AHRQ RESEARCH INITIATIVES ON HEALTH CARE-ASSOCIATED INFECTIONS

Reducing Health Care-Associated Infections: Important to AHRQ's Patient Safety Mission

Health care-associated infections (HAIs) are the most common complication of hospital care. According to the Centers for Disease Control and Prevention (CDC), nearly 2 million patients suffer from an HAI in U.S. hospitals each year, resulting in 99,000 deaths and $20 billion in health care costs.

The most common HAI agent is methicillin-resistant *Staphylococcus aureus* (MRSA). The number of MRSA-associated hospital stays more than tripled after 2000, reaching 368,600 in 2005, according to the Healthcare Cost and Utilization Project (HCUP) database (http://www.hcup-us.ahrq.gov/reports/statbriefs/sb35.pdf), which is sponsored by the Agency for Healthcare Research and Quality (AHRQ). Patients hospitalized for MRSA have longer hospital stays and are more likely to die than patients who don't have MRSA. These infections are especially common in intensive care units (ICUs).

A core part AHRQ's mission is to improve the safety of health care for all Americans. Toward that end, the Agency has funded numerous projects to reduce HAIs, including MRSA infections. Following are brief descriptions of some of these projects and initiatives.

AHRQ HAI Research Initiatives

HAI ACTION Project

In September 2007, AHRQ awarded task orders to five Accelerating Change and Transformation in Organizations and Networks (ACTION) partners to mitigate HAIs at 34 hospitals. For 6 months, multidisiciplinary teams at each hospital will use AHRQ-supported evidence-based tools for improving infection safety to facilitate changes in clinician behaviors and habits, care processes, and the safety culture.

In addition, AHRQ has funded an assessment program, led by Indiana University, to coordinate project tasks and activities, provide technical assistance to the hospitals, and examine information gleaned from the project. Also, the Agency plans to develop an HAI project toolkit, which will include a case study for health care organizations interested in learning how the HAI project participants implemented infection safety training, the challenges they faced, and how they addressed them.

The HAI ACTION project partners are:

- American Institutes for Research, Washington, D.C.
- Denver Health & Hospital Authority, Denver, CO
- Health Research and Educational Trust, Chicago, IL
- University of Iowa, Iowa City, IA
- Yale University, New Haven, CT

Evidence Report/Technology Assessment of HAIs

In January 2007, AHRQ published an evidence report/technology assessment entitled *Closing the Quality Gap: A Critical Analysis of Quality Improvement Strategies*. Volume six of this report, *Prevention of Health Care-Associated Infections*, is based on research conducted by the Stanford–University of California, San Francisco Evidence-based Practice Center under contract to AHRQ.

The researchers reviewed 64 studies that reported either HAI rates or rates of adherence to target preventive quality improvement interventions for any of four targeted HAIs: surgical site infections (SSIs), bloodstream infections (BSIs), ventilator-associated pneumonia (VAP), and catheter-associated urinary tract infections (CAUTIs). The researchers targeted hand hygiene as a preventive intervention for all HAIs. Specific interventions for the individual HAIs included appropriate perioperative antibiotic prophylaxis, perioperative glucose control, and decreased shaving of the operative site for SSIs; maximal sterile barrier precautions, use of chlorhexidine for skin antisepsis, and avoidance of femoral catheterization for BSIs; semirecumbent patient positioning and daily assessment of readiness for ventilator weaning for VAP; and reduction in unnecessary catheter use and adherence to aseptic catheter insertion and care for CAUTIs.

Based on the limited data available and poor methodologic quality of the studies, the researchers recommended several strategies as worthy of future study and possibly wider implementation if an appropriate plan is in place to monitor their effectiveness and potential adverse effects:

- Printed or electronic reminders with use of automatic stop orders to reduce unnecessary urethral catheterization. This was the only strategy supported by multiple controlled trials.
- Printed or electronic reminders for improving adherence to recommendations for timing and duration of surgical antibiotic prophylaxis.
- Staff education, including use of video and Web-based interactive tutorials and checklists, to improve adherence to insertion practices for placement of central venous catheters.

For more details on the report, go to http://www.ahrq.gov/downloads/pub/evidence/pdf/qualgap6/hainfgap.pdf.

Patient Safety Improvement Corps Fellowship Program on HAIs

The Patient Safety Improvement Corps (PSIC) is a partnership program between AHRQ and the Department of Veterans Affairs to improve patient safety by providing the knowledge and skills necessary to investigate medical errors and develop and evaluate sustainable system interventions to prevent them. The PSIC Fellowship Program on HAIs is a 1-day program to provide PSIC graduates with an overview of HAIs and to demonstrate different and successful approaches to prevention, reduction, or mitigation of HAIs from different perspectives including public and private hospital systems, communities, and regions. The program is open to all former PSIC graduates. For more information on the PSIC program, go to http://www.ahrq.gov/About/psimpcorps.htm.

AHRQ MRSA Research Initiatives

MRSA Collaborative Activities

In October 2007, Congress appropriated $5 million to AHRQ to identify and help suppress the spread of MRSA and related HAIs. Until then, the only large-scale study that had produced evidence on how to reduce serious HAIs and maintain that reduction was supported by AHRQ and carried out in 127 Michigan hospitals from 2003 to 2006. This new effort to reduce MRSA builds on that experience. In developing the action plan that AHRQ is funding, the Agency has worked in collaboration with the CDC and the Centers for Medicare & Medicaid Services (CMS).

This action plan will use electronic and administrative data, surveillance, and implementation strategies to:

- Reduce the burden of MRSA infections by more than 30 percent via novel interventions aimed at critical control points in a community/region.
- Determine scope, risk factors, and control measures for hospital-acquired, community-onset MRSA infections.

- Test methods to reduce hospitalization from community-acquired MRSA.
- Understand the role of inter-facility MRSA transmission on overall infection rates.
- Understand the role of nursing home transmission on overall rates and delineate interventions that are effective in reducing such transmission.

Other proposed MRSA collaborative projects are as follows:

- Testing Spread and Implementation of Novel MRSA-Reducing Practices (using AHRQ's ACTION Network).
- Optimizing the Initial Evaluation and Treatment of Suspected Community-Acquired MRSA Infections in Primary Care Practice (using AHRQ's network of primary care practices).
- Identifying Potentially Modifiable Factors Associated with Hospitalization for Community-Acquired MRSA (augmenting AHRQ's State and regional demonstration projects in health information technology).
- Determining the Contribution of MRSA Originating in the Community and Long-term Care Facilities to the Rapidly Rising Occurrence of MRSA in Hospitalized Patients (using AHRQ's State-level database on hospital discharges, HCUP).
- Producing Rapid Cycle State and National Estimates to Support and Evaluate the MRSA Initiative.
- Understanding MRSA Reservoirs in Assessing MRSA Solutions.

Initiative to Test MRSA Reduction Techniques

In September 2006, AHRQ funded a project, led by Indiana University, to test techniques to radically reduce MRSA infections. The purpose of this project is to measurably reduce hospital-acquired MRSA infections and document how this was done in order to help others achieve success in similar settings. Interim results indicate that MRSA infections have been reduced by 60 percent in the intervention ICUs and 20 percent in control units. Final results are expected to be reported later this year.

AHRQ Keystone ICU Project

Under an AHRQ-sponsored study, all Michigan hospitals with ICUs for adults were invited to participate in the Keystone ICU Project launched in October 2003. A total of 108 ICUs agreed to participate in this study, with 103 reporting results, and the findings were published in the December 26, 2006, issue of the *New England Journal of Medicine.*

This project, a partnership between the Johns Hopkins University School of Medicine and the Michigan Health & Hospital Association Keystone Center and its member hospitals, resulted in a large and sustained reduction (up to 66 percent) in rates of catheter-related BSIs that was maintained throughout the 18-month study period. The study targeted clinicians' use of five evidence-based procedures recommended by the CDC: hand hygiene, using full-barrier precautions during the insertion of central venous catheters, cleaning the skin with chlorhexidine, avoiding the femoral site when possible, and removing unnecessary catheters. Through AHRQ's ACTION initiative, further work will begin later this year using the components of the Keystone ICU Project to beta test a public domain tool at additional hospitals nationwide to build on and sustain reductions in catheter-related BSIs.

MRSA Statistical Brief

In July 2007, AHRQ published a statistical brief on MRSA infections in U.S. hospitals from 1993 to 2005, which can be viewed at http://www.hcup-us.ahrq.gov/reports/statbriefs/sb35.pdf. The following are some of the highlights from the brief:

- Hospital stays for MRSA infections more than tripled after 2000 and increased nearly tenfold after 1995.
- On average, hospital stays for MRSA infections cost $14,000 compared with $7,600 for all other stays.
- MRSA hospitalizations were highest among the elderly.

- Hospital stays for MRSA infections were highest in the South.
- The most common conditions associated with MRSA were skin infections (19 percent of all MRSA cases) followed by medical care complications (16 percent).

Department of Health and Human Services' Cross-Agency Initiatives

The Department of Health and Human Services (HHS) has recently begun several cross-agency initiatives to improve and expand HAI prevention efforts to bolster patient safety and reduce unnecessary health care costs. AHRQ is one of the lead agencies involved in a new planning effort to develop comprehensive short- and long-term goals to reduce HAIs nationwide. This effort addresses and expands on issues highlighted by a March 2008 Government Accounting Office review of HAIs in hospitals that underscored the depth of the problem. The HHS Deputy Secretary for Health has charged a newly created steering committee, which includes representatives from AHRQ, the CDC, CMS, the Food and Drug Administration, the National Institutes of Health, the Office of the National Coordinator for Health Information Technology, other HHS offices, the Department of Defense, and the Department of Veterans Affairs, with developing a national action plan to reduce HAIs. This plan will establish national goals, outline key actions for enhancing and coordinating HHS-supported efforts, and outline opportunities for collaboration to maximize the efforts of all stakeholders. The steering committee will establish national targets for HAI reduction over the next 5 to 10 years.

The national plan will be implemented in stages:

- Stage one will focus on hospitals and address CAUTIs, BSIs, SSIs, VAP, *Clostridium difficile*, and MRSA.
- Stage two will address additional HAIs and other types of health care facilities, such as long-term care settings, nursing homes, and ambulatory care settings.

All of AHRQ's efforts regarding HAIs have been tightly aligned with the CDC's definitions of and protocols for reducing HAIs. For example, the Keystone ICU Project described above employed CDC techniques with great success. AHRQ's experience in translating research into practice thus fosters more rapid adoption of evidence-based practices to reduce HAIs. Two recent activities underscore the productive working relationship between AHRQ and the CDC: the recent $5 million MRSA initiative, outlined above, where CDC scientists worked together with AHRQ researchers to develop project plans to reduce the incidence of MRSA; and the joint development of HAI data collection instruments to support new Patient Safety Organizations (PSOs).

AHRQ will be issuing regulations before the end of 2008 that will implement the Patient Safety and Quality Improvement Act of 2005. This legislation authorizes the formation of PSOs, which are voluntary organizations that work with clinicians and provider organizations to identify, analyze, and reduce the risks and hazards associated with patient care. PSOs provide Federal privilege and confidentiality protections to clinicians and provider organizations for all information they create, collect, or use for patient safety activities. In this way, PSOs promote collection and analysis of information on patient safety events. In order for data collected by PSOs to be harmonized and aggregated across organizations, AHRQ has recently made available "common definitions and reporting formats," known as Common Formats, for collection of information on patient safety events. With respect to HAIs, AHRQ worked with CDC personnel to ensure that data collected by PSOs will be consistent with that reported to the CDC in their National Healthcare Safety Network program.

For more information about AHRQ's HAI initiatives, contact: William B. Munier, M.D., Director, AHRQ's Center for Quality Improvement and Patient Safety; 301-427-1338; william.munier@ahrq.hhs.gov.

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