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Infection Control Link Nurse Program: An interdisciplinary approach in targeting health care-acquired infection

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Background: We describe a successful interdisciplinary liaison program that effectively reduced health care-acquired (HCA), methicillin-resistant *Staphylococcus aureus* (MRSA) in a university hospital setting.

Methods: Baseline was from January 2006 to March 2008, and intervention period was April 2008 to September 2009. Staff nurses were trained to be liaisons (link nurses) to infection prevention (IP) personnel with clearly defined goals assigned and with ongoing monthly education. HCA-MRSA incidence per 1,000 patient-days (PD) was compared between baseline and intervention period along with total and non-HCA-MRSA, HCA and non-HCA-MRSA bacteremia, and hand soap/sanitizer usage. Hand hygiene compliance was assessed.

Results: A reduction in MRSA rates was as follows in intervention period compared with baseline: HCA-MRSA decreased by 28% from 0.92 to 0.67 cases per 1,000 PD (incidence rate ratio, 0.72; 95% confidence interval: 0.62-0.83, $P < .001$), and HCA-MRSA bacteremia rate was reduced by 41% from 0.18 to 0.10 per 1,000 PD (incidence rate ratio, 0.59; 95% confidence interval: 0.42-0.84, $P = .003$). Total MRSA rate and MRSA bacteremia rate also showed significant reduction with nonsignificant reductions in overall non-HCA-MRSA and non-HCA-MRSA bacteremia. Hand soap/sanitizer usage and compliance with hand hygiene also increased significantly during IP.

Conclusion: Link nurse program effectively reduced HCA-MRSA. Goal-defined metrics with ongoing re-education for the nurses by IP personnel helped drive these results.

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The Ohio State University Wexner Medical Center's Link Nurse Program was awarded one of four honorable mentions for partnership in infection prevention at the Fifth Decennial International Conference on Healthcare-Associated Infections, 2010.

Preliminary findings were previously reported by M.M. Sopirala, L. Fawley,

D. Taylor, L. Wellington, P. Kulich, J. Dickman, and J. E. Mangino. OSUMC Infection Control Link Nurse Program. Society for Healthcare Epidemiology of America (SHEA) 19th Annual Scientific Meeting; March 19-22, 2009; San Diego, CA.

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Increasing antibiotic resistance among the most common bacterial pathogens, in the hospital and community, presents a growing threat to human health worldwide.¹ Health care-acquired (HCA) infections cause significant morbidity and mortality in addition to posing huge financial burden to health care systems.²⁻⁷ This is especially true for methicillin-resistant *Staphylococcus aureus* (MRSA), which can cause a variety of infections with variable but significant cost impact.^{8,9} The avoided cost was estimated to be \$2,051,286 for 58 MRSA infections avoided over the 2-year period during the Effective Processes in Infection Control project by the Spartanburg Regional Healthcare System.¹⁰ Hospital reimbursement is now affected for certain hospital-acquired infections including MRSA infections.¹¹

It is possible to significantly reduce the rates of HCA-MRSA and other multidrug-resistant organisms with attention to IP practices.^{9,12-16} Improving hand hygiene compliance among health care workers (HCW) has shown to have a positive impact on HCA-MRSA.^{17,18} This may be achieved by engaging front-line HCW in the process of infection prevention (IP). Such an engagement may require a multidisciplinary effort with well-defined goals and an effective feedback process. An IP program entitled "Partners in your Care" initially developed at the University of Pennsylvania¹⁹⁻²³ was previously implemented at our medical center in March 2006. Unfortunately, the program struggled to survive, until it was subsequently disbanded. This experience led to a root cause evaluation for its failure within the Department of Clinical Epidemiology (Infection Prevention). Ownership of such quality improvement programs needs to be with the individual patient care unit (PCU) staff themselves, and IP needs sustained presence on PCUs to facilitate this ownership. Some studies describing the perceptions of HCW on IP practices including hand hygiene stress the need to spread knowledge of IP and effective hand hygiene beyond IP professionals to other HCW for ongoing success.²⁴⁻²⁷ Collaboration between IP professionals and staff nurses (link nurses) from the individual PCUs to reduce HCA infections, especially MRSA, has been described in the past. However the strategies for carrying out the collaboration and the success of such programs were variable.^{15,28-31}

Previous descriptions of link nurse programs acknowledge operational difficulties such as high turnover of staff, insufficient time for training, and monitoring their effectiveness.^{30,31} Overcoming these early challenges may result in a successful and sustainable program that will be a valuable asset for IP. We hypothesized that a well-designed link nurse program will result in a decrease in HCA-MRSA by causing an increase in hand hygiene participation. We demonstrate how a multidisciplinary effort led by a clinical epidemiology team has successfully developed and sustained this program.

METHODS

Study design

This quality improvement study implemented an IP program (Link Nurse Program) to reduce HCA-MRSA incidence. It was implemented as a performance improvement initiative at all of the hospitals affiliated with The Ohio State University Wexner Medical Center (OSUWMC) including University Hospital, Ross Heart Hospital, University Hospital East, the James Cancer Hospital and Richard Solove Research Institute, and the Dodd Rehabilitation Hospital. Data analysis was performed to evaluate the effect of Link Nurse Program on HCA-MRSA. The OSUWMC is a 1,191-bed hospital with 5 infection preventionists (at the time of this study) and 3 physicians in the Department of Clinical Epidemiology. Waiver from the OSUWMC's Institutional Review Board was obtained and the study deemed a quality improvement effort.

Study time period

The baseline period for this study was January 1, 2006, to March 31, 2008. Intervention period was April 1, 2008, to September 30, 2009.

Routine surveillance and IP practices

When multidrug-resistant pathogens (defined as resistance to ≥ 2 drugs within 2 or more drug classes) are identified by the Clinical Microbiology Laboratory, contact isolation (CI) precautions (ie, gloving and gowning for those who enter the room) are instituted. These precautions are also instituted when patients with a history of MRSA or vancomycin-resistant *enterococcus* are readmitted to the hospital.

Selection and training of link nurses

Department of Clinical Epidemiology physicians (co-authors) approached the 3 chief nursing officers individually with a proposal detailing each of the 3 hospitals' individual rates of HCA-MRSA, compliance to hand hygiene, and CI in the winter of 2007. We presented a plan to monitor outcome measures that are described below and obtained approval from hospital administration to implement the program. We selected 1 to 2 link nurses per PCU, who either volunteered or were nominated by nursing administrators and/or nurse managers of each PCU. The time commitment for participation in the program was considered as part of their work time. We offered an opportunity to use their work for a clinical ladder project for advancement. The original commitment was for attendance at a 2-day training course and monthly 1-hour meetings, both led by Clinical Epidemiology, with at least 4 hours per month per nurse dedicated to this ongoing work on each PCU.

Clinical Epidemiology conducted 3 consecutive 16-hour training sessions (in April 2008, June 2008, and March 2009); the curriculum included the basics and principles of IP. Clinical Microbiology Laboratory provided a 2-hour laboratory tour with on-site education on microbiology supporting the IP principles within the 16 hours. All link nurses were required to attend the training within the first year that they joined the program. Clinical Epidemiology led monthly follow-up meetings for link nurses to evaluate progress and provide ongoing education on IP issues.

Duties of link nurses

Link nurses monitored hand hygiene on a daily basis during their regularly scheduled shifts along with CI compliance (at least 10 audits per month) among HCW and physicians on their respective units and provided on-the-spot feedback. They were also asked to bring specific IP issues that they identified on their unit to the attention of Clinical Epidemiology, which would subsequently address those issues as part of topic-focused monthly meetings. The subjects ranged from HCW noncompliance with IP policies to system issues that potentially hindered compliance. The link nurses reviewed IP information provided during the link nurse monthly meetings and shared it at the individual PCU staff meetings. The assigned 4 hours/month were spent attending monthly link nurse meeting, disseminating information at staff meetings and preparing informational bulletins for quality boards on PCUs, one-on-one education to the staff, in-service education, observing hand hygiene and CI precaution practice on their units and identifying existing barriers that hinder performance and identifying barriers to compliance, and on-the-spot feedback to the staff in the event of a breach in compliance.

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