

'Positive Deviance' Aids MRSA Reduction Efforts

ARTICLES BY DOUG BRUNK

SAN DIEGO — Implementation of a multifaceted methicillin-resistant *Staphylococcus aureus* prevention program at three hospitals triggered significant reductions in MRSA incidence that ranged from 26% to 62%.

"There are few reports of successful multicenter interventions to reduce endemic MRSA in U.S. health care settings," lead investigator Katherine Ellingson, Ph.D., said at the annual meeting of the Society for Healthcare Epidemiology of America.

One novel approach to implementation is positive

deviance, a concept that "highlights uncommon but effective solutions to persistent problems using existing resources. Once identified, solutions that work are scaled up to change new behavior."

In the context of MRSA prevention, positive deviance "encourages hospital employees to uncover, create, and diffuse effective infection-control solutions that work in the context of a given ward or a given hospital," said Dr. Ellingson, an epidemiologist with the Centers for Disease Control and Prevention.

In 2006 six hospitals partnered with the CDC and the Plexus Institute, a nonprofit based in Bordentown, N.J., to implement MRSA prevention programs in acute care settings. Hospitals used a combination of strategies, including enhanced emphasis on hand hygiene, contact precautions for known MRSA carriers, environmental cleaning, selective application of active surveillance testing, and positive deviance.

As a way to foster positive deviance at the hospitals, hundreds of frontline workers "were asked for their ideas on how to stop MRSA transmission, who among them was

practicing good infection control, and what actions they could take to improve adherence to precautions," according to a report available at the Web site of the Plexus Institute, which funded the study with the Robert Wood Johnson Foundation.

When a group of clinicians visited one of the hospitals participating in the study, it saw an example of positive deviance in action. As recounted in the report, the group members "saw a physician entering

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DR. ELLINGSON

an isolation room without washing his hands or donning gowns and gloves. A housekeeper politely reminded the physician to wash his hands and handed him a gown and gloves. The physician complied."

The hospitals shared electronic data for objective, third-party evaluation of the impact of the prevention efforts. At the meeting, Dr. Ellingson presented complete data from three of the six hospitals that took part in the analysis: the 272-bed Billings (Mont.) Clinic (hospital A), the 844-bed Albert Einstein Network in Philadelphia (hospital B), and the 404-bed University of Louisville (Ky.) Hospital (hospital C).

The study's primary objective was to analyze the impact of the interventions on the incidence of MRSA in hospitalized patients. The researchers extracted 12-32 months of data from the preintervention period and 20-24 months of data from the postintervention period.

When Dr. Ellingson and her associates compared the preintervention period with the postintervention period, they observed a 31% reduction in MRSA incidence in hospital A, a 62% reduction in hospital B, and a 26% reduction in hospital C. All three reductions were statistically significant.

Though the results are encouraging, Dr. Ellingson acknowledged the study had several limitations. ■



Hand Hygiene Alone May Cut Hospital-Onset MRSA

SAN DIEGO — Two medical centers of similar size located in the northeastern United States that use different methicillin-resistant *Staphylococcus aureus* infection control strategies have very similar rates of hospital-onset MRSA infection, results from a year-long analysis showed.

"Our study illustrates the need for these kinds of comparisons so we can decide which MRSA infection control strategies work best," lead investigator Dr. Kathryn B. Kirkland said at the annual meeting of the Society for Healthcare Epidemiology of America. "We need to expand the set of measures that we have that will allow us to do ongoing comparisons across a range of settings. We also need to have better national benchmarks."

Researchers set out to compare the incidence of MRSA and other health care-acquired infections at Dartmouth-Hitchcock Medical Center, Lebanon, N.H., and Fletcher Allen Health Care, Burlington, Vt., between October 2007 and September 2008. Both are academic medical centers, with an average daily census of 295 and 387, respectively, said Dr. Kirkland, medical director of infection prevention at Dartmouth-Hitchcock Medical Center.

Fletcher Allen Health Care staff screen for MRSA upon admission and screen all ICU patients on a weekly basis; the staff also uses contact precautions when providing care for any inpatient known to be colonized or infected with MRSA. In contrast, although Dartmouth-Hitchcock staff maintain an aggressive hand hygiene protocol, they do not screen for MRSA and use contact precautions only for patients with open wounds, uncontrolled secretions, or diarrhea, regardless of causative organism.

The researchers used National Healthcare Safety Network definitions to track hospital-onset primary

bloodstream infections and MRSA infections, as well as *Clostridium difficile* infections with onset during or within 30 days of hospitalization. They calculated rates as per 1,000 patient days and used direct observation to estimate hand hygiene compliance.

During the study period, the number of inpatient days at Dartmouth-Hitchcock Medical Center and Fletcher Allen Health Care were 114,828 and 126,600, respectively, while the estimated hand hygiene compliance was 84% and 93%.

Dartmouth-Hitchcock and Fletcher Allen did not differ significantly in the rate of new hospital-onset infections (0.48 vs. 0.54 per 1,000 patient days, respectively), the rate of primary MRSA bloodstream infections (0.06 vs. 0.08 per 1,000 patient days), the rate of primary methicillin-sensitive *S. aureus* bloodstream infections (0.1 vs. 0.07 per 1,000 patient days), or the rate of primary bloodstream infections due to non-*S. aureus* organisms (0.49 vs. 0.52 per 1,000 patient days).

The only significant difference between the two medical centers was in the rate of *C. difficile* infection, which was higher at Fletcher Allen Health Care (0.81 vs. 0.55 patient days).

"Both programs could be said to successfully control health care-associated infections, including invasive MRSA, primary bloodstream infections due to all pathogens, and *C. difficile* infection," Dr. Kirkland concluded. "Both strategies are effective in controlling a range of health care-associated infections. It may be that the hand hygiene rates, which were high at both institutions, are the key to the low observed rates that we saw. Contributors to the difference in the rates of *C. difficile* infection are unexplained, as our control programs differ in almost every aspect."

Dr. Kirkland had no conflicts of interest to disclose. ■

Community-Acquired MRSA Found in 14% of ICU Patients

SAN DIEGO — Community-associated methicillin-resistant *Staphylococcus aureus* genotypes have emerged as a cause of MRSA nares colonization among patients admitted to adult ICUs in the United States.

In addition, patients with a history of previous hospitalization and those older in age were significantly less likely to be colonized with community-associated MRSA (CA-MRSA) genotypes.

Those are the key findings from an effort to examine the molecular epidemiology and assess the prevalence of and risk factors for CA-MRSA genotype

carriage among patients admitted to adult ICUs.

The molecular epidemiology of MRSA in the health care setting is incompletely defined, Dr. Henry M. Blumberg said at the annual meeting of the Society for Healthcare Epidemiology of America.

Dr. Blumberg and his associates studied 5,512 adult ICU visits at 18 academic medical centers that participated in the STAR-ICU (Strategies to Reduce Transmission of Antimicrobial-Resistant Bacteria in Intensive Care Units) trial. STAR-ICU, a National Institutes of Health-funded trial, is de-

signed to evaluate the effectiveness of a package of infection control strategies focused on active surveillance cultures and barrier precautions in reducing transmission of MRSA and vancomycin-resistant enterococci (VRE) among adults in ICUs for 3 or more days.

CA-MRSA genotypes were defined as USA300, USA400, and USA1000 while health care-associated MRSA genotypes (HA-MRSA) were defined as USA100, USA200, USA500, USA600, USA800, the epidemic strain EMRSA-15, and the Brazilian clone.

Of the 5,512 patients, 626

(11%) had a positive culture for MRSA, reported Dr. Blumberg, professor of medicine and epidemiology in the division of infectious diseases at Emory University, Atlanta.

Of 210 isolates available for molecular typing, 70% were the USA100 clone, 12% were USA300, 6% were USA500, 4% were USA800, 3% were the Brazilian clone, 2% were USA600, 1% were USA1000, 1% were USA200, 0.5% were USA400, and 0.5% were EMRSA-15.

Overall, 14% of patients had CA-MRSA colonization.

Univariate analysis revealed that compared with patients col-

onized with HA-MRSA genotypes, those colonized with CA-MRSA genotypes were significantly younger (51 years vs. 65 years), significantly less likely to have been hospitalized in the previous 12 months (47% vs. 74%), and significantly less likely to have a history of MRSA or VRE colonization or infection (13% vs. 37%). Multivariate analysis revealed similar findings.

"These findings suggest that the predominant site of MRSA acquisition remains in the community," Dr. Blumberg concluded.

He said he had no conflicts of interest to disclose. ■