiving contact precautions, and patients receiving contact precautions may face delays in hospital admission and discharge.^{1,4} Fewer visits may be associated with lower patient satisfaction, depression, anxiety, or preventable adverse events including falls, pressure ulcers, or hypoglycemia.^{1,4} The data on harms of contact precautions are observational, however, and should not be overinterpreted.^{1,4} Higher-quality data

from a cluster trial of a related intervention of using gowns and gloves for all patient contact regardless of MRSA or VRE status found that, in a subset of patients, adverse events were no more common when gowns and gloves were used.⁵

Despite the widespread use of contact precautions, there is little evidence these measures prevent MRSA or VRE infections in endemic, nonoutbreak settings (the current situation in most US hospitals). No interventional study has compared MRSA or VRE acquisition rates with contact precautions vs standard precautions. The CDC's review of the literature concluded that "it has not been possible to determine the effectiveness of individual interventions, or a specific combination of interventions, that would be appropriate for all healthcare facilities to implement in order to control their target MDROs."¹ A high-quality cluster-randomized trial found that active surveillance for detection of MRSA and VRE colonization led to a doubling of the number of patients receiving contact precautions but had no effect on rates of transmission of MRSA or VRE.^{1,3}

To better understand why isolating more patients would not necessarily result in fewer infections, it is important to consider the steps to MDRO acquisition and infection using MRSA as an example. Most MRSA infections are endogenous, meaning that the infecting strain colonized the patient for some time prior to infection,¹ and contact precautions obviously do not prevent infections in the already colonized patient. Rather, contact precautions theoretically prevent infection by preventing MRSA acquisition by patients who are noncarriers. Recent data suggest that MRSA acquisition events are uncommon (occurring in approximately 2% of higher-risk patients in an intensive care unit)^{1,2} and that only about 20% of apparent acquisitions can be attributed to patient-to-patient transmission.^{1,6}

To put this into perspective, a recent CDC study found that 4% of hospitalized patients had a health care-associated infection, and of these infections only 11% were attributable to *S aureus* (thus affecting approximately 0.4% of patients).⁷ Given that half of all *S aureus* infections are attributable to MRSA,¹ an estimated 0.2% of hospitalized patients experience a health care-associated infection attributable to MRSA. Since many of these infections occur in patients already colonized with MRSA, only a small fraction of health care-associated infections are likely to result directly from in-hospital patient-to-patient MRSA transmission events, which could potentially be prevented by contact precautions. Whether those

transmission events are prevented by contact precautions or could be prevented by improved application of standard precautions is unknown.

The randomized trial data on the related intervention of universal use of gowns and gloves for all high-risk intensive care unit patients help inform the upward limit of what could be achieved with contact precautions. Beyond the use of gowns and gloves for all patients, this trial also improved infection prevention by increasing hand hygiene compliance and decreasing health care worker visits. Universal gowns and gloves resulted in a 14% to 58% decrease in MRSA acquisition and no effect on VRE acquisition.⁵

Could improved use of standard precautions (hand hygiene, selective use of barriers for patients with uncontained wound drainage, incontinence, etc) work as well or better than traditional contact precautions? Although no study has directly compared optimal use of standard precautions alone vs standard precautions in combination with contact precautions for MRSA or VRE, data from currently available studies suggest that the incremental benefit of contact precautions is likely to be small.^{1,3} Given that most studies of contact precautions were completed more than 10 years ago, before widespread efforts to improve hand hygiene compliance, chlorhexidine bathing, and environmental cleaning (which should decrease rates of all infections), the potential benefits of contact precautions are probably even less than these studies estimate.¹

Despite the limited evidence, most US hospitals have continued routine use of contact precautions for MRSA and VRE carriers, with some routine use based on state laws mandating screening patients for MRSA. Some exceptions include Dartmouth-Hitchcock Medical Center, Baystate Medical Center, University of Massachusetts Medical Center, Virginia Commonwealth University Medical Center, Detroit Medical Center, and the Cleveland Clinic.⁸

These centers do not use contact precautions for endemic MRSA or VRE and, in unpublished reports, note stable or decreasing rates of infections.⁸

Better studies are needed to understand whether contact precautions should be used. The ideal study would be a high-quality quasi-experimental study or cluster-randomized trial comparing the effect of adding contact precautions to the assiduous application of standard precautions on MRSA and VRE infections. This would provide critical guidance for hospitals and would likely require funding from the Agency for Healthcare Research and Quality, the CDC, or private foundations.

How should hospitals apply contact precautions, if not to patients found to be colonized or infected with MRSA or VRE? Should contact precautions be maintained in the absence of documented benefits, or is proof of lack of benefit necessary to forego contact precautions? Careful weighing of risk vs benefit is required based on available information. Given the limited current understanding of the epidemiology of emerging, generally nonendemic multiple-drug resistant gram-negative bacteria such as carbapenem-resistant *Enterobacteriaceae*, use of contact precautions for these organisms is prudent. For MRSA or VRE, contact precautions could be considered an adjunctive, or secondary, measure to reduce transmission when standard approaches (standard precautions and infection prevention bundles) fail, such as during outbreaks or when rates of infections are increasing despite best efforts at prevention. State laws and mandates arbitrarily requiring screening and use of contact precautions for MRSA should be reconsidered. If the experience of a few early adopter hospitals is any guide, the future promises a more thoughtful approach to limit MDRO transmission and infection while improving overall patient safety and satisfaction.

ARTICLE INFORMATION

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