

FACT SHEET

AHRQ Projects to Prevent Healthcare-Associated Infections, Fiscal Year 2010

The mission of AHRQ 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

A core part of the mission of the Agency for Healthcare Research and Quality (AHRQ) is to improve the safety of health care for all Americans.

In support of this mission, Congress appropriated \$34 million to AHRQ for fiscal year 2010 for research and implementation projects to prevent and reduce healthcare-associated infections (HAIs). HAIs are infections that patients acquire during the course of receiving treatment for other conditions within a health care setting. AHRQ has collaborated with the Centers for Disease Control and Prevention (CDC), the Centers for Medicare & Medicaid Services (CMS), the National Institutes of Health (NIH), and the Office of Healthcare Quality in the development of 22 projects aimed at addressing research gaps and accelerating the adoption of evidence-based approaches for HAI prevention.

HAIs are the most common complication of hospital care and one of the top 10 leading causes of death in the United States. According to CDC,

Acronyms

ASC	—Ambulatory surgery center
CAUTI	—Catheter-associated urinary tract infection
CDC	—Centers for Disease Control and Prevention
CDI	— <i>Clostridium difficile</i> infection
CLABSI	—Central line-associated blood stream infections
CMS	—Centers for Medicare & Medicaid Services
CUSP	—Comprehensive Unit-based Safety Program
ESBL-EB	—Extended-spectrum beta-lactamase-producing <i>Enterobacteriaceae</i>
ESRD	—End-stage renal disease
HAI	—Healthcare-associated infection
HCUP	—Healthcare Cost and Utilization Project
ICU	—Intensive care unit
<i>K. pneumoniae</i>	— <i>Klebsiella pneumoniae</i>
MRSA	—Methicillin-resistant <i>Staphylococcus aureus</i>
NIH	—National Institutes of Health
PHIS	—Pediatric Health Information System
SSI	—Surgical site infection
STPRA	—Sociotechnical probabilistic risk assessment
UTI	—Urinary tract infection



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HAIs accounted for an estimated 1.7 million infections and almost 100,000 associated deaths in 2002. CDC estimates that the financial burden attributable to these infections is between \$28 and \$33 billion in excess health care costs each year.

This fact sheet provides brief descriptions of each of the 22 HAI-related projects funded in fiscal year 2010. The projects are listed by health care setting: hospitals; ambulatory settings, including ambulatory surgery centers, outpatient clinics and offices, emergency departments, and end-stage renal disease facilities; and long-term care facilities.

Projects in Hospitals

Effect of the Use of Universal Glove and Gowning on HAI Rates and Antimicrobial Resistant Bacteria

Funding Mechanism: Contract

Institution: Yale New Haven Health

Collaborating Agency: CDC

Targeted HAIs: Methicillin-resistant *Staphylococcus aureus* (MRSA), *Clostridium difficile* infections (CDIs)

Goals: This project will determine the effectiveness of universal glove and gowning procedures in reducing HAI rates in intensive care units (ICUs). Objectives include:

1. Documenting the effectiveness, costs, and unintended consequences associated with implementing universal glove and gowning procedures.
2. Disseminating the study findings, including information about the costs and unintended consequences.

Evaluating *Clostridium difficile* Infection in Hospitalized Patients

Funding Mechanism: Grant

Institution: Virginia Commonwealth University

Targeted HAI: CDIs

Goals: This project will evaluate the extent to which hospital-level antibiotic and gastric acid suppressant usage patterns, infection prevention and control, and pharmacy policies predict CDI occurrence; develop and compare various approaches to risk adjustment to identify hospitals with higher- or lower-than-expected CDI rates; and identify facilitators and barriers to implementation of best practices for CDI prevention.

National Implementation of Comprehensive Unit-based Safety Program to Reduce Central Line-Associated Blood Stream Infections

Funding Mechanism: Contract

Institution: Health Research & Educational Trust

Targeted HAI: Central line-associated blood stream infections (CLABSI)

Goals: This project expands the previously funded project to reduce CLABSI to allow participation by all units and in all hospitals that wish to reduce CLABSI rates. Objectives include:

1. Expanding the Comprehensive Unit-based Safety Program (CUSP) CLABSI efforts to include all interested hospitals in the 10 States that were funded in fiscal year 2008.
2. Expanding the current CUSP-CLABSI efforts in the ICU to include all States, Puerto Rico, and the District of Columbia and increase the number of hospitals per State that participate in the effort.
3. Extending the current CUSP-CLABSI efforts to demonstrate the effectiveness of CUSP in reducing CLABSI in hospital units outside the ICU.

PHIS+: Augmenting the Pediatric Health Information System with Clinical Data

Funding Mechanism: Grant

Institution: Children's Hospital of Philadelphia

Targeted HAI: MRSA

Goals: This project will enhance the Pediatric Health Information System (PHIS) by linking laboratory results and radiology reports from member children's hospitals with administrative data. It will use the enhanced PHIS+ database to conduct four pediatric comparative effectiveness studies to:

1. Compare the effectiveness of aminopenicillins, second-generation cephalosporins, and macrolides in children hospitalized with community-acquired pneumonia.
2. Compare the effectiveness of fundoplication versus feeding via gastrojejun tube for treatment of gastroesophageal reflux disease in neurologically impaired children.
3. Compare the effectiveness of monotherapy antibiotic regimens versus two- or three-drug combinations of antibiotics in the initial postoperative treatment of children with advanced appendicitis.
4. Compare the effectiveness of antibiotics active against MRSA versus non-MRSA active antibiotics in the initial treatment of acute osteomyelitis.

Central Venous Catheter-Related Blood Stream Infections in Pediatric Cancer

Funding Mechanism: Grant

Institution: University of California, Los Angeles

Targeted HAI: Central venous catheter-related blood stream infections

Goal: This project will perform a study comparing the impact of using a

specialty team of nurses providing evidence-based central venous catheter care versus the use of assigned bedside nurses on reducing central venous catheter-related blood stream infections among pediatric oncology patients.

Translating Comparative Effectiveness Research Results from Intensive Care Unit Study to Improve Outcomes in Cardiac Surgery

Funding Mechanism: Grant

Institution: Johns Hopkins University

Targeted HAI: CLABSI, surgical site infections (SSIs), ventilator-associated pneumonia

Goals: This project aims to implement and evaluate the impact of CUSP on rates of SSIs and cardiac operating room safety culture; on rates of CLABSI, ventilator-associated pneumonia, and safety culture in cardiac surgical ICUs; on errors associated with handoffs from the ICU to the floor and discharge from the hospital; and on 30-day mortality, hospital readmissions, and hospital length of stay in cardiac operating rooms, ICUs, and floors compared to passive feedback of outcome data.

Quality of Care and Outcomes of Health Care-Associated Pneumonia

Funding Mechanism: Grant

Institution: Baystate Medical Center

Targeted HAI: Health care-associated pneumonia

Goals: This project aims to characterize the clinical features and outcomes of patients hospitalized with health care-associated pneumonia compared to patients hospitalized with community-acquired pneumonia. It will refine and validate an inpatient pneumonia mortality model using hospital claims data and assess adherence to antibiotic prescribing guidelines in the setting of health care-associated pneumonia and identify factors associated with





guideline-concordant treatment. Researchers will compare the effectiveness of guideline-concordant antibiotic therapy to other antibiotic regimens; compare outcomes of patients within the three primary subgroups of health care-associated pneumonia; and compare the microbiology of health care-associated pneumonia across hospitals and assess the relationship of causative organisms to patient prognosis and antibiotic effectiveness.

Optimizing Pre-Operative Surgical Antibiotic Prophylaxis for the 21st Century

Funding Mechanism: Contract

Institution: University of Iowa

Collaborating Agencies: CDC, NIH

Targeted HAI: SSIs

Goals: This project aims to determine whether a pre-operative antibiotic prophylaxis algorithm that includes the use (including selective use) of antibiotics shown to be effective against resistant gram-positive organisms is effective in reducing the number of SSIs attributable to resistant gram-positive organisms. Objectives include:

1. Conducting an environmental scan of existing pre-operative antibiotic prophylaxis algorithms for the prevention of cardiac and orthopedic SSIs.
2. Developing one or more new prophylaxis algorithms that incorporate the use of antibiotics with shown effectiveness against resistant gram-positive organisms.
3. Designing and conducting a study to compare the new algorithm(s) against standard algorithms used for administering pre-operative antibiotic prophylaxis of SSIs in cardiac and orthopedic surgery.

Development of Measures for Healthcare-Associated Infections in Surgical Care Settings

Funding Mechanism: Contract

Institution: Battelle

Collaborating Agencies: CDC, CMS

Targeted HAI: Multiple

Goals: This project will develop an initial set of measures for HAIs originating in surgical care settings. This work will focus on assessing existing measures of HAIs that originate in surgical care settings, developing a candidate list of measures, and then implementing the AHRQ Quality Indicator process. During the Quality Indicator process, these candidate measures will be vetted through a clinical panel, and for the selected measures, specifications will be developed. Objectives include:

1. Developing specifications for a set of evidence-based measures of HAIs that originate in surgical care settings applicable to all-payer data.
2. Providing a set of recommended next steps to further develop measures in this area.

Targeting Hospital-Acquired Complications: Impact on the Care of Complex Patients

Funding Mechanism: Grant

Institution: University of Michigan at Ann Arbor

Targeted HAI: Multiple

Goals: This project will validate measures of hospital-acquired complications, including HAIs, derived from administrative data as indicators of hospital quality by triangulating measures from other data sources. It will also evaluate unintended outcomes for patients, as collateral benefits or damages, from the Hospital-Acquired Conditions Initiative.

Projects in Ambulatory Settings

Proactive Risk Assessment in Ambulatory Surgery Centers

Funding Mechanism: Contract

Institution: American Institutes for Research

Collaborating Agencies: CDC, CMS

Targeted HAI: SSIs

Goals: This project will use sociotechnical probabilistic risk assessment (STPRA) modeling to analyze factors leading to the development of HAIs originating in ambulatory surgery centers (ASCs). Researchers will use this information to inform the design of an intervention to reduce the likelihood of at least one potential failure. Objectives include:

1. Identifying a surgical procedure or group of related procedures conducted in an ASC for the STPRA.
2. Conducting the STPRA by identifying the failures leading to adverse events, estimating the probability of these failures, and using this information to determine the probability of an SSI occurring for the given surgical procedure(s).
3. Using STPRA modeling to identify and design an intervention to reduce the probability of this SSI originating in the ASC setting.

Surgical Site and *Clostridium difficile* Infections after Ambulatory Surgery

Funding Mechanism: Grant

Institution: Washington University

Targeted HAI: CDIs, SSIs

Goals: This project will determine incidence of CDIs and SSIs after certain procedures performed in ASCs. It will identify facility and patient-level factors associated with increased risk of developing CDIs and SSIs, develop and validate risk prediction models using patient-level factors, and determine

clinical outcomes and attributable costs of SSIs and CDIs originating in ASCs.

Healthcare Cost and Utilization Project Administrative Data Initiative to Support the Evaluation of HAIs in Ambulatory Surgery Settings

Funding Mechanism: Contract

Institution: Thomson Reuters

Targeted HAI: Multiple

Goals: This project will further develop the Healthcare Cost and Utilization Project (HCUP) data infrastructure to provide baseline estimates of HAIs in the ambulatory surgery setting. Implementation strategies aimed at decreasing the occurrence of HAIs in ambulatory surgery settings also will be evaluated. Objectives include:

1. Increasing the ability to link patients across time and setting within HCUP databases.
2. Evaluating the feasibility of developing a national readmission data file that can produce national estimates of readmissions to U.S. hospitals, including readmissions for HAIs.
3. Developing a national ambulatory surgery database.
4. Developing a toolkit for States to add clinical data to administrative data with an emphasis placed on “present on admission,” a critical data element to distinguish HAIs that develop during a hospitalization.

Project CLEAR — Changing Lives by Eradicating Antibiotic Resistance

Funding Mechanism: Grant

Institution: University of California, Irvine

Collaborating Agency: CDC

Targeted HAI: MRSA

Goals: This project will conduct a randomized controlled trial of serial





decolonization versus standard-of-care patient education among individuals who are carriers of MRSA upon their discharge from the hospital, identify predictors of infection or rehospitalization due to MRSA and of successful MRSA decolonization, and estimate medical and nonmedical costs of MRSA infection among individuals who are carriers of MRSA and evaluate the potential for cost savings associated with decolonization.

Multidrug-Resistant Urinary Tract Infections in Ambulatory Settings

Funding Mechanism: Grant

Institution: University of Pennsylvania

Targeted HAI: Multidrug-resistant bacterial urinary tract infections (UTIs)

Goals: This project will identify the phenotypic and genotypic characteristics of extended-spectrum beta-lactamase-producing *Enterobacteriaceae* (ESBL-EB) causing community-onset UTIs, elucidate risk factors for community-onset ESBL-EB UTIs, develop and validate a clinical prediction rule for community-onset ESBL-EB UTIs, and identify the clinical impact of community-onset ESBL-EB UTIs. The project has parallel aims for *Klebsiella pneumoniae* carbapenemase-producing *K. pneumoniae*.

Emergency Department Best Practices to Reduce Healthcare-Associated Infections

Funding Mechanism: Grant

Institution: Brigham and Women's Hospital

Targeted HAI: CLABSI, catheter-associated urinary tract infections (CAUTI)

Goals: This project will measure health care-associated CLABSI and CAUTI infection prevention practices within the emergency department setting with a focus on CLABSI, CAUTI, and hand hygiene. It will investigate cultural and organizational barriers to successful implementation of HAI prevention strategies in this setting, and then develop, pilot test, and disseminate an implementation toolkit for HAI prevention strategies in the emergency department.

Improving Infection Control Practices in End-Stage Renal Disease Facilities

Funding Mechanism: Contract

Institution: Health Research & Educational Trust

Collaborating Agencies: CDC, CMS

Targeted HAI: Vascular access infections

Goals: This project aims to improve adherence to infection control practices in end-stage renal disease (ESRD) facilities to reduce preventable vascular access infections. Objectives include:

1. Develop an infection control worksheet that can be used by ESRD facilities to assess their performance and by surveyors to identify adherence to required infection control practices.
2. Implement, evaluate, and revise the infection control worksheet at a cohort of hemodialysis facilities.
3. Develop a CUSP to prevent vascular access infections and use data from implementation of the infection control worksheet to assess facility performance.

Projects in Long-Term Care Facilities

Detection, Education, Research, and Decolonization Without Isolation in Long-Term Care

Funding Mechanism: Grant

Institution: Northshore University Health System

Targeted HAI: MRSA

Goals: This project will test the effectiveness of a protocol for admission testing and immediate decolonization of positive persons for MRSA colonization in long-term care facilities. It will develop an infection control outreach program to provide expert guidance on infection disease prevention specific to long-term care facilities and create a model of a hospital-long-term care facilities infection control collaboration.

Preventing/Managing *Clostridium difficile* for Nursing Home Residents, Admissions and Discharges

Funding Mechanism: Grant

Institution: Texas A&M University Health Science Center

Collaborating Agency: CDC

Targeted HAI: CDIs

Goals: This project will implement the use of a CDI control bundle in the nursing home, enhance communication among providers concerning CDI and other HAIs as individuals transition between nursing homes and hospitals, determine the costs and potential savings resulting from implementation of the intervention, and determine the extent to which nursing homes and hospitals serve as a source of *Clostridium difficile* among individuals transferred between care types.

Using Nursing Home Antibigrams to Improve Antibiotic Prescribing and Delivery

Funding Mechanism: Contract

Institutions: Denver Health & Abt Associates

Collaborating Agency: CDC

Targeted HAI: Multiple

Goals: This project will assess whether the development of nursing home-specific antibiograms will improve empiric antibiotic prescribing practices and delivery within nursing homes and for residents transferred to local emergency departments with presumed bacterial infections. Objectives include:

1. Developing a standardized method for determining antibiotic susceptibility patterns and developing nursing home-specific antibiograms.
2. Implementing the antibiogram within the nursing home and in affiliated emergency departments to guide empiric management of nursing home residents with presumed bacterial infections.
3. Developing a toolkit that will aid nursing homes and affiliated laboratories in creating and maintaining nursing home-specific antibiograms.





Projects in Other Settings

Epidemiology of Rural MRSA: Is Livestock Contact a Risk Factor?

Funding Mechanism: Grant

Institution: University of Iowa

Targeted HAI: MRSA

Goals: This project aims to establish the prevalence, molecular subtypes, and antibiotic resistance profiles of *Staphylococcus aureus* in populations of rural Iowans and determine risk factors for colonization. It will determine the incidence and molecular epidemiology of symptomatic *Staphylococcus aureus* infections in rural Iowans.

Reducing Healthcare-Associated Infections Using an Infection Control Network

Funding Mechanism: Grant

Institution: Indiana University - Purdue University at Indianapolis

Targeted HAI: Multiple

Goals: This project will build upon an existing health information exchange to automate the processing of microbiology reports coming into the exchange for the identification of patients with infections from multidrug resistant organisms. It will also implement clinical decision support for HAIs caused by multidrug-resistant organisms.

For More Information

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

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