The Institute for Healthcare Improvement (IHI) estimates that nearly 15 million instances of medical harm occur annually in the United States, equating to a rate of 40,000 incidents per day. Healthcare professionals are intimately acquainted with these incidents, and for the most part believe they’re unavoidable circumstances. Of the six new targeted interventions in the 5 Million Lives Campaign, reducing methicillin-resistant *Staphylococcus aureus* (MRSA) hospital-wide infections fits right into that old way of thinking.
Why MRSA?

Seventy percent of hospital-acquired infections are due to bacteria that are resistant to previously effective antibiotics, with MRSA being one of the fastest growing and most virulent offenders. The Centers for Disease Control and Prevention (CDC) attributes more than 50% of hospital-acquired St. aureus infections—63% in ICUs—to MRSA. The CDC estimates that over 126,000 hospitalized patients are infected with MRSA annually, leading to approximately 5,000 deaths. Hospitalized MRSA patients have an increased length of stay up to 9.1 days, with roughly $30,000 in additional costs per episode.

Making matters even worse, about 19% of patients with MRSA colonization at admission and 25% who acquire MRSA colonization during hospitalization actually become infected. An indisputable fact: Healthcare workers play a major role in spreading resistant strains from patient to patient via contaminated hands and clothing. In other words, “We have met the enemy, and it is us.”

While a number of U.S. healthcare facilities have significantly reduced rates of MRSA transmission and associated infections, success in transferring “best practices” and replicating positive change in other units or hospitals has been slow and limited. What makes this even more of a mystery is that for over 2 decades MRSA infections have been significantly reduced or even eradicated in several European healthcare systems. (See “MRSA patterns.”) Success was achieved through aggressive implementation of transmission-based control policies that included active surveillance cultures to identify colonized patients, with strict isolation precautions for those patients identified as being colonized or infected with MRSA. With such significant results, why can’t the United States achieve the same success?

One system’s story

The VA Pittsburgh Healthcare System (VAPHS) is an integrated three-division system with an active affiliation with the University of Pittsburgh School of Medicine. The medical center consists of 629 operational beds serving a veteran population of over 360,000 patients. Services include acute care, long-term care, and behavioral health, as well as tertiary services such as cardiac surgery and liver and kidney transplantation.

We began our journey in October 2002 by making a commitment to reducing healthcare-associated infections (HAIs). Despite an HAI rate that was substantially less than the national average, VAPHS began an initiative to achieve a MRSA prevention goal of “Getting to Zero.” Working in partnership with the Pittsburgh Regional Healthcare Initiative (PRHI) and CDC, VAPHS adapted the principles of the Toyota Production System (TPS) as a strategy to reduce the transmission of MRSA infection.

TPS uses a systems engineering approach to change structures and processes within an organization. Our goal was to use this approach to reduce HAI-MRSA rates in surgical patients. From a nursing perspective, our challenge was to facilitate a culture change so that nursing staff adopted TPS and the related interventions as a component of the traditional sacred “nursing process.” This cultural transformation wouldn’t only allow us to reach our goal, but also anchor the changes in practice and sustain ongoing compliance.

TPS was piloted on an acute care surgical unit over a 4-year period, during which supportive nursing and educational resources were dedicated to the program. Since our medical center executive team believed that facilitating change started with its full commitment and willingness to “walk the talk,” the medical center director, chief of staff, associate director for patient care services/nurse executive, associate director for operations, and unit staff attended TPS University—a comprehensive didactic training program. To support the unit in applying TPS principles, a dedicated RN TPS facilitator was provided to assist in the transformation. Key interventions included:

- active surveillance—nares swabbing of every patient upon admission, discharge, or transfer followed by timely notification to the unit staff regarding MRSA-positive patients
- contact isolation list printed to the unit so that nursing staff could identify positive patients
- weekly 15-minute MRSA briefings on the unit, which included the medical center’s executive team and the unit staff. Managers responded with support for resources (equipment, supplies) or removal of barriers (modifying hospital systems)

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when the “help chain” is pulled. If a transmission was reported for the unit, staff was actively engaged to apply TPS principles and track down the source.

- **Hand hygiene**
  - aggressive hand hygiene protocol before and after every patient contact; a hospital-wide education campaign on hand hygiene was developed;
  - staff in-services and online tutorials to educate and increase awareness;
  - hand hygiene posters visible on the unit;
  - hand hygiene dispensers at entry/exit of patient rooms and other staff-identified locations;
  - hand hygiene observations conducted regularly to monitor compliance; volume of hand sanitizer, alcohol rub/gel used on the unit also monitored.

- **Contact precautions**
  - contact precautions initiated for all MRSA infected and colonized patients;
  - staff required to wear gown and gloves when providing care; masks are required if patient has MRSA sputum;
  - visitors adhere to contact precaution guidelines;
  - “red isolation tape” rule identifies contaminated areas to help staff and visitors recognize when they should wear gown and gloves (See photo on page 25.)
  - compliance monitored through Nosocomial Infection Prevention Committee, which does quarterly observations of contact precaution compliance;
  - RN MRSA facilitator provided immediate feedback to nurse manager and unit staff regarding infection transmission; peer-to-peer compliance promoted.

**Spreading change**
The preceding changes were sustained over time to improve compliance with isolation and reduce MRSA infection on one surgical unit, and then the strategy was expanded to the surgical intensive care unit (SICU). The result was an 82% reduction in the rate of MRSA infection after 2 years. MRSA infection on the surgical unit decreased from 1.40 per 1,000 bed days to 0.27. (See bar graph.)

Our experience with the application of TPS on a surgical unit and expansion to an SICU taught us how to change systems and processes. Applying TPS principles, implementation was accomplished by changing the pattern of workflow and identifying and eliminating impediments to infection prevention and isolation procedures. Additionally, nurses were empowered to take ownership by having frank discussions with the medical staff and supportive disciplines to do the right thing. Using an educational approach and constructive feedback, nurses adopted a “not in my house” demeanor when healthcare team members forgot to comply.

Additionally, patients and family members were actively engaged in the prevention program and taught hand hygiene. Staff compliance was an expectation supported by room signage, “You have a right to clean hands—Please remind everyone to wash or sanitize their hands upon entering and exiting your room.”

After achieving success on the two pilot units, our next challenge was to bridge the gap between the knowledge gained and dissemination throughout VAPHS. However, with twelve additional units to convert, it...
wasn't cost-effective to put dedicated RN TPS facilitators on each unit. Searching for an approach that could promote and sustain cultural change on a larger scale, we tried positive deviance (PD). This model is based on the observation that in most communities and organizations there are certain individuals or groups (positive deviants) whose special practices and strategies enable them to find better solutions to prevalent, seemingly intractable problems than their peers who have access to the same resources.

PD facilitates a process that enables a community or organization to identify and disseminate those practices. It differs from traditional approaches to change by focusing on identifying and building on internally generated successes. PD acts as a catalyst for solutions that fit with an organization’s history, context, or practices. Projects applying PD sustain themselves because they’re founded on the already present capacity of people to discover and implement “home-grown” solutions to long-standing problems. In July 2005, VAPHIS leaders incorporated the PD approach in their efforts to foster support for staff-owned implementation of MRSA precautions.

**Positive deviance**

The PD process uses the following steps to involve staff in defining issues and to self-discover potential solutions:

1. **Define** the problem and its perceived causes. Explore behavioral norms related to the problem.
2. Define what a successful outcome would be.

—Point prevalence disclosed that 8% of patients at one campus and 20% at another division were colo-
MRSA

nized with MRSA.

- Staff surveys uncovered a knowledge gap regarding MRSA prevention.
- Behavioral norms reflected variation in precaution compliance across disciplines; patients and families weren’t engaged in infection prevention efforts.
- Targeted outcomes included achieving zero hospital-acquired MRSA infections, and staff and patient engagement in preventing MRSA transmission.

2. Determine if there are any individuals or groups who exhibit PD practices and behaviors.

- Staff focus groups were facilitated to identify PD practices and behaviors. Core groups of staff representing multiple disciplines volunteered to identify areas for improvement.
- Performance measures identifying MRSA infection rates by unit helped identify positive deviants.

3. Discover through inquiry the uncommon behaviors and practices of staff that outperform others with access to the same resources.

- Staff volunteers visited existing positive deviant units, reporting back to peers and eliciting responses for discussion.

4. Design and implement initiatives enabling others to access, improve, and practice new behaviors.

- Staff selects applicable PD discoveries and designs action-based implementation strategies.

PD successes

- Organizational activities through discovery and action dialogues (interdisciplinary focus groups): Shared learning enabled the staff to quickly apply innovative precautions in challenging situations such as codes (cardiac arrest) and contaminated medical equipment. Nurses educated patients and visitors to use available hand hygiene supplies and ensured that inpatients washed their hands before eating a snack. A nursing assistant identified the need to equip transport vans with hand hygiene supplies for personnel and patient use. Staff reviewed the facility layout, decided where to put new hand hygiene dispensers (e.g., cafeteria, library), and developed new posters and signs.

- Unit-level activities: Nursing staff developed new protocols to ensure all patients are swabbed for MRSA colonization and infection. Environmental management staff developed a plan for terminal cleaning of all the patient’s rooms. Nursing and Environmental Management staff relocated isolation supplies to ensure proper usage. Physical therapists requested an updated list of colonized and infected patients coming to therapy and redesigned schedules to prevent transmission.

- Patient-generated activities: Patients in the nursing home care unit created a brochure on MRSA for veterans and families, participated in decisions regarding the location of hand hygiene supplies in common areas, and promoted hand hygiene among their peers.

Real results

Consistent use of VA Pittsburgh MRSA interventions, together with other infection prevention practices, markedly reduced MRSA-related infections. (See above graph.) Over an 8-month period there were only two surgical site infections, compared to a previous average of 40 surgical site infections a year. Through PD, VAPHS has created and implemented a staff-owned and operated MRSA prevention program that’s efficient, measurable, and sustainable.

It has been said that culture change doesn’t occur until a facility’s fundamental values have been transformed. Transformation is occurring at VAPHS. The leadership group has evolved from having sole responsibility for infection control to providing support and technical assistance for staff-initiated improvements.

MRSA prevention has become the focal point for unlikely partners such as the environmental management staff, multidisciplinary clinical staff, clerical staff, patients, and families. While most studies of MRSA prevention focused on acute care, VAPHS has also successfully implemented a program in a large nursing home care environment.

Our successes in “Getting to Zero” have been communicated nationally throughout the Veterans Health Administration and the private sector. As a result, a directive has been issued by the Veterans Health Administration that requires all VA medical centers to initiate a MRSA prevention program. Managing MRSA in a hospital environment by using proven evidence-based
strategies along with a cultural transformational model is a winning formula toward “protecting 5 million lives from harm.”

REFERENCES

ABOUT THE AUTHORS
At the VA Pittsburgh Healthcare System, Pa., Ira Richmond is associate director for patient care services; Alan Bernstein is nursing program leader, long term care; Cheryl Creen and Candace Cunningham are MRSA prevention coordinators; and Mary Rudy is nursing program leader, acute care.

ABOUT THE IHI
Founded in 1991 and based in Cambridge, Mass., the Institute for Healthcare Improvement (IHI) is a not-for-profit organization leading the improvement of healthcare throughout the world. The IHI is a catalyst for change, cultivating innovative concepts for improving patient care and implementing programs for putting these ideas into action. The 5 Million Lives Campaign is a nationwide initiative of the IHI to radically reduce incidents of medical harm in U.S. hospitals. The 5 Million Lives Campaign asks hospitals to improve more rapidly than before in the care they provide to protect patients from 5 million incidents of medical harm over a 24-month period, ending December 9, 2008. To learn more about this effort, visit the IHI at http://www.ihi.org.

ABOUT THIS SERIES
This series examines the IHI’s suggested 5 Million Lives Campaign interventions from a managerial perspective. The series continues next month with a discussion of lowering patient risk from pressure ulcers. The Journal will explore the remaining interventions in subsequent months.