

# FACT SHEET

## AHRQ's 2009 Funded Projects to Prevent Healthcare-Associated Infections

AHRQ's mission is to improve the quality, safety, efficiency, and effectiveness of health care by:

- Using evidence to improve health care.
- Improving health care outcomes through research.
- Transforming research into practice.

### Introduction

Healthcare-associated infections (HAIs) are infections that patients get while receiving treatment for another condition in a health care facility. A study of patients in 2002 estimated that HAIs account for an estimated 1.7 million infections and 99,000 associated deaths annually, making them the most common complication of hospital care. The added financial burden attributable to HAIs is estimated to be between \$28 billion to \$33 billion each year.

To address this growing problem, AHRQ has funded and collaborated with other Federal agencies, including the Centers for Disease Control and Prevention (CDC), to develop and launch projects that prevent and reduce HAIs. These projects are primarily funded through existing AHRQ mechanisms.

In October 2008, Congress appropriated \$17 million to the Agency for Healthcare Research and Quality


### Acronyms

ACTION	—Accelerating Change and Transformation in Organizations and Networks
AHRQ	—Agency for Healthcare Research and Quality
BSI	—blood stream infection
CAUTI	—catheter-associated urinary tract infection
CDC	—Centers for Disease Control and Prevention
CDI	— <i>Clostridium difficile</i> infection
<i>C. difficile</i>	—Clostridium difficile
CLABSI	—central line-associated blood stream infection
CRE	—Carbapenem-resistant <i>enterobacteriaceae</i>
CUSP	—Comprehensive Unit-based Safety Program
HAI	—Healthcare-associated infection
HHS	—U.S. Department of Health and Human Services
HCUP	—Healthcare Cost and Utilization Project
ICU	—intensive care unit
KPC	— <i>Klebsiella pneumoniae</i> carbapenemase
MRSA	—methicillin-resistant <i>Staphylococcus aureus</i>
SSI	—surgical site infection



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(AHRQ) for projects to help further reduce and eliminate HAIs. This fact sheet features details of projects that AHRQ funded in fiscal year 2009 to address various infections, including central line-associated blood stream infections (CLABSIs), methicillin-resistant *Staphylococcus aureus* (MRSA) infections, *Clostridium difficile* infections (CDIs), surgical site infections (SSIs), Carbapenem-resistant *enterobacteriaceae* (CRE) infections, catheter-associated urinary tract infections (CAUTIs), and blood stream infections (BSIs).

### Addressing Healthcare-Associated Infections

Medical devices and surgical procedures can cause BSIs, CAUTIs, SSIs, and ventilator-associated pneumonia, all of which can lead to extended hospital stays, increased care costs, and higher risk of death. Many of these infections are caused by antimicrobial-resistant pathogens, such as MRSA or CRE, which are related to overuse of antibiotics and frequent patient-to-patient transmission of microorganisms. Although not related to a medical device or surgical procedure, *Clostridium difficile* (*C. difficile*) is a frequent cause of an intestinal infection that is spread in health care settings and infects patients who have recently received antibiotics. Preventing and reducing these infections can be a challenge for individuals who provide patient care. To address this issue, AHRQ supports many activities focused on preventing and reducing HAIs. They are summarized below.

### Reducing the Overuse of Antibiotics by Primary Care Clinicians in Ambulatory and Long-Term Care Settings

A critical step in limiting the number of infections caused by the multidrug-resistant bacteria present in health care settings is to reduce the overuse of antibiotics. This project will design and test interventions aimed at reducing inappropriate use of antibiotics in primary care settings and disseminate findings widely. It also will define modifiable factors that appear to contribute to primary care clinicians' overuse of antibiotics when caring for residents of long-term care facilities.

**AHRQ Program:** Practice-Based Research Networks

**Institutions:** Medical University of South Carolina, Charleston, SC; Children's Hospital of Philadelphia, PA; University of Colorado Health Sciences Center, Denver, CO; and University of North Carolina at Chapel Hill, NC

**Project Nos.:** HHSA-290-2007-10015 task order 3; HHSA-290-2007-10013 task order 3; HHSA-290-2007-10008 task order 7; and HHSA-290-2007-10014 task order 6

**Project Period:** 8/09-8/11

**Total Funding:** \$2,000,000

### Standardizing Antibiotic Use in Long-Term Care Settings

Antibiotics are commonly prescribed in long-term care facilities, and the proportion of inappropriate antibiotic prescriptions can be as high as 75 percent in this setting. Optimizing use of antibiotics in long-term care facilities will reduce the incidence of *C. difficile* colitis and the emergence of multidrug-resistant organisms that pose major morbidity and mortality risks for residents. This effort, called SAUL, for standardizing antibiotic use in long-term care settings, includes two projects

that will first assess current antibiotic utilization practices in a group of long-term care facilities using the Loeb “minimum criteria” as a standard and then develop new approaches to optimize antibiotic prescribing practices in a subset of facilities.

**AHRQ Program:** Accelerating Change and Transformation in Organizations and Networks (ACTION)

**Institutions:** Abt Associates, Cambridge, MA; and American Institutes for Research, Washington, DC

**Project No.:** HHSA-290-2006-000111 and HHSA-290-2006-00191

**Project Period:** 9/09-3/12

**Total Funding:** \$2,000,000

### **Producing Rapid National-, Regional-, and State-Level Estimates to Evaluate the Impact of Interagency HAI Initiatives**

This project will build on an initial investment to produce rapid national, regional, and State estimates of HAIs, including *C. difficile*, MRSA, CLABSIs, and SSIs, acquired in the acute care setting. Researchers will establish a baseline and subsequent rates of HAIs in the acute care setting following interventions funded through this and earlier initiatives.

**AHRQ Program:** Healthcare Cost and Utilization Project (HCUP)

**Institution:** Thomson Reuters, Santa Barbara, CA

**Project No.:** HHSA-290-2006-00009C

**Project Period:** 9/09-12/10

**Total Funding:** \$500,000

### **Implementing Teamwork Principles for Frontline Health Care Providers**

This project will use a national training and support network called the National Implementation of Team

Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS™) Project, developed by AHRQ and the Department of Defense. Researchers will use an evidence-based teamwork system aimed at optimizing patient outcomes by improving communication and teamwork skills among health care professionals. The project will focus on high-risk areas, such as hospital surgery centers, ambulatory care centers, emergency departments, labor and delivery units, and other health care settings. Researchers will work to reduce MRSA, CAUTIs, CLABSIs, and other HAIs by using resources at five Team Resource Centers located at Duke Medical Center, Durham, NC; Carilion Clinic, Roanoke, VA; University of Minnesota Fairview Medical Center, Minneapolis, MN; Creighton University Medical Center, Omaha, NE; and University of Washington Medical Center, Seattle, WA.

**AHRQ Program:** Patient Safety

**Institution:** American Institutes for Research, Washington, DC

**Project No.:** HHSA-290-2006-0019 task order 3

**Project Period:** 9/09-9/11

**Total Funding:** \$1,000,000

### **Addressing Central Line-Associated Blood Stream Infections**

Often referred to as a central venous catheter, a central line is a tube placed in a large vein in a patient’s neck, chest, or groin to administer medication or fluids or to collect blood samples.

According to CDC, each year, an estimated 250,000 cases of CLABSI occur in U.S. hospitals, and an estimated 30,000 to 62,000 infected

patients die. AHRQ’s latest projects to address CLABSIs are summarized below.

### **Expanding the Comprehensive Unit-Based Patient Safety Program to Reduce Central Line-Associated Blood Stream Infections**

The following projects build on the national implementation of the 3-year-long Comprehensive Unit-based Safety Program (CUSP) to reduce CLABSIs in intensive care units (ICUs) that began in 100 hospitals from 10 States in 2008. The program includes tools to help health care professionals identify opportunities to reduce potential HAIs and implement policies to make care safer in the ICU.

- Since the initial implementation of the CUSP-CLABSI initiative in 10 States, additional hospitals in those States have expressed interest in participating in the program. This project will increase the number of participating hospitals.

**Total Funding:** \$1,000,000

- This project expands the CUSP-CLABSI initiative to 22 States, the District of Columbia, and Puerto Rico. As a result of this additional funding from AHRQ and a private foundation, all 50 States, Puerto Rico, and the District of Columbia are now participating in the Keystone Project. In an 18-month period, the Keystone Project reduced the rate of BSIs from intravenous lines by two-thirds within 3 months in more than 100 ICUs in Michigan and helped the average ICU decrease its infection rate from 4 percent to 0.

**Total Funding:** \$3,000,000

- Because CLABSI is a significant problem in hospitals and in settings other than the ICU, this project

expands the CUSP-CLABSI initiative to general medical and surgical hospital units. Current CUSP resources will be modified so they are applicable to a non-ICU environment.

**Total Funding:** \$2,000,000

**AHRQ Program:** ACTION

**Institution:** Health Research & Educational Trust

**Project No.:** HHSA-290-2006-000221 task order 7

**Project Period:** 9/09-09/12

### Addressing Methicillin-Resistant *Staphylococcus aureus* Infections

Although there is evidence to suggest that the number of CLABSIs caused by MRSA, specifically, as well as CLABSIs, overall, are decreasing, MRSA remains one of the most common pathogens responsible for HAIs. Moreover, according to the AHRQ-sponsored HCUP database (<http://www.hcup-us.ahrq.gov/reports/statbriefs/sb35.jsp>), the number of MRSA-associated hospital stays more than tripled after 2000, reaching 368,600 in 2005. Patients hospitalized for MRSA infections have longer hospital stays and are more likely to die than patients who do not have MRSA infections. These HAIs are especially common in hospital ICUs. AHRQ's latest project that addresses MRSA infections is summarized below.

#### Evaluation of Strategies to Eliminate MRSA in Intensive Care Units

Recent interest in preventing MRSA infections has led to the widespread practice of screening patients in ICUs for MRSA to guide additional infection control practices, such as isolation and application of MRSA-decolonization

regimens. Screening patients for MRSA is labor intensive, costly, and may have limited impact on other important pathogens. In contrast, universally bathing ICU patients with chlorhexidine, a practice increasingly employed in U.S. hospitals, has yielded promising results in reducing bacterial skin colonization and central-line infections from all pathogens, and the strategy may be simpler to implement. This project proposes a large, simple, cluster-randomized trial to compare the relative effectiveness of screening and isolation with two novel approaches: 1) screening plus decolonization regimens for MRSA carriers and 2) universal decolonization regimens for all ICU admissions in the absence of screening. The study may help identify a more cost-efficient and effective alternative to what has become a very popular approach to preventing hospital-associated MRSA infections. The project also will answer quality improvement questions through the use of practical, pragmatic, cluster-randomized trials that take advantage of the existing clinical care infrastructure.

**AHRQ Program:** Developing Evidence to Inform Decisions about Effectiveness

**Institution:** Harvard Pilgrim Health Care, Harvard Medical School, Boston, MA

**Project No.:** HHSA-290-2005-00331 task order 11

**Project Period:** 9/09-3/11

**Total Funding:** \$1,500,000

### Addressing *Clostridium Difficile* Infections

*C. difficile*-associated infections occur most often when antibiotic therapy suppresses the normal bacteria in the patient's colon. According to AHRQ's HCUP database (<http://www.hcup-us.ahrq.gov/reports/statbriefs/sb50.jsp>),



there were more than 2 million cases of *C. difficile* in U.S. hospitals between 1993 and 2005; two out of three infected hospital patients in 2005 were elderly. On average, patients with *C. difficile* were hospitalized almost three times longer than uninfected patients, and the in-hospital death rate for patients with *C. difficile* was 9.5 percent compared with 2.1 percent overall. A summary of AHRQ's latest project that addresses *C. difficile* infections follows.

### **Reducing *Clostridium Difficile* Infections in a Regional Collaborative of Inpatient Health Care Providers**

Building on the Keystone Project's successful reduction of bloodstream infections, this project aims to reduce CDIs along with their associated morbidity, mortality, and costs in a cohort of regional inpatient facilities. Participating facilities have patients with frequent health care contacts before and after hospitalization, such as acute care facilities, associated nursing homes, long-term care facilities, and ambulatory care settings, such as emergency departments. Interventions for reducing CDI rates will include decreasing unnecessary antimicrobial prescribing and improving infection control. Prevention measures will be bundled according to the clinical processes and personnel most affected by their implementation (e.g., measures impacting environmental services or facilities maintenance versus nursing care or other clinical care). Investigators will conduct both quantitative and qualitative research, including interviews, focus groups, and periodic surveys to identify barriers that either impede prevention measure implementation or make it expensive. As a result of this project, researchers

will develop an implementation toolkit and manual to assist other regional prevention collaboratives in reducing CDI rates.

**AHRQ Program:** ACTION

**Institution:** Boston University School of Public Health, Boston, MA

**Project No.:** HHSA-290-2006-0012I task order 10

**Project Period:** 9/09-9/11

**Total Funding:** \$1,000,000

### **Addressing Surgical Site Infections**

SSIs are a substantial cause of morbidity and mortality among hospitalized patients. Based on survey data from 2002, SSIs accounted for approximately 16 percent of an estimated 1.7 million HAIs and 8,205 of the 98,987 HAI associated deaths, for a mortality rate of 3 percent. The financial burden attributable to these largely preventable infections is also significant, with an estimated hospital cost of \$25,546 per infection and approximately \$7 billion annually. A summary of AHRQ's latest project that addresses SSIs follows.

#### **Improving Measurement of Surgical Site Infection Risk Stratification and Outcome Detection**

Feedback on surgeon-specific SSI rates is considered to be the cornerstone for preventing these infections. For feedback to be effective, however, surgeons must believe that the rates are reliable for comparing their performance to that of their peers. Unfortunately, many surgeons believe that current surveillance methods are unreliable because of limitations in patient risk adjustment and event detection. This multihospital study will employ sensitive electronic detection algorithms to determine SSI rates in a

large number of specific high-risk procedures and will design and test methods to risk stratify on data elements that can be optimized for electronic collection. Investigators will propose a risk-adjusted model in a set of procedures and then verify the model's predictive value in a second patient pool. Finally, investigators will assess surgeon acceptance of the surveillance methodology using the risk-adjusted models with sensitive event-detection methods.

**AHRQ Program:** ACTION

**Institution:** Denver Health, Denver, CO

**Project No.:** HHSA-290-2006-00020 task order 8

**Project Period:** 09/09-03/11

**Total Funding:** \$413,000

### **Addressing Carbapenem-Resistant *Enterobacteriaceae* Infections**

CRE is another bacterial agent that is emerging as a challenge in health care settings. One type of CRE—*Klebsiella pneumoniae* carbapenemase (KPC) producing organisms, also known as carbapenem-resistant *Klebsiella pneumoniae*—poses significant treatment challenges because it is resistant to almost all available antimicrobial agents. As a result, these infections have been associated with higher mortality, longer hospital stays, and increased health care costs. The emergence and spread of KPC-producing organisms and other types of CRE are worrisome public health developments and underscore the immediate need for aggressive detection and control strategies. AHRQ's latest project that addresses these infections is summarized below.

### **Reducing Infections Caused by Carbapenem-Resistant *Enterobacteriaceae* through Application of Recently Developed Recommendations**

The goal of this project is to demonstrate the efficacy of aggressive, CDC-recommended infection control interventions to halt the emergence of KPC-producing organisms. A second goal is to develop an implementation toolkit and manual to assist facilities in implementing aggressive infection control approaches to reduce the spread of KPC-producing organisms.

**AHRQ Program:** ACTION

**Institution:** Boston University

**Project No.:** HHSA-290-2006-00012 task order 9

**Project Period:** 09/09-09/11

**Total Funding:** \$500,000

### **Addressing Catheter-Associated Urinary Tract Infections**

The urinary tract is the most common site of HAIs, accounting for more than 30 percent of infections reported by acute care hospitals. Complications associated with CAUTIs cause patient discomfort, prolonged hospital stays, and increased cost and mortality. Each year, more than 13,000 deaths are associated with urinary tract infections. A summary of AHRQ's latest project that addresses CAUTIs follows.

#### **Catheter-Associated Urinary Tract Infection Demonstration Project Using the Comprehensive Unit-Based Patient Safety Program**

The success of CUSP in reducing CLABSIs has increased pressure to apply the program to other HAIs, including CAUTIs; thus, this project initiates a

demonstration of the CUSP concept as applied to CAUTIs. Investigators will first modify CUSP materials so they apply to CAUTI and then use the materials in 10 hospitals in each of 10 States, for a total of 100 hospitals, to demonstrate CUSP's utility in reducing CAUTIs.

**AHRQ Program:** ACTION

**Institution:** Health Research & Educational Trust

**Project No.:** HHSA-290-2006-00022 task order 8

**Project Period:** 9/09-9/11

**Total Funding:** \$1,000,000

### **Addressing Blood Stream Infections in Hemodialysis**

According to CDC, in 2006 approximately 330,000 patients were maintained on hemodialysis in the United States. Infection, most often of the bloodstream, is the second leading cause of death for hemodialysis patients. BSIs are most frequently experienced by patients with indwelling vascular catheters. A summary of AHRQ's latest project to address BSIs is below.

#### **Prevention of Blood Stream Infections for Outpatients Undergoing Hemodialysis**

This study will use CUSP to examine the comparative effectiveness of standard recommended practices with antibiotic catheter locks and antiseptic catheter locks for preventing BSIs in hemodialysis patients. Secondary evaluations will include screening assessments for changes in antimicrobial resistance and evaluating the development of toxicities related to the use of catheter locks.

**AHRQ Program:** ACTION

**Institution:** Yale University, New Haven, CT

**Project No.:** HHSA-290-2006-00015 task order no. 3

**Project Period:** 9/09- 3/12

**Total Funding:** \$1,000,000

### **For More Information**

For more information about AHRQ's HAI initiatives, visit <http://www.ahrq.gov/qual/hais.htm> or contact:

William B. Munier, M.D., M.B.A.  
Director

AHRQ's Center for Quality  
Improvement and Patient Safety

540 Gaither Road  
Rockville, MD 20850

Phone: 301-427-1327

E-mail: [william.munier@ahrq.hhs.gov](mailto:william.munier@ahrq.hhs.gov)

To view a fact sheet on AHRQ's current and earlier projects that address HAIs, go to <http://www.ahrq.gov/qual/haiflyer.htm>.



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