Routine Use of Contact Precautions for Methicillin-Resistant *Staphylococcus aureus* and Vancomycin-Resistant Enterococcus: Which Way Is the Pendulum Swinging?

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Routine Use of Contact Precautions for Methicillin-Resistant *Staphylococcus aureus* and Vancomycin-Resistant Enterococcus: Which Way Is the Pendulum Swinging?

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**BACKGROUND.** Studies have suggested that contact precautions (CP) for methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant enterococcus may have risks that outweigh the benefits. These risks, coupled with more widespread use of horizontal interventions such as daily bathing with chlorhexidine gluconate, have brought into question the value of routine CP for these organisms.

**Objective.** To assess the state of utilization of CP as well as adjunctive measures to reduce the risk of transmission in US hospitals.

**Design.** Cross-sectional survey.

**Participants.** Total of 751 physician members of the Emerging Infections Network.

**Methods.** An 8-question electronic survey distributed by email.

**Results.** A total of 426/751 (57%) responded to the survey; 337/364 (93%) of respondents use routine CP for methicillin-resistant *S. aureus* and 335/364 (92%) use routine CP for vancomycin-resistant enterococcus. The most widely used trigger for initiation of CP for both pathogens was positive clinical culture. Practices for discontinuation of isolation varied widely. We found that 325/354 (92%) perform routine chlorhexidine gluconate bathing and 236/353 (67%) perform *S. aureus* decolonization with mupirocin for 1 or more subsets of inpatients, and 82/356 (23%) reported using either hydrogen peroxide vapor or ultraviolet-C room disinfection at discharge. Free text responses noted frustration and variation in the application, practice, and process for initiation and discontinuation of CP.

**Conclusions.** Use of CP for methicillin-resistant *S. aureus* and vancomycin-resistant enterococcus remains commonplace, although horizontal interventions such as chlorhexidine gluconate bathing are increasingly used. The heterogeneity of practices and policies was striking. Evidence-based guidelines regarding CP and horizontal interventions are needed.

The routine use of contact precautions (CP) for methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococcus (VRE) is recommended by the Centers for Disease Control and Prevention to prevent transmission in the healthcare setting.1 US hospitals have maintained a heterogeneous approach to implementation of this recommendation. A facility’s decision to implement routine CP for MRSA and VRE is complex and not simply a question of whether or not to adhere to the recommendations of the Centers for Disease Control and Prevention. Both internal and external pressure, including regulatory standards and state law, may drive screening and isolation for MRSA or VRE.

Healthcare epidemiology has experienced a shift in recent years to a mixed vertical and horizontal approach to prevention that includes interventions like chlorhexidine gluconate bathing.2 The healthcare environment as well is a target for technology that reduces bioburden (eg, disinfection with ultraviolet-C light) and thus reduces risk of transmission.3–5 Additionally, the literature describing CP’s negative impact on patient care has continued to proliferate. Studies have suggested that CP may increase patient adverse events such as falls and pressure ulcers,6,7 isolation, and depression,8 perhaps because healthcare workers do not spend as much time in direct patient care with patients in CP.9,10 Facilities have reported delayed bed assignment,11 patient perceptions of poor coordination of care,12 and decreased healthcare worker adherence to isolation precautions with increasing numbers of patients on CP.13

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Given the availability of a bundle of interventions of which CP is just 1 component, published evidence pointing to negative impact on care, and voiced concern regarding effort vs value, we set out to determine (1) whether CP remains a widely used intervention for MRSA and VRE, (2) how facilities use CP, and (3) what other key interventions are in place to reduce the risk of transmission.

**Methods**

We distributed an 8-question electronic survey to physician members of the Emerging Infections Network who had reported interest or involvement in infection prevention/infection control or who belonged to the Society of Healthcare Epidemiologists of America and had ever responded to a survey (http://www.int-med.uiowa.edu/Research/EIN/ContactPrecautions_fi nalquery.pdf). Recipients had 3 weeks to respond and were not required to answer all questions. Question formats included discrete answer choices plus free text fields for comments. Respondents were able to select more than 1 answer choice where applicable. Two reminder emails approximately 1 week apart were sent to those recipients who had not responded. Survey data were analyzed in an electronic spreadsheet (Excel; Microsoft).

**Results**

Seven hundred fifty-one US-based physicians were surveyed, and 426 (57%) responded. Respondent characteristics are outlined in Table 1. Most were adult infectious disease physicians from several US regions with more than 15 years post-fellowship experience from university or nonuniversity teaching hospitals. Of the 426 respondents, 67 (16%) indicated that they were not involved in infection prevention. These respondents were excluded from further analysis.

We found 337/364 (93%) and 335/364 (92%) report using routine CP for MRSA and VRE, respectively. Triggers for initiation of CP include clinical culture results (97% MRSA, 98% VRE), active surveillance testing results (87% MRSA, 65% VRE), preexisting alert in electronic health record (91% MRSA, 85% VRE), and suspicion of infection (36% MRSA, 20% VRE) (Table 2A). Active surveillance testing is performed for MRSA by 81% for any inpatient population and for VRE by 34% for any inpatient population.

Duration of isolation was reported to be indefinite once positive (18% MRSA, 31% VRE), until cleared or decolonized (69% MRSA, 54% VRE), for 1 year past last positive clinical culture (17% MRSA, 13% VRE), or for specific inpatient encounter only (7% MRSA, 8% VRE) (Table 2B). Free text responses indicate a wide variety of population- and specimen-based practices (Table 2B).

Use of adjunctive measures to reduce the risk of transmission is reported in Tables 3–5. Chlorhexidine gluconate bathing for 1 or more subsets of inpatients was reported to be used by 85%, most commonly in intensive care unit (73%) and preoperation (55%) patients (Table 3). We found that 64% perform S. aureus decolonization with intranasal mupirocin in 1 or more subsets of inpatients (Table 4), and 23% use either ultraviolet-C light or hydrogen peroxide vapor to disinfect patient rooms at discharge (Table 5A). To monitor performance of patient room discharge cleaning, 47% use visual inspection, 41% use adenosine triphosphate bioluminescence, and 21% use blacklight inspections (Table 5B).

**Discussion**

In this large, nationwide survey of more than 400 physicians with an interest in infection prevention, substantial heterogeneity in application of CP was identified. Despite increasing evidence of the negative impact of CP, routine CP for MRSA and VRE remains commonplace. Our findings are similar to those reported by Morgan et al.14 Although their sampled population was smaller and varied slightly from ours, both surveys reveal a high percentage of respondents using CP (more than 90%) yet expressing interest in alternative approaches.
Variation in the way CP is used was evident and likely driven by these factors: institutional (eg, infection rates, facility experience, workplace culture), patient (eg, population served), scientific (eg, evidence regarding duration of colonization), and regulatory (eg, state requires active surveillance testing for MRSA, so hospitals use CP).
Table 5A. Environmental Interventions: Methods for Discharge Cleaning

Does your facility use ultraviolet light or hydrogen peroxide vapor disinfection in any patient rooms at time of discharge?

<table>
<thead>
<tr>
<th>Answer</th>
<th>No. (%) of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>241 (68%)</td>
</tr>
<tr>
<td>Yes</td>
<td>82 (23%)</td>
</tr>
<tr>
<td>Unsure</td>
<td>33 (9%)</td>
</tr>
</tbody>
</table>

NOTE. Answered by 356.

Table 5B. Environmental Interventions: Method of Cleaning Performance Monitoring

<table>
<thead>
<tr>
<th>Answer</th>
<th>No. (%) of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection</td>
<td>167 (50%)</td>
</tr>
<tr>
<td>ATP bioluminescence</td>
<td>145 (43%)</td>
</tr>
<tr>
<td>Blacklight inspection</td>
<td>74 (22%)</td>
</tr>
<tr>
<td>Unsure</td>
<td>72 (22%)</td>
</tr>
<tr>
<td>Do not monitor</td>
<td>34 (10%)</td>
</tr>
</tbody>
</table>

NOTE. Answered by 335. ATP, adenosine triphosphate.

We were surprised by how many respondents report using CP routinely. We perceive from the literature plus conversations with healthcare epidemiology colleagues that CP for MRSA and VRE is falling out of favor. However, although many institutions may contemplate discontinuing routine CP for MRSA and MRE, the effort involved may be a significant disincentive to change.

One of our facilities, a tertiary academic center, discontinued using routine CP for MRSA and VRE in 2014. It took 6 months to carefully plan, educate staff on the change, and implement. The overarching educational message was 2-pronged: (1) adherence to excellent hand hygiene is crucial, (2) though use of CP for MRSA and VRE is no longer routine, CP may be appropriate if implemented as part of standard precautions (eg, with drainage that can’t be contained, use CP). After the extensive educational effort, discontinuation of CP was met with mostly applause and has allowed staff to better understand and apply the nuances of standard precautions. Preliminary data show no increase in rates of MRSA or VRE infections by laboratory-identified method since the change.15

This study has several limitations. First, this was a cross-sectional study conducted in 2014; data represent 1 point in time and could have changed by now. Second, we do not know whether more than 1 person from any given facility responded. As such, some facilities could be overrepresented and cause some skew of the data. Third, respondents may have interpreted questions differently. Lastly, respondents were not required to answer all questions. As such, they could be selective in choosing which questions to address, potentially biasing results.

Although routine CP for MRSA and VRE remains a standard at most hospitals across the country after decades of use, robust studies demonstrating the benefits of CP for these organisms, outside of the outbreak setting, are lacking in the medical literature, especially in comparison with horizontal interventions, such as universal chlorhexidine gluconate bathing. Additionally, studies demonstrate that the use of CP may result in substandard care for patients. In 2014, Daishell Earp et al6 published the results of a time-motion study of internal medicine interns. The study found that interns visited less frequently and spent less time with patients on CP compared with patients not on CP. Less healthcare worker time in a patient’s room could lead to unintended consequences such as those reported by Karki et al,7 who found that patients on CP had a significantly higher risk of nonpressure injuries, such as falls and skin tears, and of medication administration errors.

Nevertheless, before we relegate routine CP for MRSA and VRE to the dustbin of history, there are a number of questions regarding its use that remain unanswered with large-scale, quality trials. Studies should address the relative importance of CP versus emerging horizontal interventions, such as chlorhexidine gluconate bathing, electronic hand hygiene monitoring, and nasal decolonization for *S. aureus*. Clarity is needed on whether some particular segments of the hospitalized patient population benefit more than others. As the current survey shows, there is heterogeneity in the application of CP for MRSA and VRE, especially surrounding how long institutions should continue CP after a positive culture. As additional studies better elucidate the risks and benefits of CP relative to horizontal interventions in the future, professional societies and regulatory agencies should take into account the trade-offs of routine CP and guide healthcare facilities to take a more personalized, risk-based approach to applying these measures.

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References


