Iowa Department of Public Health
Promoting and Protecting the Health of Iowans

Iowa Department of Public Health
Center for Acute Disease Epidemiology
Healthcare-associated Infection Prevention Plan
January 1, 2010 *(Updated April 28, 2010)*

Public Health Action Plan to Reduce and Prevent Healthcare-associated Infections

Objectives:

1. **Develop healthcare-associated infection (HAI) prevention program infrastructure in Iowa**
2. **Develop and implement strategies for HAI surveillance, detection, reporting, and response within Iowa healthcare hospitals and systems**
3. **Develop and support HAI prevention collaboratives within Iowa healthcare hospitals and systems**
4. **Develop HAI prevention evaluation, oversight, and communication processes in Iowa**

Healthcare-Associated Infections: Healthcare-associated infections (HAIs) are infections that patients acquire while receiving treatment for medical or surgical conditions. HAIs occur in all settings of care, including acute care within hospitals and same day surgical centers, ambulatory outpatient care in healthcare clinics, and in long-term care facilities, such as nursing homes and rehabilitation facilities. HAIs are associated with a variety of causes, including (but not limited to) the use of medical devices, such as catheters and ventilators, complications following a surgical procedure, transmission between patients and healthcare workers, or the result of antibiotic overuse.

Introduction: The Iowa Department of Public Health (IPDH) recognizes that HAIs are a major concern in health care today and that there is a need to reduce preventable healthcare-associated infections in Iowa. According to the CDC, nearly two million patients suffer from an HAI in U.S. hospitals each year, resulting in 99,000 deaths, and it is estimated that HAIs cause an estimated $28 to $33 billion in excess health care costs each year.

“When patients go to the hospital, they do not expect, nor should they expect to get an infection,” said IDPH Medical Director, Dr. Patricia Quinlisk. “Eliminating infections is critical to making healthcare safer for Iowans.”

Healthcare-associated infections are a leading cause of preventable mortality in the U.S. The infections also add a significant economic burden to the healthcare system. The IDPH, in conjunction with experts and stakeholders, has developed this public health action plan to reduce, prevent, and eventually eliminate much of the significant burden of HAIs to Iowans and to our nation’s health systems, communities, and individuals.

Public Health Strategic Plan and Funding for Prevention of HAIs: The IDPH has a unique and important role for HAI prevention, particularly given shifts in healthcare delivery from acute care settings to ambulatory and long term care settings. In the non-hospital setting, infection control and oversight have been lacking and outbreaks –which can have a wide-ranging and substantial impact on affected communities-, are increasingly reported. At the same time, trends toward mandatory reporting of HAIs from acute care inpatient settings (hospitals and hospital systems) reflect increased demand for accountability from the public.

IDPH received funding to support efforts to prevent and reduce healthcare-associated infections in Iowa over the next two years. The $880,622 grant is funded by the U.S. Department of Health and Human Services American Recovery and Reinvestment Act (ARRA), from the Centers for Disease Control and Prevention (CDC). IDPH choose to begin the strategic planning using the CDC template. CDC’s framework for the prevention of HAIs builds on a coordinated effort of federal, state and partner organizations. The framework is based on a collaborative public health approach that includes surveillance, outbreak response, research, training and education, and systematic implementation of prevention practices. Recent legislation in support of HAI prevention provides a unique opportunity to strengthen existing and expand state capacity for prevention efforts.

The IDPH proceeded to implement the grant goals including hiring a lead nurse epidemiologist in October 1, 2009. The Nurse Epidemiologist serves as the HAI prevention grant coordinator has begun to implement grant activities. A HAI prevention steering committee has been established to guide the department in the development of this plan and has met monthly since October 2009. This committee is composed of physicians, specialists, hospital infection preventionists; healthcare professional organization representatives; licensing and regulatory agencies; and consumer stakeholders from across Iowa.

The IDPH HAI steering committee has identified two prevention priority areas, ***Clostridium difficile*** **infection and catheter-associated urinary tract infections related to hospitalization.** Initial emphasis for HAI prevention may focus on acute care inpatient settings, yet the need for prevention activities for outpatient settings is recognized. IDPH is increasingly challenged by the need to identify, respond to, and prevent HAI across the continuum of healthcare settings.

Conclusion and Contacts: IDPH encourages governmental agencies, healthcare providers, hospitals, and the public to review the **Iowa Healthcare-associated Infection Prevention Plan January 1, 2010 at www.idph/haiprevention**

The HAI prevention plan targets the following areas:

1. **Develop HAI prevention program infrastructure in Iowa**
2. **Develop and implement strategies for HAI surveillance, detection, reporting, and response within Iowa healthcare hospitals and systems**
3. **Develop and support prevention collaboratives within Iowa healthcare hospitals and systems**
4. **Develop HAI prevention evaluation, oversight, and communication processes**

Key:
**Items Underway are those in which the state is presently engaged and includes activities that are scheduled to begin using currently available resources.*
**Items Planned are activities that represent future directions and are contingent on available resources and competing priorities.*

1. **Develop HAI Prevention Program Infrastructure in Iowa**					
Planning Level	**Check Items Underway**	**Check Items Planned**	**Items Planned for Implementation (or currently underway)**	**Target Dates**	**Additional Comments and Key Points**
	☒	☐	**1. Establish statewide HAI prevention leadership through the formation of state HAI prevention steering committee (Revised 4/28/2010): to monitor the effectiveness of prevention initiatives activities and time it takes for full implementation**	October 2009 **Ongoing**	**Revised 4/28/2010** • **IDPH will continuously plan for and monitor the on-going activities and role for the HAI prevention steering committee during the grant period.** • **The HAI prevention steering committee will provide expert consulting to the effectiveness of the prevention collaboratives as well as implementation guidance.** • **Members of the HAI prevention steering committee will be asked to participate in CAUTI and CDI sub groups who will determine infection targets and prevention strategies based on the CDC's Tool Kits.** • **The HAI prevention steering committee will be asked to provide an assessment of these targets and strategies and timeline for completion of each.**
	☒	☐	1a. Collaborate with local and regional partners (e.g., state hospital associations, professional societies for infection control and healthcare epidemiology, academic organizations, laboratorians and	October 2009 Ongoing	• HAI Prevention Steering Committee formed and meetings planned for 2-4 times a year. • Two Subgroups to guide hospital prevention action steps. Interventions

			networks of acute care hospitals and long term care facilities (LTCFs)		proposed by subgroups will follow HICPAC recommendations and other best practices. • State HAI Prevention Grant Coordinator attending state-wide meetings including APIC and eight District Consultant IP meetings. • Create an IDPH HAI Prevention web site • Invitation letter to Iowa hospital CEO and IP's to participate • Media release planned.
				January 2010	• State HAI prevention infections (selected with the guidance of the HAI Prevention Steering committee) • **1.Catheter-associated Urinary Tract Infections (CAUTI)** • **2.*Clostriduim difficile* Infections(CDI)** • The IDPH will explore integration of Iowa hospital surveillance and reporting to the National Health Safety Network (NHSN) coordinated by Iowa Healthcare Collaborative (IHC) •
	☒	☐	**3.Improve communication of HAI outbreaks and infection control breaches**	January 2012	• Council of State and Territorial Epidemiologists (CTSE) and NHSN definitions with IDPH reportable outbreaks
	☒	☐	a. Develop standard reporting criteria including, number, size and type of HAI outbreak for health departments and CDC	On going	• Use existing IDPH electronic reporting mechanisms, epidemiological and laboratory capacity
	☒	☐	b. Establish mechanisms or	On going	**Revised 4/28/2010**

			protocols for exchanging information about outbreaks or breaches among state and local governmental partners (e.g., State Survey agencies, Communicable Disease Control, state licensing boards)		**b. IDPH will develop the infrastructure and partnerships across the healthcare continuum to improve the detection, reporting, and investigation of HAI outbreaks in both inpatient and outpatient facilities.** • **The Department will work to strengthen both its infrastructure and partnerships to provide education to this requirement in the Iowa Code and develop the internal capacity to work collaboratively with these healthcare settings to the detection, reporting, and investigation of outbreaks**. • **IDPH's trained "statusers" will review all infections reported to IDSS to detect outbreaks, clusters and other information suspicious for outbreaks.** • **The Department will extend its partnerships in the districts and regions by providing a nurse epidemiologist in each with the goal to support a relationship with local health departments and hospital and community based healthcare staff in Iowa's HAI prevention plan and for the detection, reporting, and investigation of HAI outbreaks in both inpatient and outpatient**

					facilities. • **IDPH staff will attend infection preventionists' district meetings, regional and state APIC chapter meetings to report on IDPH HAI prevention activities, provide education regarding detection, reporting, and investigation of HAI outbreaks, as well as updates on Department and statewide issues such as influenza, food borne disease outbreaks and zoonotic diseases among others.** • **IDPH will attend professional meetings of acute care professionals, long term care association meetings and practitioner's professional meetings to speak and/or disseminate information on reporting requirements and infectious disease resource materials and Iowa's HAI prevention action plan.** • **The Department will strengthen the relationship with the Department of Inspections and Appeals (DIA). A DIA representative is a member on the HAI prevention steering committee. The Department and the DIA will work collaboratively in education and assessment of infection prevention strategies in**

					licensed facilities.
	☐	☒	**4. Integrate laboratory activities with HAI surveillance, prevention and control efforts.**		
			a. Improve University Hygienic Laboratory (UHL) capacity to confirm emerging resistance in HAI pathogens and perform typing where appropriate. b. In order to determine the services needed by hospitals for support testing, UHL will survey Iowa hospital labs to assess the needs for confirmatory testing of emerging resistance. c. Based upon the results of the survey, UHL will update services as funding permits. d. UHL will provide hospital labs further surveillance support by expanding the existing pulsed field gel electrophoresis (PFGE) testing capacity. e. Hospitals will be encouraged to submit HAI associated pathogens for PFGE testing and a database will be built to compare patterns of pathogens over time.	Review January 2011	• Expanding UHL testing capacity is based on **availability of funding** and the need for increased capacity. University Hygienic laboratory capacity and support considered critical elements to be integrated in planning and implementation • To support these improvements in capacity, a 1.0 FTE laboratory position will be needed
	☒	☐	**5. Improve coordination among government agencies staff or**	January 2011	• Target stakeholder and professional audiences for education, surveys,

			organizations that share responsibility for assuring or overseeing HAI surveillance, prevention and control (e.g., State Survey agencies, Communicable Disease Control, state licensing boards)		curriculum planning; education for inspection agencies, licensing boards and professionals in healthcare including nursing, providers, etc. • Explore requirements of licensing boards, healthcare professional education and hospital credentialing • Convene a series of HAI prevention meetings with governmental agencies (e.g., State Survey agencies, Communicable Disease Control, state licensing boards)
	☐	☒	**6. Facilitate utilization of UHL for testing and strain typing.** **See #4 above.**	January 2011	• Expand capacity of University Hygienic Laboratory to review reported submission of pathogens and determine the need for further testing and strain typing using a screening algorithm.
	☒	☐	**7. Facilitate use of NHSN by infection preventionists for the purpose of electronic reporting of HAI data.**	January 2011	• IDPH will develop train the trainer capacity and promote voluntary NHSN reporting with each Regional Epidemiologist working with the Infection Preventionist District Consultant • IDPH will serve as NHSN group administrator and encourage voluntary reporting to NHSN with the goal of one hospital or system in each Infection preventionist's district at a minimum (10) and 80% of these to complete one month of reporting on at least one infection by January 2011. • IHC participating hospitals may continue infection improvement efforts and reporting and build upon already existing

					HAI prevention and reporting efforts. This includes their participation in existing IHC-sponsored HAI data collection activities • Plan to develop tailored reports of data analysis and make available risk adjusted HAI data to voluntary participating hospitals **Revised 4/28/2010** • **IDPH will support the enrollment in and reporting to the NHSN of all Iowa hospitals and healthcare facilities that participate in this plan.** • **IDPH HAI prevention grant coordinator will be the NHSN group administrator.** • **IDPH will continue to recruit Iowa hospitals in activity B and provide support to each infection preventionist to do this reporting.** • **IDPH staff will provide education sessions as well as informal meeting discussions on NHSN in a variety of settings including district and regional meetings, APIC chapter meetings and professional conferences.** • **IDPH will develop NHSN expertise by participating in the monthly State users of NHSN calls to learn about best practices and the "NHSN Basics" webinars to learn about the system by NHSN conference calls**

			7a. Develop NHSN expertise at the state health department by participating in the monthly State users of NHSN calls to learn about best practices and the "NHSN Basics" webinars to learn about the system.		• **A nurse epidemiologist will be hired for HAI grant NHSN activities.** • **A PhD epidemiologist and the IDSS coordinator will be assigned to provide technical support of NHSN and will attend NHSN training sessions.** • **IDPH staff will attend NHSN monthly and other scheduled conference calls** • **Additional nurse epidemiologists will be assigned to HAI grant NHSN activities.** • **A PhD epidemiologist and the IDSS coordinator will be assigned to provide technical support of NHSN and will attend monthly training.**
2. Develop and Implement Strategies for HAI Surveillance, Detection, Reporting, and Response within Iowa Healthcare Hospitals and Systems					
	Check Items Underway	**Check Items Planned**	**Items Planned for Implementation (or currently underway)**	**Target Date**	**Additional comments**
	☒ ☐	☐ ☒	**1. Improve HAI outbreak detection and investigation** a. Work with partners including CSTE, CDC, Iowa General Assembly, and providers across the Iowa healthcare continuum to improve outbreak reporting to IDPH	January 2011	• IDPH Center for Acute Disease Epidemiology (CADE) staff target healthcare networks with educational strategies related to outbreaks detection, and investigations • Adopt strategies that will increase awareness of communicable disease outbreaks are currently reportable in Iowa • Maintain the ability to consult on

	☐	☒	b. Establish protocols and provide training for CADE staff and other healthcare partners to investigate outbreaks, clusters or unusual cases of HAIs.		infectious diseases
	☒	☐	c. Develop mechanisms to protect facility/provider/patient identity when investigating incidents and potential outbreaks during the initial evaluation phase where possible to promote reporting of outbreaks		
	☒	☐	d. Improve overall use of surveillance data to identify and prevent HAI outbreaks or transmission in healthcare settings (e.g., hepatitis B, hepatitis C, multi-drug resistant organisms (MDRO), and other reportable HAIs)		
			e. **Ensure engagement of local health departments (LHD) in HAI activities**		**Revised 4/28/2010** • **LHD is a member of HAI prevention steering committee.** • **IDPH staff will routinely communicate with LHD in various ways with investigations of reportable diseases, during outbreaks and for consultation.**

					• **Continue to expand IDPH role and communications with LPH with public messaging, communications at regional meetings and by delivering education strategies.** • **Assess if there is an increase in the detection, reporting, and investigation of HAI outbreaks in both inpatient and outpatient facilities based on these strategies**.
	☒	☐	**2. Enhance laboratory capacity for state and local detection and response to new and emerging HAI issues.**	January 2011	• Continue to support Expanding Laboratory Capacity (ELC) grant • Increase laboratory capacity • Support for current structure of isolate submissions from clinical labs to UHL and confirmatory MIC testing of resistant organisms
	☒	☐	**3.Improve communication of HAI outbreaks and infection control breaches**	January 2012	• Council of State and Territorial Epidemiologists (CTSE) and NHSN definitions with IDPH reportable outbreaks
	☒	☐	c. Develop standard reporting criteria including, number, size and type of HAI outbreak for health departments and CDC	On going	• Use existing IDPH electronic reporting mechanisms for outbreaks reports
	☒	☐	**4. Will use national standards for data and technology to track HAIs using National Healthcare Safety Network (NHSN)**	January 2011	• *Clostridium difficile* Infections (CDI) and Catheter-associated Urinary Tract Infections (CAUTI) activities in Activity B using NHSN data
	☒	☐	**5. Establish baseline measurements for prevention**	January 2012	• Utilize existing NHSN data for comparison

			targets	On-going	
	☒	☐	**6. Develop state HAI surveillance training competencies**	January 2011	• Nursing Epidemiologist to be hired Jan/Feb 2010, and will increase IDPH capacity to implement NHSN training and reporting strategies within the Infection Control districts • CADE epidemiological staff will assist with ongoing educational strategies and surveillance activities • Nationally known NHSN data will be used to determine relevant baseline measurements and will be appropriately adjusted by such factors as patient risk, facility size and other factors deemed reasonable by the HAI prevention steering committee
	☒	☐	**7. Develop tailored reports of data and analyses for state HAIs prepared by IDPH epidemiologist**	March 2011	• Department staff will support data analysis of NHSN • Data analysis will include relevant baseline measurements and be appropriately adjusted by such factors as patient risk, facility size and other factors deemed reasonable by the HAI prevention steering committee
	☐	☒	**8. Validate data entered into HAI surveillance (e.g., through healthcare records review, parallel database comparison) to measure accuracy and reliability of HAI data collection**	Apr/June 2011	• Work with HAI steering committee and infection preventionists to develop NHSN data validation strategies • IDPH Nurse Epidemiologist and NHSN will support these activities
	☒	☐	**9. Develop preparedness plans for improved response to HAI**	July 2012	• Tasking HAI prevention steering committee sub -groups to participate in the development of response criteria

					over the next year
	☒	☐	9a. Define processes and tiered response criteria to handle increased reports of serious infection control breaches (e.g., syringe reuse), suspect cases/clusters, and outbreaks	July 2012	
	☒	☐	**10. Collaborate with professional licensing organizations to identify and investigate complaints related to provider infection control practice in hospital settings, and to set standards for continuing education and training**	January 2012	• Use existing healthcare associations to promote HAI continuing education and training • Support existing IHC patient safety conference and hospital learning community workshop • Participate in discussion with healthcare licensing boards
	☒	☐	**11. Adopt integration and interoperability standards for HAI information systems and data sources**	January 2012	• IDPH will develop internet technology (IT) capacity to understand and implement Public Health Information Network (PHIN) compliant interoperability standards and use this knowledge base to facilitate the exchange of information between hospital IT systems, NHSN, and other data collection systems for purposes of advancing ease of collecting HAI data • Applicability to NHSN/Iowa Disease Surveillance Network (IDSS) definitions and current reporting strategies
	☐	☒	**12. Report HAI data to the public**	March 2015	• Following data validation and the collection of a sufficient number of cases from a sufficient number of hospitals, provide for the aggregated statewide reporting of a hospital infection rate for

					Iowa at the end of a five year period
3. Develop and Support Prevention Collaboratives within Iowa Healthcare Hospitals and Systems					
	Check Items Underway	**Check Items Planned**	**Items Planned for Implementation (or currently underway)**	**Target Date**	**Additional comments**
	☒	☐	**1. Implement Healthcare Infection Control Practices Advisory Committee (HICPAC) recommendations and other best practices aimed at reducing CAUTI and CDI in the state HAI prevention plan**	January 2011	• See #2 below • Convene sub groups from the HAI prevention steering committee to provide guidance in identifying methods of implementing HICPAC recommendations for Iowa hospitals for CAUTI and CDI
	☒	☐	**2. Establish sub-groups from state HAI prevention steering committee to provide expert recommendations on HAI prevention interventions for CAUTI and CDI**	January 2010 and ongoing	• Sub groups to provide expert consultation and coaching to Iowa hospitals voluntary participation in HAI prevention collaboratives coordinated by the IHC
	☒	☐	**3. Establish at least two HAI prevention collaboratives;(one for each HAI prevention priority) with at least 10 hospitals or systems participating in each priority area**	January 2012	• Develop and support HHS Grant Activity C contract with the IHC • IHC to establish regular communications and joint area of collaboration with IDPH staff
	☒	☐	3a. Identify staff trained in project coordination and infection prevention. Develop a communication strategy to facilitate peer-to-peer learning and sharing of best practices	January 2010 and ongoing	

	☒	☐	**4. Develop state HAI prevention training competencies**	January 2012	
	☒	☐	4a. Consider establishing requirements for education and training of healthcare professionals in HAI prevention (e.g., certification requirements, public education campaigns and targeted provider education) or work with healthcare partners to establish best practices for training and certification	January 2010	• Establish and maintain Activity C activities contracted with Iowa Healthcare Collaborative • Begin the development and implement a series of meetings to engage educational, industry and regulatory institutions in the discussion of establishing HAI prevention best practices and/or requirements in Iowa
	☒	☐	**5. Implement strategies to promote compliance with HICPAC recommendations**	January 2012 and ongoing.	• Collaborate with Iowa Hospital Association, Iowa Medical Society, Iowa Board of Medical Examiners, Iowa Nurses Association, Iowa Board of Nursing and educational institutions in exploring compliance strategies • Engage educational, industry and regulatory institutions in the discussion of establishing these requirements in Iowa
	☒	☐	**6. Enhance prevention infrastructure by establishing collaboratives with a goal of one hospital or system per District and 80% of these volunteer hospitals or systems reporting to NHSN on one or infections**	January 2012	• Activity C (contract with IHC) in coordination with IDPH will begin HAI prevention activities
	☐	☒	**7. Establish collaborative to prevent HAIs in nonhospital settings (e.g., long term care, dialysis)**	January 2015 if funded for 5 years.	

4. Develop HAI Prevention Evaluation, Oversight, and Communication Processes					
	Check Items Underway	**Check Items Planned**	**Items Planned for Implementation (or currently underway)**	**Target Date**	**Additional comments, and key points**
	☒	☐	**1. Conduct needs assessment and/or evaluation of the state HAI program to learn how to increase impact**	January 2012 to begin to develop of statewide targets	• HAI Steering Committee will assist in establishing baseline performance targets and NHSN data **Revised 4/28/2010** • **To evaluate HAI program, IDPH will meet with CAUTI and CDI subgroups for an assessment as well as engage the HAI prevention steering committee by September 2010.** • **IDPH will send out survey monkey as a tool to assess the impact both prior to the initiation of our plan (pre-HAI work survey has been completed) and following the 2 year period of the grant.** • **IDPH will send out survey monkey to each participating hospital: CDC template specific to CAUTI and/or CDI.** • **Results of conversations and surveys will guide HAI prevention activities, education and communication.**
	☒	☐	1a. Establish evaluation activity to measure progress towards performance targets		• Working groups will be reconvened and examine performance data and utilize it as feedback in refinement of education and outreach approaches to facilitate

					improvement
	☒	☐	1b. Establish systems for refining approaches based on data gathered		• HAI Advisory Committee working groups will be asked to assist IDPH in the establishment of system of evaluation of NSHN data • HAI Advisory Committee sub groups will recommend performance targets • IHC will utilize data analysis and HAI Steering committee feedback in refinement of education and outreach approaches to facilitate improvement
			2. Develop and implement a communication plan about the state's HAI program and progress to meet public and private stakeholders needs	Begin January 2010, quarterly	See **1**-1a above
	☒	☐	2a. Disseminate state priorities for HAI prevention to healthcare organizations, professional provider organizations, governmental agencies, non-profit public health organizations, and the public	January 2010 and ongoing	
	☒	☐	**3. Provide consumers access to useful healthcare quality measures**	Plan update January 2012	• Collaborate with healthcare provider groups, professional organizations and IHC in providing information to the public via press releases, IDPH web site, Listserv, IHC website
	☒	☐	**4. Identify priorities and provide input to partners to help guide patient safety initiatives and research aimed at reducing HAIs**	Begin in January 2012	• Work with HAI Steering committee and IHC to develop communication strategies targeting Iowa hospitals, and healthcare providers with updates on progress and outcomes of participation in HAI prevention plan

Appendix 1.

The HHS Action plan identifies metrics and 5-year national prevention targets. These metrics and prevention targets were developed by representatives from various federal agencies, the Healthcare Infection Control Practices Advisory Committee (HICPAC), professional and scientific organizations, researchers, and other stakeholders. The group of experts was charged with identifying potential targets and metrics for six categories of healthcare-associated infections:

- Central Line-associated Bloodstream Infections (CLABSI)
- Clostridium difficile Infections (CDI)
- Catheter-associated Urinary Tract Infections (CAUTI)
- Methicillin-resistant Staphylococcus aureus (MRSA) Infections
- Surgical Site Infections (SSI)
- Ventilator-associated Pneumonia (VAP)

Following the development of draft metrics as part of the HHS Action Plan in January 2009, HHS solicited comments from stakeholders for review.

Stakeholder feedback and revisions to the original draft Metrics

Comments on the initial draft metrics published as part of the HHS Action Plan in January 2009 were reviewed and incorporated into revised metrics. While comments ranged from high level strategic observations to technical measurement details, commenter's encouraged established baselines, both at the national and local level, use of standardized definitions and methods, engagement with the National Quality Forum, raised concerns regarding the use of a national targets for payment or accreditation purposes and of the validity of proposed measures, and would like to have both a target rate and a percent reduction for all metrics. Furthermore, commenter's emphasized the need for flexibility in the metrics, to accommodate advances in electronic reporting and information technology and for advances in prevention of HAIs, in particular ventilator-associated pneumonia.

To address comments received on the Action Plan Metrics and Targets, proposed metrics have been updated to include source of metric data, baselines, and which agency would coordinate the measure. To respond to the requests for percentage reduction in HAIs in addition to HAI rates, a new type of metric, the standardized infection ratio (SIR), is being proposed. Below is a detailed technical description of the SIR.

To address concerns regarding validity, HHS is providing funding, utilizing Recovery Act of 2009 funds, to CDC to support states in

validating NHSN-related measures and to support reporting on HHS metrics through NHSN. Also, most of the reporting metrics outlined here have already been endorsed by NQF and for population-based national measures on MRSA and *C. difficile*, work to develop hospital level measures will be conducted in the next year utilizing HHS support to CDC through funds available in the Recovery Act.

Finally, to address concerns regarding flexibility in accommodating new measures, reviewing progress on current measures, and incorporating new sources of measure data (e.g., electronic data, administrative data) or new measures, HHS and its constituent agencies will commit to an annual review and update of the HHS Action Plan Targets and Metrics.

Below is a table of the revised metrics described in the HHS Action plan. Please select items or add additional items for state planning efforts.

Metric Number and Label	Original HAI Elimination Metric	HAI Comparison Metric	Measurement System	National Baseline Established (State Baselines Established)	National 5-Year Prevention Target	Coordinator of Measurement System	Is the metric NQF endorsed?
1. CLABSI 1	CLABSIs per 1000 device days by ICU and other locations	CLABSI SIR	CDC NHSN Device-Associated Module	2006-2008 (proposed 2009, in consultation with states)	Reduce the CLABSI SIR by at least 50% from baseline or to zero in ICU and other locations	CDC	Yes*
2. CLIP 1 (formerly CLABSI 4)	Central line bundle compliance	CLIP Adherence percentage	CDC NHSN CLIP in Device-Associated Module	2009 (proposed 2009, in consultation with states)	100% adherence with central line bundle	CDC	Yes†
3a. C diff 1	Case rate per patient days; administrative/discharge data for ICD-9 CM coded	Hospitalizations with *C. difficile* per 1000 patient discharges	Hospital discharge data	2008 (proposed 2008, in consultation with states)	At least 30% reduction in hospitalizations with *C. difficile* per 1000 patient discharges	AHRQ	No

Metric Number and Label	Original HAI Elimination Metric	HAI Comparison Metric	Measurement System	National Baseline Established (State Baselines Established)	National 5-Year Prevention Target	Coordinator of Measurement System	Is the metric NQF endorsed?
	Clostridium difficile Infections						
3b. C diff 2 (new)		*C. difficile* SIR	CDC NHSN MDRO/CDAD Module LabID‡	2009-2010	Reduce the facility-wide healthcare facility-onset *C. difficile* LabID event SIR by at least 30% from baseline or to zero	CDC	No
4. CAUTI 2	# of symptomatic UTI per 1,000 urinary catheter days	CAUTI SIR	CDC NHSN Device-Associated Module	2009 for ICUs and other locations 2009 for other hospital units (proposed 2009, in consultation with states)	Reduce the CAUTI SIR by at least 25% from baseline or to zero in ICU and other locations	CDC	Yes*
5a. MRSA 1	Incidence rate (number per 100,000 persons) of invasive MRSA infections	MRSA Incidence rate	CDC EIP/ABCs	2007-2008 (for non-EIP states, MRSA metric to be developed in collaboration with EIP states)	At least a 50% reduction in incidence of healthcare-associated invasive MRSA infections	CDC	No

Metric Number and Label	Original HAI Elimination Metric	HAI Comparison Metric	Measurement System	National Baseline Established (State Baselines Established)	National 5-Year Prevention Target	Coordinator of Measurement System	Is the metric NQF endorsed?
5b. MRSA 2 (new)		MRSA bacteremia SIR	CDC NHSN MDRO/CDAD Module LabID‡	2009-2010	Reduce the facility-wide healthcare facility-onset MRSA bacteremia LabID event SIR by at least 25% from baseline or to zero	CDC	No
6. SSI 1	Deep incision and organ space infection rates using NHSN definitions (SCIP procedures)	SSI SIR	CDC NHSN Procedure-Associated Module	2006-2008 (proposed 2009, in consultation with states)	Reduce the admission and readmission SSI§ SIR by at least 25% from baseline or to zero	CDC	Yes¶
7. SCIP 1 (formerly SSI 2)	Adherence to SCIP/NQF infection process measures	SCIP Adherence percentage	CMS SCIP	To be determined by CMS	At least 95% adherence to process measures to prevent surgical site infections	CMS	Yes

* NHSN SIR metric is derived from NQF-endorsed metric data
† NHSN does not collect information on daily review of line necessity, which is part of the NQF
‡ LabID, events reported through laboratory detection methods that produce proxy measures for infection surveillance
§ Inclusion of SSI events detected on admission and readmission reduces potential bias introduced by variability in post-discharge surveillance efforts
¶ The NQF-endorsed metric includes deep wound and organ space SSIs only which are included the target.

Understanding the Relationship between HAI Rate and SIR Comparison Metrics

The Original HAI Elimination Metrics listed above are very useful for performing evaluations. Several of these metrics are based on the science employed in the NHSN. For example, metric #1 (CLABSI 1) for CLABSI events measures the number of CLABSI events per 1000 device (central line) days by ICU and other locations. While national aggregate CLABSI data are published in the annual NHSN Reports these rates must be stratified by types of locations to be risk-adjusted. This scientifically sound risk-adjustment strategy creates a practical challenge to summarizing this information nationally, regionally or even for an individual healthcare facility. For instance, when comparing CLABSI rates, there may be quite a number of different types of locations for which a CLABSI rate could be reported. Given CLABSI rates among 15 different types of locations, one may observe many different combinations of patterns of temporal changes. This raises the need for a way to combine CLABSI rate data across location types.

A standardized infection ratio (SIR) is identical in concept to a standardized mortality ratio and can be used as an indirect standardization method for summarizing HAI experience across any number of stratified groups of data. To illustrate the method for calculating an SIR and understand how it could be used as an HAI comparison metric, the following example data are displayed below:

Risk Group Stratifier	**Observed CLABSI Rates**			**NHSN CLABSI Rates for 2008 (Standard Population)**		
Location Type	**#CLABSI**	**#Central line-days**	**CLABSI rate***	**#CLABSI**	**#Central line-days**	**CLABSI rate***
ICU	170	100,000	1.7	1200	600,000	2.0
WARD	58	58,000	1.0	600	400,000	1.5

$$\text{SIR} = \frac{\text{observed}}{\text{expected}} = \frac{170+58}{100000\times\left(\frac{2}{1000}\right)+58{,}000\times\left(\frac{1.5}{1000}\right)} = \frac{228}{200+87} = \frac{228}{287} = 0.79$$

95%CI = (0.628,0.989)

*defined as the number of CLABSIs per 1000 central line-days

In the table above, there are two strata to illustrate risk-adjustment by location type for which national data exist from NHSN. The SIR calculation is based on dividing the total number of observed CLABSI events by an "expected" number using the CLABSI rates from the standard population. This "expected" number is calculated by multiplying the national CLABSI rate from the standard population by the observed number of central line-days for each stratum which can also be understood as a prediction or projection. If the observed data represented a follow-up period such as 2009 one would state that an SIR of 0.79 implies that there was a 21% reduction in CLABSIs overall for the nation, region or facility.

The SIR concept and calculation is completely based on the underlying CLABSI rate data that exist across a potentially large group of strata. Thus, the SIR provides a single metric for performing comparisons rather than attempting to perform multiple comparisons across many strata which makes the task cumbersome. Given the underlying CLABSI rate data, one retains the option to perform comparisons within a particular set of strata where observed rates may differ significantly from the standard populations. These types of more detailed comparisons could be very useful and necessary for identifying areas for more focused prevention efforts.

The National 5-year prevention target for metric #1 could be implemented using the concept of an SIR equal to 0.25 as the goal. That is, an SIR value based on the observed CLABSI rate data at the 5-year mark could be calculated using NHSN CLABSI rate data stratified by location type as the baseline to assess whether the 75% reduction goal was met. There are statistical methods that allow for calculation of confidence intervals, hypothesis testing and graphical presentation using this HAI summary comparison metric called the SIR.

The SIR concept and calculation can be applied equitably to other HAI metrics list above. This is especially true for HAI metrics for which national data are available and reasonably precise using a measurement system such as the NHSN. The SIR calculation methods differ in the risk group stratification only. To better understand metric #6 (SSI 1) see the following example data and SIR calculation:

Risk Group Stratifiers		**Observed SSI Rates**			**NHSN SSI Rates for 2008 (Standard Population)**		
Procedure Code	**Risk Index Category**	**#SSI†**	**#procedures**	**SSI rate***	**#SSI†**	**#procedures**	**SSI rate***
CBGB	1	315	12,600	2.5	2100	70,000	3.0
CBGB	2,3	210	7000	3.0	1000	20,000	5.0

HPRO	1	111	7400	1.5	1020	60,000	1.7

$$\text{SIR} = \frac{\text{observed}}{\text{expected}} = \frac{315+210+111}{12600\times\left(\frac{3.0}{100}\right)+7000\times\left(\frac{5.0}{100}\right)+7400\left(\frac{1.7}{100}\right)} = \frac{636}{378+350+125.8} = \frac{636}{853.8} = 0.74$$

95%CI = (0.649,0.851)

† SSI, surgical site infection

* defined as the number of deep incision or organ space SSIs per 100 procedures

This example uses SSI rate data stratified by procedure and risk index category. Nevertheless, an SIR can be calculated using the same calculation process as for CLABSI data except using different risk group stratifiers for these example data. The SIR for this set of observed data is 0.74 which indicates there's a 26% reduction in the number of SSI events based on the baseline NHSN SSI rates as representing the standard population. Once again, these data can reflect the national picture at the 5-year mark and the SIR can serve as metric that summarizes the SSI experience into a single comparison.

There are clear advantages to reporting and comparing a single number for prevention assessment. However, since the SIR calculations are based on standard HAI rates among individual risk groups there is the ability to perform more detailed comparisons within any individual risk group should the need arise. Furthermore, the process for determining the best risk-adjustment for any HAI rate data is flexible and always based on more detailed risk factor analyses that provide ample scientific rigor supporting any SIR calculations. The extent to which any HAI rate data can be risk-adjusted is obviously related to the detail and volume of data that exist in a given measurement system.

In addition to the simplicity of the SIR concept and the advantages listed above, it's important to note another benefit of using an SIR comparison metric for HAI data. If there was need at any level of aggregation (national, regional, facility-wide, etc.) to combine the SIR values across mutually-exclusive data one could do so. The below table demonstrates how the example data from the previous two metric settings could be summarized.

	Observed HAIs			**Expected HAIs**		
HAI Metric	**#CLABSI**	**#SSI†**	**#Combined HAI**	**#CLABSI**	**#SSI†**	**#Combined HAI**

CLABSI 1	228			287		
SSI 1		636			853.8	
Combined HAI			228 + 636 = 864			287+853.8 = 1140.8
SIR = $\frac{\text{observed}}{\text{expected}} = \frac{228+636}{287+853.8} = \frac{864}{1140.8} = 0.76$ 95%CI = (0.673,0.849)						

† SSI, surgical site infection