

Better Hygiene, Less Resistance

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gel hand sanitizers among health care workers to improve compliance, because hand washing is often perceived as burdensome (MMWR 2002;51[RR16]:1-44).

The other CDC guideline, on prevention of intravascular catheter-related infection, advocated five principles: educating and training health care providers; using maximal sterile barrier precautions during insertion; using a 2% chlorhexidine preparation for skin antisepsis; avoiding routine replacement of catheters; and using antiseptic/antibiotic-impregnated short-term central venous catheters if the rate of infection remains high (MMWR 2002;51[RR10]:1-26).

Data support the efficacy of both guidelines. In an analysis of CDC data reported at the 2008 meeting of the Society for Healthcare Epidemiology of America (SHEA), the overall rate of central line-associated methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infections among ICU patients increased from 1997 to 2001 but then declined steadily from 2002 to 2004, resulting in an overall 44.4% reduction in incidence during the period from 1997 to 2004. But such infections from methicillin-susceptible *S. aureus* (MSSA) strains also declined during those 7 years, by 72.4%. Thus, although the proportion of infections caused by MRSA rose relative to susceptible strains, the infection rate dropped overall. Among 103 Michigan ICUs that adopted strategies based on those recommended by the CDC, the median rate of such catheter-associated infections per 1,000 catheter-days decreased from 2.7 at baseline to 0 at 3 months after implementation of the study intervention, and the mean rate per 1,000 catheter-days decreased from 7.7 at baseline to 1.4 at 16-18 months of follow-up (N. Engl. J. Med. 2006;355:2725-32).

Attention to the cleanliness of inanimate objects also has been shown to reduce infection rates. In a study presented in 2001 at an infectious disease conference, routine cleansing of surfaces in an ICU resulted in a 61% reduction in contamination of hospital workers' hands and gloves with vancomycin-resistant enterococci (VRE).

And in another study for which Dr.

Weinstein was a coauthor, routine daily bathing of medical ICU patients with cloths impregnated with chlorhexidine gluconate during November 2005–October 2006 reduced the rates of central venous catheter-associated bloodstream infections, compared with the baseline time period of September 2004–October 2005, from 5.31 to 0.69 per 1,000 catheter-days. Significant reductions were also seen in the rates of positive blood cultures (from 10.26 to 5.17 per 1,000 patient-days) and of blood culture contamination (from 6.99 to 4.1 per 1,000 patient-days). In the surgical ICU, the number of positive blood cultures decreased from 10.05 to 6.04 per 1,000 patient-days. Those data were also reported at this year's SHEA meeting.

Chlorhexidine gluconate eliminates what Dr. Weinstein calls the “fecal veneer” that is common in ICU patients. “Basically they have stool organisms all over their bodies. You use antiseptic to clean them. It's just what your mother and grandmother would have told you.”

A more controversial method for reducing hospital rates of MRSA and VRE is the “search and destroy” system, involving active surveillance and isolation of infected patients. Widely used in the Netherlands, the system is also now mandated in four states and at all Veterans Affairs hospitals. Although the practice does have the advantage of identifying asymptomatic individuals and some studies do suggest it is beneficial, Dr. Weinstein believes there are several drawbacks. For one, nearly all the studies are “quasi-experimental,” while those that have used concurrent controls have been negative, he said in an interview.

In one such negative study he conducted with associates in the Netherlands, surveillance cultures performed for 158 medical ICU patients during a 10-week period showed that 55 (34.8%) were colonized with MSSA and 9 (5.7%) with MRSA. Of those, 62 had been colonized before admission to the hospital (53 with MSSA and 9 with MRSA). The other two appeared to have acquired MSSA in the medical ICU, but genotyping analysis determined that this was not the result of cross-acquisition

(Clin. Infect. Dis. 2005;40:405-9).

“Surveillance cultures and genotyping of MRSA and MSSA isolates demonstrated the absence of cross-transmission among patients in the MICU, despite ongoing introduction of these pathogens. Reporting culture results and isolating colonized patients, as suggested by some guidelines, would have falsely suggested the success of such infection-control policies,” the authors wrote.

Moreover, patients in isolation might receive less care, Dr. Weinstein said in an interview. In another study he conducted with his daughter, Dr. Kathryn B. Kirkland, health care workers were half as likely to enter the rooms of patients in contact isolation, although they were more likely to wash their hands after caring for these patients than after caring for patients not in isolation (Lancet 1999;354:1177-8).

Focusing solely on antimicrobial-resistant organisms will not necessarily affect overall infection rates, particularly in hospitals where resistance rates are not excessively high. The “search and destroy” system “assumes one size fits all,” said Dr. Weinstein, adding he believes that the state laws mandating the system are “ill-advised.”

But he said he does support other types of recent legislation aimed at reducing the rates of hospital infections and their asso-

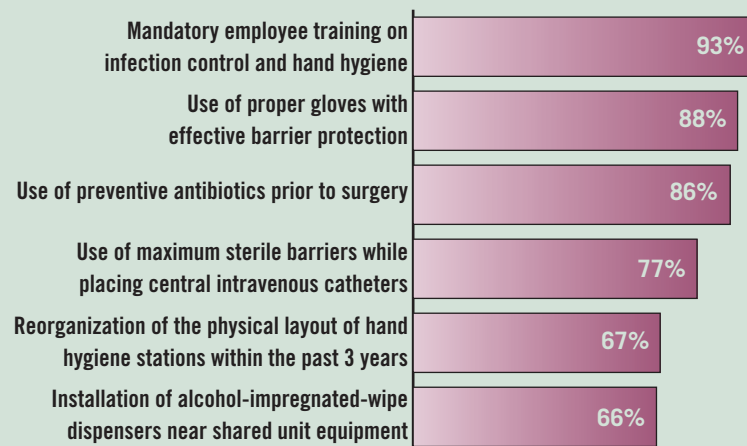
ciated costs. For example, Medicare's policy to stop paying for eight health care-acquired infections as part of the U.S. Federal Deficit Reduction Act of 2005 begins Oct. 1, 2008. Included are intravenous catheter infections, mediastinitis after heart surgery, and catheter-associated urinary tract infections. “Medicare perceives these as preventable. ... People will learn how to game the system, but eventually it will have an impact,” Dr. Weinstein predicted.

Mandated public reporting of hospital infection rates—coupled with payment for “good” performance and penalties for “bad”—will also make a difference, he said. Now adopted by a majority of states, public reporting is widely becoming viewed as a universal goal, despite a current dearth of outcome data. Although Dr. Weinstein is unconvinced that reporting hospitals are necessarily safer or that informed patients will obtain safer care, he does think that hospitals that are required to report infection rates will work to lower them “because of embarrassment, altruism, et cetera. ... What is measured, improves.”

Dr. Weinstein disclosed that he has received grant funding from the Centers for Disease Control and Prevention and from Sage Products Inc., which manufactures the disposable chlorhexidine gluconate-impregnated cloths his group studied. ■

DATA WATCH

Steps Taken in Hospital to Prevent Hospital-Acquired Infections



Note: Based on a 2008 survey of 539 members of the Association for Healthcare Resource and Materials Management.
Source: Perception Solutions Inc.

ELSEVIER GLOBAL MEDICAL NEWS

Respond Early to Hospital-Acquired Bloodstream Infections

BY KERRI WACHTER
Senior Writer

WASHINGTON — Mortality from hospital-acquired bloodstream infections is greater when the causal organism is not susceptible to initial antibiotic choice.

“We need to know the antibiogram and select broadly enough to cover the likely organism in the first 24 hours,” Dr. Richard Wenzel said at the annual meeting of the American College of Physicians.

He recommended using systemic inflammatory response syndrome (SIRS) criteria to identify sepsis patients early. SIRS is defined as the presence of two or more of these variables:

- ▶ A body temperature of more than 38° C or less than 36° C.
- ▶ A heart rate of more than 90 beats per minute.
- ▶ A respiratory rate of more than 20 breaths per minute (or an arterial partial pressure of carbon dioxide [PaCO₂] level of less than 32 mm Hg).

- ▶ An abnormal white blood cell count (greater than 12,000/mcL or less than 4,000/mcL, or greater than 10% bands).

Two SIRS criteria plus any evidence of infection define sepsis, he said. Severe sepsis involves any end-organ dysfunction plus sepsis. Septic shock is defined as severe sepsis with a blood pressure of less than 90 mm Hg after a 500-mL fluid bolus.

Coagulase-negative staphylococcus organisms are the No. 1 cause of crude mortality among patients with bloodstream infections. Other potentially deadly organisms include *Staphylococcus aureus*, enterococcus, *Candida* species, gram-negative rods, and *Pseudomonas aeruginosa*.

Two culprits—*Candida* species and *P. aeruginosa*—predict outcome after correction for the underlying disease, noted Dr. Wenzel, professor and chair of the department of internal medicine at Virginia Commonwealth University, Richmond.

The duration of hypotension prior to the initiation of

effective treatment is another critical factor in survival. “Treat the patients early. Resuscitate them early. Move them to the ICU early,” Dr. Wenzel advised.

The use of five evidence-based interventions—hand hygiene, a skin preparation with chlorhexidine, barrier precautions, preferred use of the subclavian vein, and catheter removal as soon as possible—can reduce catheter-associated bloodstream infections by as much as two-thirds according to some studies, he said.

For skin antisepsis, 2% chlorhexidine is now preferred over alcohol to reduce bloodstream infections. Another important element of hand hygiene may be eradication of nasal carriage through use of mupirocin. “Forty to fifty percent of people who are nasal carriers have the same organism on their hands,” he said.

Technology-based approaches—including antibiotic-coated catheters, vancomycin lock solutions, chlorhexidine-impregnated dressings, and daily bathing of ICU patients with chlorhexidine—also show some promise, Dr. Wenzel added. ■