Most of the inappropriate glycopeptide use found in our study occurred in empiric vancomycin therapy. As in previous reports, prolonged empiric therapy (more than 72 hours) in patients with negative cultures and without neutropenia or evidence for catheter-related infection was a frequent inappropriate use of vancomycin.[7,9,10] This is a situation in which the use of vancomycin should be discouraged.

REFERENCES

1. Smith TL, Pearson ML, Wilcox KR, et al. Emergence of vancomycin resistance in *Staphylococcus aureus*. *N Engl J Med* 1999;340:493-501.
2. Ploy MC, Grelaud C, Martin C, de Lumley L, Denis F. First clinical isolate of vancomycin-intermediate *Staphylococcus aureus* in a French hospital. *Lancet* 1998;351:1212.
3. Hospital Infection Control Practices Advisory Committee. Recommendations for preventing the spread of vancomycin resistance. *Infect Control Hosp Epidemiol* 1995;16:105-113.
4. Jarvis WR. Epidemiology, appropriateness, and cost of vancomycin use. *Clin Infect Dis* 1998;26:1200-1203.
5. Ena J, Dick J, Jones R, Wenzel R. The epidemiology of intravenous vancomycin usage in a university hospital: a 10-year study. *JAMA* 1993;269:598-602.
6. Watanakunakorn C. Prescribing pattern of vancomycin in a community teaching hospital with low prevalence of vancomycin resistant enterococci. *Infect Control Hosp Epidemiol* 1996;17:767-769.
7. Evans M, Kortas KJ. Vancomycin use in a university medical center: comparison with Hospital Infection Control Practices Advisory Committee Guidelines. *Infect Control Hosp Epidemiol* 1996;17:356-359.
8. Singer MV, Haft R, Barlam T, Aronson M, Shafer A, Sands KE. Vancomycin control measures at a tertiary-care hospital: impact of interventions on volume and patterns of use. *Infect Control Hosp Epidemiol* 1998;19:248-253.
9. Roghmann MC, Perdue BE, Polish L. Vancomycin use in a hospital with vancomycin restriction. *Infect Control Hosp Epidemiol* 1999;20:60-63.
10. Floret N, Thouverez M, Thalamy B, Estavoyer JM, Talon D. Evaluation of vancomycin use in a large university-affiliated hospital in eastern France in 1999. *Pharm World Sci* 2001;23:93-97.

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SHEA Guideline for Preventing Nosocomial Transmission of Multidrug-Resistant Strains of *Staphylococcus aureus* and *Enterococcus*

The following questions were submitted by Kathleen LeDell, MPH, RN, Infection Control and Antimicrobial Resistance Unit, Acute Disease Investigation and Control Section, Minnesota Department of Health, Minneapolis, Minnesota, regarding the "SHEA Guideline for Preventing Nosocomial Transmission of Multidrug-Resistant Strains of *Staphylococcus aureus* and *Enterococcus*."[1] Several of the authors of the SHEA guideline (Carlene A. Muto, MD, MS, University of Pittsburgh School of Medicine and Graduate School of Public Health, Pittsburgh, Pennsylvania; William R. Jarvis, MD, retired from the Centers for Disease Control and Prevention, Atlanta, Georgia; and Barry M. Farr, MD, MSc, University of Virginia Health System, Charlottesville, Virginia) have responded to these questions. Their answers are in italics.

To the Editor:

I am writing regarding the "SHEA Guideline for Preventing Nosocomial Transmission of Multidrug-Resistant Strains of *Staphylococcus aureus* and *Enterococcus*,"[1] published in the May 2003 issue of *Infection Control and Hospital Epidemiology*.

I thank you for publishing this informative and thought-provoking guideline. The research is thorough and I believe that these recommendations should be strongly considered by healthcare facilities.

However, I do have some questions about how these recommendations would be operationalized in a facility that chooses to implement them.

The guideline does not define patients at high risk for carriage of methicillin-resistant *Staphylococcus aureus* (MRSA) or vancomycin-resistant enterococci (VRE). Presumably, these are nursing home residents or patients with prior hospitalization. It would be helpful if this were explained. I am also curious as to what percentage of patients would fall into these risk groups and warrant culturing, so that it would be possible to get an indication of how many patients this would involve.

As mentioned in the Society for Healthcare Epidemiology of America (SHEA) guideline, risk has varied from country to country and hospital to hospital.[1] The principal risk factor has been healthcare, so patients coming from other healthcare facilities or those with a history of exposure to healthcare facilities (especially with antimicrobial treatment) may be at high risk. In countries such as the Netherlands, the risk of MRSA is low because the measures recommended by the SHEA guideline (ie, active surveillance cultures and contact precautions) are routinely used; patients returning from healthcare facilities in other countries not using surveillance cultures and contact precautions are routinely at a higher risk. The implementation of surveillance cultures in each facility would allow for the recognition of high-prevalence referral facilities and other risk factors. It would also determine the percentage of patients at risk. For patients remaining in the institution, the amount and duration of antimicrobial therapy, duration of stay, and location in a high-risk area can each serve as a marker for high-risk patients, as mentioned in the guideline.[1]

Are those patients who have surveillance cultures performed on admission placed in contact precautions pending the results of their cultures? It would seem that for this strategy to work, they would have to be. Also, would masks be indicated as part of empiric precautions due to the chance that the patients might have MRSA?

Most of the 44 studies cited in the guideline that reported success with surveillance cultures and contact precautions did not isolate patients until cultures were positive, so this is not always necessary. However, it is true that optimal control would likely come from the isolation of colonized patients on admission. Above some threshold prevalence, surveillance cultures and contact precautions likely save money by preventing spread, consequent (more expensive) infections, and greater numbers of patients requiring isolation, as discussed in the guideline. In recommendation III. 3., we suggested that universal gloves or gowns and gloves could be considered for patients with cultures pending.

The average length of stay for hospitalized patients in Minnesota is 4.4 days. In the absence of affordable, reliable commercial polymerase chain reaction tests for MRSA and VRE, many patients would be in contact precautions for most (if not all) of their stay because culture results would not be available in time.

A 4.4-day mean stay results from some relatively healthy patients staying 1 to 2 days (with low risk for carriage or spread) and others staying considerably longer (and having much higher risk for both carriage and spread). A recent study at a tertiary-care hospital treating, on average, the sickest patients in a state of 7 million people showed that a surveillance culture program identified 437 patients on admission who would have gone unisolated for 3,247 patient-days (7.4 days per patient) if not detected by surveillance cultures (only 15% had a routine clinical culture positive for MRSA during the entire hospital stay, a mean of 5.4 days after admission).[2] The mean hospital stay during the study was approximately 5.5 days. Because MRSA patients often get readmitted, detection can prevent spread during subsequent admissions.

If patients are to be placed in contact precautions while awaiting culture results, would there be enough private rooms at most facilities to accomplish this? Such patients could not be cohorted because we would not yet know their MRSA or VRE status. Also, there would be increased costs associated with keeping these patients in empiric contact precautions.

The number of private rooms should not be an impediment because most facilities initially will need to use cohorts involving larger rooms. The decision about cohorting patients with pending cultures can be made in each facility based on its own rates of positive cultures for different groups. Such patients should not be cohorted with patients who are known to be colonized. Cohorting should not be viewed as a new risk because hospitals not using surveillance cultures and contact precautions have routinely housed untested colonized and noncolonized patients in the same room. As cited in the guideline, all of the cost-effectiveness studies so far have shown lower costs associated with the use of surveillance cultures and contact precautions than without their use (ie, using standard precautions).

How many cultures would be performed for each patient? At a minimum, the guideline suggests nares and rectal cultures each time. Other possible additional culture sites are mentioned. Who would pay for these cultures? Presumably, the healthcare facility would do so.

As stated in recommendation I. 6., the frequency of cultures should depend on the prevalence in that facility. In a country where MRSA and VRE are rare and the frequency of patients returning from countries with higher rates is very low, not many cultures will be needed. If 50% of all patients have MRSA, VRE, or both, far more cultures will be needed. In such a facility, a sweep of all patients should be done and cohorts established. Cultures of high-risk admissions should be performed to detect and isolate colonized patients; a high-risk facility will likely have shared this high risk with its referral facilities. As mentioned in the guideline, cultures of the nose and of broken skin should be used for MRSA and rectal or perirectal cultures for VRE. The cost-effectiveness studies mentioned above suggest that surveillance cultures and contact precautions will save money as compared with letting more expensive infections continue to spread out of control. The cost of a culture is small compared with the cost of a hospital stay, and can thus be borne by the hospital or charged to the patient, depending on the philosophy and practices of the individual facility. Either way, cultures should be done at cost (ie, for media, supplies, and technologists' time), as both the hospital and patients benefit from controlling antibiotic-resistant infections.

Weekly surveillance cultures are recommended. Because patients can become colonized quickly, would this be often enough to accomplish the goal of prompt isolation? However, culturing more often (eg, after each prior set comes back [approximately every 3 days]) could be prohibitively time consuming and expensive.

Many studies have shown control (and even eradication of the pathogen) using weekly surveillance cultures among patients staying on high-risk wards, so more frequent cultures are probably not necessary in most circumstances.

Facilitating and monitoring all of these cultures would be labor intensive for infection control departments that are likely already stretched thin. How can administrative "buy in" be achieved?

We agree that infection control programs are often underfunded and undermanned (especially given published data showing that investment in this area saves money). We believe that you and your colleagues at our many public health departments could help the hospital infection control community get administrative buy in by supporting the SHEA guideline (eg, the Rhode Island Health Department endorsed a similar approach for Rhode Island hospitals to control MRSA last year). With support from health departments and the Centers for Disease Control and Prevention (CDC), the Centers for Medicare and Medicaid Services could be encouraged to require the use of this approach by all healthcare facilities accepting federal dollars as part of Medicare or Medicaid. The cost of this initiative may seem large, as did that of switching to needleless intravenous infusion systems or of requiring respirator fit testing for all healthcare workers who might enter a tuberculosis isolation room, but the latter were required to comply with an advisory from the Food and Drug Administration and a recommendation from the Occupational Safety and Health Administration, respectively, and healthcare facilities quickly found ways to implement these policies. The differences with performing surveillance cultures and contact precautions are that there are far more data showing that this method works and that it should result in significant long-term healthcare savings, whereas the other interventions mentioned did not result in detectable savings for the healthcare system.

Surveillance cultures are recommended in all types of healthcare settings. Presumably, this would include outpatient clinics and emergency departments. How would this be implemented? Even if a polymerase chain reaction test were available, would those results be available quickly enough to institute precautions while the patient was still in the facility? Again, many patients would be placed in empiric contact precautions in a variety of healthcare settings. What would this mean in a practical sense?

Patients colonized with MRSA, VRE, or both regularly enter outpatient clinics, resulting in spread, but we would not suggest surveillance cultures in this setting. There are no data evaluating the use of surveillance cultures

performed in a clinic. We recommend performing surveillance cultures in hospitals and nursing homes, but would use contact precautions for colonized patients returning to a clinic.

The guideline suggests that contact precautions may require modifications in other settings such as nursing homes and psychiatric wards. What would these modifications be?

Four published studies showing control in the long-term–care facility setting with this approach were cited in the guideline[3-6] and two of those comment on the use of such modified approaches.[3,4] These involved allowing patients social contact while still taking measures to prevent physical contact. For example, patients could be allowed modifications on a case-by-case basis to meet special needs (eg, allowing patients to come out of a private room to attend group activities under certain conditions). This could involve cleansing hands, putting on clean clothes, and sitting in a dedicated spot during the meeting.

I understand that the data supported the use of gowns in addition to gloves. However, in light of the above issues, would it perhaps be a reasonable approach to institute universal gloving for all patients, with or without surveillance cultures? It seems that, in a sense, this guideline is recommending that contact precautions become "de facto" standard precautions for many patients.

There have been no studies showing long-term control with universal barriers alone, so this could not be recommended in an evidence-based guideline. As discussed in the guideline, universal contact precautions would also cost more than the approach we have recommended.

Was this guideline reviewed by the Healthcare Infection Control Practices Advisory Committee (HICPAC)? Also, does this guideline reflect what will be included in the draft revision of the CDC "Isolation Guideline for Hospitals?"

The SHEA guideline was available to HICPAC and a HICPAC draft of a new version of its isolation guideline was made available to the SHEA Task Force and the SHEA Board of Directors several months before the SHEA guideline was published. After months of review and presentations by both groups, the SHEA Board decided that the SHEA guideline represented a better approach to controlling MRSA and VRE than did the approach recommended in the HICPAC draft, which allowed standard precautions to be the usual approach in most facilities.

If community-associated MRSA becomes more prevalent, how will this affect the risk groups recommended for surveillance cultures? In Minnesota, approximately 15% of MRSA meets the CDC definition for community-associated MRSA. These patients would not be included in any currently defined high-risk group for healthcare-associated MRSA and would therefore be missed.

Although community-acquired MRSA has been increasing for years, less than 1% of individuals are colonized with MRSA, according to recently conducted prevalence studies.[7,8] In many areas, exposure to healthcare or to individuals who have been exposed to healthcare appears to account for many cases of MRSA identified in the community.[7-11] Regardless of where an antibiotic-resistant pathogen is acquired, it will enjoy a selective advantage to survive, proliferate, and spread once introduced into the healthcare setting. Because spread can be maximal in this setting, control can also be optimal in this setting. A previous publication from your department showed an important risk factor that could be used to facilitate detection of the new mec*IV strain that was circulating prominently in a "semi-closed" community in Minnesota. This could involve cultures on admission.*

Again, thank you for all of your work on these issues. Your responses to my questions are greatly appreciated and will help me communicate with the Minnesota infection control community about this guideline.

REFERENCES

1. Muto CA, Jernigan JA, Ostrowksy BE, et al. SHEA guideline for preventing nosocomial transmission of multidrug-resistant strains of *Staphylococcus aureus* and *Enterococcus*. *Infect Control Hosp Epidemiol* 2003;24:362-386.
2. Salgado CD, Farr BM. What proportion of hospital patients colonized with methicillin-resistant *Staphylococcus aureus* are identified by clinical microbiology cultures? Presented at the 13th Annual Scientific Meeting of the Society for Healthcare Epidemiology of America; April 5-8, 2003; Arlington, VA. Abstract 28.
3. Ostrowsky BE, Trick WE, Sohn AH, et al. Control of vancomycin-resistant *Enterococcus* in health care facilities in a region. *N Engl J Med* 2001;344:1427-1433.
4. Silverblatt FJ, Tibert C, Mikolich D, et al. Preventing the spread of vancomycin-resistant enterococci in a long-term care facility. *J Am Geriatr Soc* 2000;48:1211-1215.
5. Armstrong-Evans M, Litt M, McArthur MA, et al. Control of transmission of vancomycin-resistant *Enterococcus faecium* in a long-term–care facility. *Infect Control Hosp Epidemiol* 1999;20:312-317.
6. Kotilainen P, Routamaa M, Peltonen R, et al. Eradication of methicillin-resistant *Staphylococcus aureus* from a health center ward and associated nursing home. *Arch Intern Med* 2001;161:859-863.
7. Sa-Leao R, Sanches IS, Couto I, Alves CR, de Lencastre H. Low prevalence of methicillin-resistant strains among *Staphylococcus aureus* colonizing young and healthy members of the community in Portugal. *Microb Drug Resist* 2001;7:237-245.
8. Shopsin B, Mathema B, Martinez J, et al. Prevalence of methicillin-resistant and methicillin-susceptible *Staphylococcus aureus* in the community. *J Infect Dis* 2000;182:359-362.
9. Charlebois E, Bangsberg D, Moss N, et al. Population-based community prevalence of methicillin-resistant *Staphylococcus aureus* in the urban poor of San Francisco. *Clin Infect Dis* 2002;34:425-433.
10. Calfee D, Durbin L, Germanson T, Toney D, Farr B. Spread of methicillin-resistant *Staphylococcus aureus* (MRSA) among household contacts of individuals with nosocomially acquired MRSA. *Infect Control Hosp Epidemiol* 2003;24:422-426.
11. Jernigan JA, Pullen AL, Partin C, Jarvis WR. Prevalence of and risk factors for colonization with methicillin-resistant *Staphylococcus aureus* in an outpatient clinic population. *Infect Control Hosp Epidemiol* 2003;24:445-450.