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Healthcare-associated infections (HAIs) are among the most frequent causes of morbidity and mortality among patients receiving medical care. The Centers for Disease Control (CDC) estimates there are 1.7 million HAIs/year in the United States. HAIs are associated with 99,000 deaths/year, substantial human suffering, and prolonged hospitalizations and readmissions (Klevens et al., 2007; U.S. Department of Health and Human Services, 2011a). The economic benefits of prevention are estimated to be as high as $31.5 billion (70% of infections preventable) per year (Scott, 2009).

In 1999, the Institute of Medicine issued To Err is Human, in which it highlighted the “nation’s epidemic of medical errors” (Kohn, Corrigan, & Donaldson, 1999). This inspired numerous initiatives to prevent HAIs, including the Institute of Healthcare Improvement’s 100,000 Lives Campaign in 2004 and Protecting 5 Million Lives Campaign in 2006, the Surgical Infection Prevention Project implemented in 2002, subsequently expanded to the Surgical Care Improvement Project in 2006, and the Comprehensive Unit-Based Safety Program (CUSP; Berwick, Calkins, McCannon, & Hackbarth, 2006; Bratler & Hunt, 2006; Institute for Healthcare Improvement, 2007; U.S. Department of Health and Human Services, 2011b). CUSP was first applied on a large scale in the Keystone Project to reduce central-line–associated bloodstream infections (CLABSI) in intensive care units (ICUs) in Michigan in 2003 (Pronovost et al., 2006). It has since expanded nationwide to include non-ICU settings and other types of HAIs.

Full adherence to evidence-based infection control practices has repeatedly been shown to be associated with major reductions in the frequency of selected HAIs (Berenholtz et al., 2011; Jain et al., 2011; Ranji, Shetty, & Posley, 2007). For example, substantial progress has been made in the prevention of CLABSI, a frequently lethal HAI with an associated mortality of 12–25%. Statewide and local hospital initiatives have demonstrated approximately 70% reductions in CLABSI rates in ICUs by increasing adherence to recommended best practices for central-line insertions (Pronovost et al., 2006; Render et al., 2011; Weber, Brown, Sickbert-Bennett, & Rutala, 2010).

As an integral component of its goal to maximize patient safety, the University of Washington Medical Center (UWMC) has focused on infection prevention initiatives for many years. The importance of infection prevention has

Abstract: To achieve sustainable reductions in healthcare-associated infections (HAIs), the University of Washington Medical Center (UWMC) deployed a collaborative, systems-level initiative. With the sponsorship of senior leadership, multidisciplinary teams were established to address healthcare-associated methicillin-resistant Staphylococcus aureus (MRSA), central-line–associated bloodstream infections (CLABSI), ventilator-associated pneumonia (VAP), and respiratory virus infections. The goal of the initiative was to eliminate these four HAIs among medical center inpatients by 2012. In the first 24 months of the project, the number of healthcare-associated MRSA cases decreased 58%; CLABSI cases decreased 54%. Staff and provider compliance with infection prevention measures improved and remained strong, for example, 96% compliance with hand hygiene, 98% compliance with the recommended influenza vaccination program, and 100% compliance with the VAP bundle. Achieving these results required an array of coordinated, systems-level interventions. Critical project success factors were believed to include creating organizational alignment by declaring eliminating HAIs as an organizational breakthrough goal, having the organization’s executive leadership highly engaged in the project, coordination by an experienced and effective project leader and manager, collaboration by multidisciplinary project teams, and promoting transparency of results across the organization.

Keywords: collaboration, infection prevention, strategic planning.
been clear because we care for many severely immunocompromised patients who are especially vulnerable to the consequences of HAIs. We have long fostered a culture of strict adherence to fundamentals of infection control such as hand hygiene, evidence-based best practices, and nationally recommended “bundles” of prevention interventions (CDC, 2011). Although substantial progress had been made in compliance with best practices and in the reduction of targeted infections, and our rates of targeted infections were well below available “national benchmarks,” HAIs continued to occur at a rate that we viewed as having potential for improvement. Accordingly, in 2009 we set a goal to eliminate four types of HAIs (methicillin-resistant Staphylococcus aureus (MRSA), CLABSI, ventilator-associated pneumonia (VAP), and respiratory virus infections) among our inpatients by fiscal year 2012 (FY12). Our approach and results for FY10 and FY11 are described below.

Methods

Setting

UWMC is an academic medical center that serves a five-state region. It has 450 licensed beds with 19,000 admissions and 15,000 surgical procedures/year. Focused clinical services include oncology, transplant, cardiology, high-risk obstetrics, and a neonatal intensive care unit (NICU). Staff includes 4,300 employees, 940 faculty physicians, 1,150 residents and fellows, and 800 volunteers. We promote a culture of collaboration among medical, nursing, and administrative leaders on quality and performance improvement initiatives.

Prior to this initiative, UWMC had a well-established, comprehensive infection prevention program. The program emphasized fundamentals of infection control and evidence-based best practices. Rigorous surveillance for HAIs and intensive reviews of individual cases were routinely performed to continuously identify opportunities for improvement. We participated in most major national and statewide infection preventive initiatives.

Approach

We approached the elimination of HAIs as a strategic initiative of the highest priority. We utilized many elements of the Institute for Healthcare Improvement’s (IHI) Execution of Strategic Initiatives framework in this effort (Nolan, 2007). The framework includes

- Setting breakthrough performance goals
- Developing a portfolio of projects to support the goal
- Deploying appropriate resources to the projects
- Establishing an oversight and learning structure to maximize the likelihood of success

We set elimination of nosocomial MRSA, CLABSI, VAP, and respiratory virus infections by FY12 as a breakthrough performance goal. Projects included insuring strict adherence to hand washing and infection prevention practices, training for all clinicians involved in central-line insertions to insure adherence to the central-line insertion bundle, and audit and feedback to insure adherence to the VAP bundle. Substantial organizational resources, as described below, were deployed in these efforts. Oversight and learning occurred through an Infection Control Breakthrough Goal (ICBG) leadership team, which included the medical center’s executive director, chief nursing officer, and medical director, and a patient/family advisor (Table 1).

Organizational alignment and a culture of accountability were identified as key drivers for success. Tactics utilized to establish that environment included

- Promoting a culture of ownership of the goal by all staff and providers
- No option to “opt out” supported by transparent real-time data to assess outcomes and compliance with targeted interventions
- Evidence-based solutions
- Realistic allocation of staff and resources
- Multidisciplinary project teams
- Oversight by an experienced project leader and project manager
- Partnership with patients and families
- A robust communication strategy
- Standardized, accessible infection prevention supplies

Multidisciplinary project teams (Figure 1) were formed to address each of the targeted HAIs. The four teams were integrated into a single initiative with shared leadership (Figure 2) and goals. Stories and photographs of patients...
Table 1. Infection Control Breakthrough Goal (ICBG) Leadership Team

- Executive Director
- Chief Nursing Officer
- Medical Director
- Project Leader
- Project Manager
- Patient & Family Advisor
- Associate Medical Directors
  - Ambulatory Care
  - Center for Clinical Excellence
  - Healthcare Epidemiology & Infection Control
  - Inpatient Care
- Medicine and Surgery Chief Residents
- Department Directors/Managers
  - Employee Health
  - Environmental Services
  - Laboratory Services
  - Materials Management
  - Pharmacy
- From each project team
  - Physician Champion
  - Advanced Practice Nurse
  - Infection Prevention Practitioner
- Information Technology Analysts
- Hand Hygiene Nurse Coach/Mentor
- Ad hoc members as needed

- Executive Director • Department Directors/Managers
- Chief Nursing Officer • Employee Health
- Medical Director • Environmental Services
- Project Leader • Laboratory Services
- Project Manager • Materials Management
- Patient & Family Advisor • Pharmacy
- Advisor
- Associate Medical Directors
  - Ambulatory Care
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and families affected by HAIs were shared at the beginning of every ICBG leadership meeting. Outcome and process metrics at the inpatient unit and medical service levels were distributed regularly throughout the organization to promote ownership by staff and providers. A structured approach was employed to communicate project plans, progress, and results (Table 2). To help build the business case for the resources needed to successfully undertake the project, a financial analysis was performed to identify the costs associated with MRSA and CLABSI, the two most common HAIs in the project. The analysis identified total annual organizational costs of approximately $4 million for healthcare-associated MRSA and CLABSI.

- Figure 1. Infection-Specific Infection Control Breakthrough Goal (ICBG) Project Teams: Structure
### Table 2. Communication Plan

<table>
<thead>
<tr>
<th>Documentation</th>
<th>Publication schedule</th>
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<tbody>
<tr>
<td>• Project work plan</td>
<td>Weekly update</td>
</tr>
<tr>
<td>• Team charters</td>
<td>Annual update</td>
</tr>
<tr>
<td>• Team status reports</td>
<td>Monthly</td>
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<tr>
<td>◦ Data collection and reporting</td>
<td></td>
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<tr>
<td>◦ Outcome measures (by team)</td>
<td></td>
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<tr>
<td>◦ Process measures (by team)</td>
<td></td>
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<tr>
<td>• ICBG Project Dashboard</td>
<td>Monthly</td>
</tr>
<tr>
<td>• Board report</td>
<td>Monthly</td>
</tr>
<tr>
<td>• Ad hoc data analyses and reports</td>
<td>As needed</td>
</tr>
</tbody>
</table>

#### Team meetings frequency

- ICBG leadership team: Monthly
- Infection-specific project teams: Twice monthly

#### Education for staff, patients, and visitors (partial list)

- Ask Me If I Cleaned My Hands campaign
- Central-Line FAQs for Patients and Family
- MRSA 101 online training module
- Central-Line Insertion online training module
- Simulation lab central-line insertion training

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### Population Definitions, Identification, and Validation

Standard CDC/National Healthcare Safety Network (NHSN) surveillance criteria were used to define the targeted HAIs. The definition of healthcare-associated MRSA (HA-MRSA) includes both infections and colonizations (i.e., patients who have a positive MRSA surveillance culture, but are asymptomatic).

UWMC conducts active MRSA surveillance in the NICU and the adult intensive care unit (ICU). NICU patients are cultured for MRSA on admission and twice weekly thereafter. Adult ICU patients are cultured for MRSA on admission and weekly thereafter. Based on analyses of patient risk factors, in FY10 active MRSA surveillance on admission was expanded to include the inpatient general medical unit. Throughout the medical center, patients with a known history of MRSA or specified MRSA risk factors were placed in empirical contact precautions until MRSA had been ruled out by surveillance cultures.

All potential HAIs were evaluated by a healthcare epidemiologist to determine if they met the CDC/NHSN criteria. A multidisciplinary intensive review was conducted for each confirmed HAI. Participants included an infection preventionist, clinical staff that cared for the patient, the unit’s medical director and nurse manager and environmental services and facilities staff assigned to the unit. Findings from intensive reviews were shared with project teams, the ICBG leadership team, and relevant stakeholders to determine if current infection prevention procedures were effective and new ones needed to be developed.

### Interventions to Eliminate HAIs

Interventions developed by the four teams included

**MRSA.**

- Instituted an executive-level, tactical MRSA team based on the Hospital Incident Command System (HICS) model employed for disaster preparedness and response to support and facilitate MRSA-related process improvement activities.
- Appointed a full-time infection prevention coach to monitor adherence to hand hygiene and infection prevention practices and to mentor staff and providers on these procedures. The coach monitored providers and staff at both inpatient and ambulatory care sites with observations conducted on all days of the week and all shifts. Staff not observed by the coach to have washed their hands before or after patient contact were asked if they had done so outside of the view of the coach. Affirmative responses were given credit for adherence.
- Hand hygiene observations, typically 1,000-1,200 per month, were analyzed by job type (medical staff, residents, nurses, and others) and unit. Results were published monthly for distribution to providers, staff, and leadership.
- Chartered a collaborative environmental services and nursing process improvement team to clarify and improve procedures for cleaning patients’ rooms at discharge.
- Deployed a personalized “Ask Me If I Cleaned My Hands” campaign to emphasize the importance of hand hygiene. The message was displayed throughout the medical center with photos of each department’s providers, patient care staff, support staff, and leadership.
• Added a “History of MRSA” alert to the electronic medical record.
• Developed a “MRSA 101” training module; completion of the online module was mandatory for clinical and nonclinical staff.
• Required all residents and fellows to complete standardized infection prevention training.
• Established a daily report to identify and monitor inpatients that should be in infection control precautions.
• Added stethoscopes to the standard equipment available within patients’ rooms.

**CLABSI.**

- Appointed a fulltime vascular access clinical nurse specialist (CNS) to facilitate compliance with best practices in central-line insertion and management, tracking of catheters for timely removal, and education of staff, patients, and providers.
- Developed and implemented mandatory simulation-based training for all faculty physicians, residents, and nurses who participate in central-line insertion. Components of the training included an online review of central-line indications, technical procedures, and complication management, skills training in the simulation lab that took each provider through complete insertion of a central line, and proctoring of central-line insertions during early clinical experience. Faculty physicians, residents, and nurses who did not complete the training by July 1, 2010 were no longer allowed to insert or assist with the insertion of central lines.
- Integrated mandatory central-line insertion training into the orientation program for new residents and fellows.
- Standardized the contents and locations of central-line supply carts.
- Required a central-line procedure checklist to be posted at the bedside and a trained nurse to be present throughout the procedure to monitor compliance with the checklist.
- Empowered nurses to “stop the line” if they noted any breaks in sterile technique during central-line insertions. Nurses were provided with scripts and mentoring in how to stop the line.

• Implemented standardized electronic medical record documentation for central-line insertions.
• Provided the vascular access CNS and infection preventionists with an automated daily report to identify and track patients with central lines.

**Respiratory virus.**

• Expanded the respiratory protection program to include fit testing and training in the use of N-95 respirators for all direct care staff, physicians, and residents, in addition to the use of PAPRs (powered air-purifying respirators) as personal protective equipment for airborne precautions.
• Instituted mandatory respiratory illness screening for all staff, providers, patients, and visitors in inpatient, ambulatory, and diagnostic care areas.
• Installed signage and kiosks with hand hygiene and respiratory protection supplies in over 100 locations easily accessible to patients, visitors, and staff.
• Deployed Employee Health RNs to clinics, inpatient units, medical staff meetings, and other staff gathering places and on evenings, nights, and weekends to make influenza vaccine available to staff, providers, and volunteers on all days and shifts.

**VAP.**

• Instituted daily monitoring and monthly reporting of compliance with the VAP prevention bundle.
• Increased ongoing emphasis on compliance with the VAP bundle.

**Results (Figure 3)**

The total number of HAIs for the three infections followed for the entire 2 years of the project (MRSA, CLABSI, respiratory viruses) declined by 46%. No VAP cases occurred during FY10.

**MRSA**

Over the 2-year time period (FY10-FY11) the number of HA-MRSA cases decreased by 58% compared to the FY09 baseline. Reductions were 35% in FY10 and 35% in FY11. The FY09 baseline rate for HA-MRSA was 0.583 per 1,000
Figure 3. (A) Number of Healthcare-Associated MRSA, CLABSI, Respiratory Virus, and VAP Cases: FY2009, FY2010, and FY2011; (B) Rates of Healthcare-Associated CLABSI, MRSA, and Respiratory Virus Cases Fiscal Years 2009, 2010, and 2011

A

<table>
<thead>
<tr>
<th>Year</th>
<th>MRSA</th>
<th>CLABSI</th>
<th>Respiratory Virus</th>
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<tbody>
<tr>
<td>FY 2009 (Baseline)</td>
<td>66</td>
<td>65</td>
<td>7</td>
</tr>
<tr>
<td>FY 2010</td>
<td>43</td>
<td>35</td>
<td>19</td>
</tr>
<tr>
<td>FY 2011</td>
<td>28</td>
<td>30</td>
<td>17</td>
</tr>
</tbody>
</table>

B

<table>
<thead>
<tr>
<th>Year</th>
<th>HA-CLABSI / 1000 Line Days</th>
<th>HA-MRSA / 1000 Patient Days</th>
<th>HA Resp. Virus / 1000 Patient Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2009</td>
<td>1.295</td>
<td>0.583</td>
<td>0.062</td>
</tr>
<tr>
<td>FY 2010</td>
<td>0.718</td>
<td>0.376</td>
<td>0.166</td>
</tr>
<tr>
<td>FY 2011</td>
<td>0.633</td>
<td>0.243</td>
<td>0.147</td>
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patient days; the FY11 rate was 0.245 per 1,000 patient days. For comparison purposes, in a large Veteran’s Administration study the transmission of MRSA was reduced from 3.02 to 2.5/1,000 patient days in the ICU and 2.54 to 2.0/1,000 patient days in non-ICU (Jain et al., 2011). Our number of HA-MRSA infections improved more than colonizations; only one HA-MRSA infection was identified in the last seven months of FY11. Compliance with hand hygiene also improved. In the first 6 months of FY10, adherence with hand hygiene across all disciplines ranged from 92% to 94%. Since then compliance has consistently remained between 95% and 98%.

**CLABSI**

Over the 2-year time period (FY10-FY11) the number of healthcare-associated CLABSI cases decreased by 54% compared to the FY09 baseline. Incremental reductions by year were 46% in FY10 and 14% in FY11. The FY09 baseline rate for HA-CLABSI was 1.3 cases/1,000 catheter days; the FY11 rate was 0.6 cases/1,000 catheter days. Comparisons from the CDC/NHSN show a median rate of CLABSI from 2006 to 2008 in medical/surgical major teaching units of 1.7 cases/1,000 catheter days (Edwards et al., 2009). By July 1, 2010, 100% (291) of the residents and fellows that insert central lines, 95% (218/230) of the monitoring RNS, and 100% (277) of faculty physicians that routinely insert central lines had successfully completed mandatory training in central-line insertion.

**Respiratory Virus Infections**

Over the 2-year time period (FY10–FY11) healthcare-associated respiratory virus infections increased by 143% compared to the FY09 baseline. In FY10 the compliance rate for organizational influenza vaccination requirements by staff and physicians reached 74%; in FY11 that rate increased to 98%.

**VAP**

No healthcare-associated VAP cases were identified in FY10. In comparison, CDC/NHSN data on VAP in medical/surgical major teaching units from 2006 to 2008 showed a median rate of 2.0 cases/1,000 ventilator days (Edwards et al., 2009). Staff achieved 95–100% compliance with the VAP bundle throughout FY10. Because of our low rate of VAP and consistent compliance with the VAP infection prevention bundle, in FY11 the VAP project was transitioned to the monitoring phase of process improvement to allow organizational resources to be reallocated to reducing catheter-associated urinary tract infection rates.

**Discussion**

Using a collaborative, systems-level approach to reducing HAI, UWMC achieved a >50% reduction in healthcare-associated MRSA and CLABSI during the 2-year project. The VAP rate dropped from a low FY09 baseline to zero in FY10. Cost reductions associated with the reductions in healthcare-associated MRSA and CLABSI were estimated to be in excess of $2 million during FY11 compared to FY09.

Unlike the reductions seen with MRSA and CLABSI, healthcare-associated respiratory virus infections increased during the project. Three factors are believed to have played a role in the observed increase. First, the H1N1 pandemic during FY10 increased the number of cases diagnosed. The H1N1 pandemic also served to heighten awareness of respiratory virus infections leading to increased levels of surveillance and, subsequently, case finding. Finally, the increased use of a highly sensitive polymerase chain reaction assay that detects 12 different respiratory viruses has led to increased testing and detection in patients whose respiratory infections may previously have been undiagnosed.

We believe critical project success factors included: creating organizational alignment by declaring eliminating HAIs as an organizational breakthrough goal, having the organization’s executive leadership highly engaged in the project, coordination by an experienced and effective project leader and manager, collaboration by multidisciplinary project teams, and promoting transparency of results across the organization.

Our findings are consistent with improvements achieved in a number of other HAI reduction efforts. After a 36-month intervention, using a CUSP framework, Pronovost and colleagues (2006) found >60% reductions from baseline in CLABSI in 90 ICU’s in the Keystone ICU project. We actively employed three of the CUSP initiative’s Five Safety Steps (identify defects, engage executives, learn from defects). We also employ the other two steps (educating
staff on the science of safety and implementing a teamwork tool) broadly throughout the organization. Other factors identified by Pronovost as important to the success of the Keystone project were also important elements in our project, including continuous feedback of infection data, improvements in safety culture, and an unremitting commitment to the prevention of HAIs. Between October 2007 and June 2010 the VA employed a bundle consisting of universal screening, contact precautions, hand hygiene, and organizational culture change to achieve a 62% reduction in ICU MRSA infection rates and a 47% reduction in non-ICU MRSA infection rates (Jain et al., 2011). Our approach was similar, with the exception that based on an analysis of our baseline incidence of MRSA, we employed targeted screening on high-risk units rather than universal screening.

The strength and generalizability of our case study’s findings are constrained by a number of factors. Our report is limited to the experience of a single academic medical center. Our patient population includes a large proportion of oncology, transplant, cardiology, high-risk obstetrics, and NICU patients, and may not be representative of other academic medical centers. We cannot be certain that we identified all HAIs in the four targeted areas during the project. However identification methods during the project were either similar to the baseline period or in the case of MRSA, were more robust, due to increased surveillance on targeted units; we believe our reductions from our baseline levels accurately reflect genuine improvements. Finally, our case study was not designed to detect the project’s critical success factors. In particular we were unable to determine with any certainty why we were able to substantially lower MRSA and CLABSI, while nosocomial respiratory virus transmission rose, despite employing a similar organizational structure and approach.

In conclusion we employed a systems-level, collaborative approach, and achieved substantial reductions in targeted nosocomial infections across the organization. We have provided details of specific interventions undertaken to reduce each of our four targeted nosocomial infections. We believe much of what was implemented during this project is applicable to other academic medical centers endeavoring to substantially decrease HAIs and particularly to efforts to reduce MRSA infections and CLABSI.

References


Authors’ Biographies

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Estella E. Whimbey, MD, is an Associate Professor of Medicine at the University of Washington. She is the Medical Director of Infection Control and Employee Health at the University of Washington Medical Center. Her primary academic interest is in infection prevention quality improvement initiatives aiming to safeguard the well-being of patients and healthcare workers.

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Core CPHQ Examination Content Area

III. Performance Measurement & Improvement

A Collaborative, Systems-Level Approach to Eliminating Healthcare-Associated MRSA, Central Line-Associated Bloodstream Infections, Ventilator-Associated Pneumonia and Respiratory Virus Infections

Objectives

1. Describe the most important factors in a system-wide initiative to eliminate healthcare-acquired infections.

2. Describe key drivers that positively impact the success of a collaborative initiative to eliminate healthcare-acquired infections.

3. Identify process improvement interventions that can reduce healthcare-associated MRSA, CLABSI, and respiratory viruses in an inpatient setting.
CEU Posttest

1. All of the following statements are correct except:
   a. Among patients receiving medical care in the U.S., healthcare-associated infections (HAIs) are among the frequent causes of morbidity and mortality.
   b. The U.S. Department of Health and Human Services (DHS) estimates that HAIs are associated with 150,000 deaths per year.
   c. The Centers for Disease Control (CDC) estimates there are 1.7 million HAIs per year in the United States.
   d. Scott estimates that the economic benefits of preventing HAIs to be as high as $31.5 billion per year.

2. All of the following are nationwide initiatives established to prevent HAIs except:
   a. The Institute of Healthcare Improvement’s 100,000 Lives Campaign
   b. The Surgical Infection Prevention Project
   c. The Comprehensive Unit-Based Safety Program (CUSP)
   d. The U.S. Department of Health and Human Services (DHS)

3. One of the tactics used by the University of Washington Medical Center (UWMC) to establish organizational alignment and a culture of accountability for the infection prevention project was:
   a. Partnership with key vendors
   b. Negative consequences for failure to meet performance targets
   c. Access to a variety of infection prevention supplies
   d. Oversight by a project manager

4. UWMC conducts active MRSA surveillance on all of these units except
   a. NICU
   b. Adult ICU
   c. General inpatient surgical unit
   d. General inpatient medical unit

5. One intervention utilized by UWMC to reduce the number of healthcare-associated MRSA cases is:
   a. A daily report to identify inpatients who should be in infection control precautions
   b. Use of a “secret shopper” to monitor staff compliance with hand hygiene protocols
   c. Quarterly reports of hand hygiene compliance by job type
   d. Mandatory attendance at a MRSA 101 inservice class

6. Interventions utilized by UWMC to reduce the number of healthcare-associated CLABSI infections included all of these except
   a. Appointed a part-time vascular access nurse specialist
   b. Implemented mandatory simulation-based central line insertion training for providers
   c. Implemented standardized documentation processes for central line insertions
   d. Empowered nurses to “stop the line” if they noted break in sterile technique during central line insertion

7. Interventions utilized by UWMC to reduce the number of healthcare-associated respiratory virus infections included which one of these?
   a. Added PAPRs (powered air-purifying respirators) as part of the personal protective equipment required for patients in airborne precautions.
   b. Deployed kiosks with hand hygiene and respiratory protection supplies throughout the medical center.
   c. Instituted mandatory respiratory illness screening for visitors, staff, providers, and patients on the Oncology and Bone Marrow Transplant units.
   d. Established a centralized location for staff, providers, and volunteers to receive their influenza vaccination.

8. In the first 2 years (fiscal year 2010–2011) of the Infection Control Breakthrough Goal Project, UWMC achieved all of these results except
   a. A 58% decrease in the number of healthcare-associated MRSA cases
   b. A 54% decrease in the number of healthcare-associated CLABSI cases
   c. 95–100% compliance with the VAP bundle
   d. A 35% decrease in healthcare-associated respiratory virus cases

9. The core members for each of the UWMC Infection Control Breakthrough Goal Project teams included the following following:
   a. A physician champion, an advanced practice nurse, an infection prevention practitioner, and a representative from the senior leadership team
   b. A physician champion, an advanced practice nurse, an infection prevention practitioner, and the project manager
   c. A physician champion, an advanced practice nurse, an infection prevention practitioner, and a nurse manager
   d. A physician champion, an advanced practice nurse, an infection prevention practitioner, and quality improvement specialist

10. Interventions that contributed to the reduction in healthcare-associated infections at UWMC included:
    a. Strict adherence to hand hygiene practices, central-line insertion training for all inserting practitioners, monthly publication of outcome and process measure statistics
    b. Strict adherence to hand hygiene practices, monetary rewards to units with the highest
rates of hand hygiene compliance, monthly publication of outcome and process measure statistics,
c. Strict adherence to hand hygiene practices, revocation of admitting privileges for providers who failed to complete central line insertion training, provision of standardized, accessible infection prevention supplies
d. Strict adherence to hand hygiene practices, central-line insertion training for all inserting practitioners, appointing a full-time VAP-prevention nurse specialist

[Correction added after online publication 20-September 2012. Core CPHQ Examination Content Area has been added.]