STATE OF NEW HAMPSHIRE
HEALTHCARE-ASSOCIATED INFECTIONS PLAN
APRIL 2016

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New Hampshire Department of Health and Human Services

Division of Public Health Services

Table of Contents

ACRONYMS AND ABBREVIATIONS

AR	Antibiotic Resistance
ASA Score	American Society of Anesthesiologists (ASA) Classification of Physical Status
ASC	Ambulatory surgical center(s)
BSI	Bloodstream infection(s)
CABG	Coronary artery bypass graft procedure(s)
CAUTI	Catheter-associated urinary tract infection(s)
CCN	CMS Certification Number
CDC	U.S. Centers for Disease Control and Prevention
CDI	*Clostridium difficile* Infection
CLABSI	Central line-associated bloodstream infection(s)
CLIP	Central line insertion practices
CMS	Centers for Medicare and Medicaid Services
CRE	*Carbapenem-Resistant Enterobacteriaceae*
DHHS	New Hampshire Department of Health and Human Services
HAI	Healthcare-associated infection(s)
HCP	Healthcare personnel
HICPAC	Healthcare Infection Control Practices Advisory Committee
HHS	U.S. Department of Health and Human Services
ICAR	Infection Control Assessment and Response Program
ICU	Intensive care unit(s)
MDRO	Multidrug-Resistant Organism
NH	New Hampshire
NHHCQAC	New Hampshire Healthcare Quality Assurance Commission
NHSN	National Healthcare Safety Network
RSA	Revised Statutes Annotated
SIR	Standardized infection ratio(s)
SSI	Surgical site infection(s)
TAW	Healthcare-Associated Infections Technical Advisory Workgroup
VAP	Ventilator-associated pneumonia(s)

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I. INTRODUCTION

A. Purpose

This report represents the second New Hampshire plan to respond and prevent healthcare-associated infections (HAI). This plan will primarily be used by the HAI Program and other stakeholders in the state to identify current progress, guide future initiatives, and identify areas for improvement. This plan focuses on three primary actions: 1) RESPOND to threats of infectious disease transmission, 2) ANALYZE data to target prevention activities and 3) PREVENT future HAIs, infection control breaches, and antibiotic resistance through education and training and promoting best practices through group collaborative programs. This plan can also be used by healthcare facilities and consumers to understand current and planned future HAI prevention and response activities.

B. Audience

The intended audience may include, but is not limited to: public health personnel, infection control and prevention staff, healthcare personnel (HCP), facility leadership and management, clinicians, and healthcare consumers.

C. How do use this document

This document includes implemented, current, and future plans and consists of four sections:

I)   Introduction
II)   Past, current and future HAI Program plans
        A. Enhance HAI program infrastructure
        B. Surveillance, detection, reporting, and response
        C. Prevention
        D. Evaluation and communications
        E. Healthcare infection control and response to Ebola and other highly pathogenic infectious diseases
III)   Conclusions
IV)   Appendices
        A. New Hampshire HAI Technical Advisory Committee
        B. HHS action plan, targets, and metrics
        C. References

Please contact the NH Department of Health and Human Services (DHHS) Healthcare-Associated Infections Program (603-271-4496) with any questions about the content or how to use this document.

D. Background on Healthcare-Associated Infections

An HAI is an infection that a patient acquires during the course of receiving treatment for another condition within a healthcare setting. An estimated 722,000 HAI and 75,000 associated deaths occurred in United States (U.S.) acute care hospitals in 2011.[i] Previous studies depict higher numbers of HAI; 1.7 million infections and 99,000 deaths each year.[ii] By these estimates, HAI are among the top 10 leading causes of death in the U.S., and 5–10% of all hospital admissions are complicated by HAI.[iii] The economic burden of HAI is substantial and increasing. The total cost of HAI has been estimated at $33 billion per year in U.S. hospitals.[iv] The most common HAI are pneumonia, gastrointestinal illness, primary bloodstream infections (BSI), and SSI. [ii]

E. Background on the New Hampshire Healthcare-Associated Infection Program

The New Hampshire Department of Health and Human Services (NH DHHS) has been actively engaged in developing a healthcare-associated infections (HAI) surveillance program since 2007. During the 2006 legislative season, the New Hampshire legislature passed a bill creating NH RSA 151:32-35, which requires hospitals to identify, track, and report HAI to NH DHHS effective July 1, 2007. RSA 151:33 specifically requires reporting of central line-associated blood stream infections (CLABSI), surgical site infections (SSI), central line insertion practices (CLIP), surgical antimicrobial prophylaxis (SAP), and influenza vaccination coverage of healthcare personnel. The intent of the law is to provide HAI data by hospital in a publicly accessible forum for hospital comparison. The passage of the 2006 bill did not include funding to carry out these activities, and as such, mandatory reporting was not implemented in July 2007 as directed. In 2007, after passage of the 2006 bill mandating reporting of HAI to NH DHHS without providing funding or positions to implement the activities, NH DHHS engaged partners to consider possible approaches on implementing the law.

In the spring of 2009, NH DHHS formed a HAI Technical Advisory Workgroup (TAW). The purpose of the TAW is to provide scientific and infection prevention expertise to the NH DHHS HAI Reporting Program. The TAW is not intended to be an oversight group, but instead a forum for stakeholder participation in decision making around the NH HAI Program. The TAW is currently a 21-member group that includes representation from stakeholders across NH and includes representatives from various sizes and types of hospitals, infection control associations, the NH Hospital Association, and the NH Healthcare Quality Assurance Commission.

In August 2009, NH DHHS received $737,551 in federal funding from CDC to further develop and support NH's Healthcare-Associated Infections Program. This expired in 2011. More recently, NH DHHS has been awarded Epidemiology Laboratory and Capacity (ELC) funds from CDC to cover infrastructure, prevention, and response activities. In spring 2015, NH DHHS was awarded supplemental funds to assist with infectious disease readiness following the Ebola outbreak and subsequent preparedness activities. Many of the planned activities described in this document were and are only made possible by the availability of this and more recent HAI

funding from CDC. Any changes in funding or personnel would affect the State's ability to continue ongoing and complete the planned activities.

F. State of New Hampshire Healthcare-Associated Infections Plan

In response to the increasing concerns about the public health impact of healthcare-associated infections (HAIs), the US Department of Health and Human Services (HHS) developed an Action Plan to help prevent Healthcare-associated Infections. The HHS Action Plan includes recommendations for surveillance, research, communication, and metrics for measuring progress toward national goals. Three overarching priorities have been identified. 1) Progress toward 5-year national prevention targets (e.g., 50-70% reduction in bloodstream infections); 2) Improve use and quality of the metrics and supporting systems needed to assess progress towards meeting the targets; and 3) Prioritization and broad implementation of current evidence-based prevention recommendations.

In a concurrent development, the 2009 Omnibus bill required states receiving Preventive Health and Health Services Block Grant funds to certify that they will submit a plan to reduce HAI to the Secretary of Health and Human Services no later than January 1, 2010. In order to assist states in responding within the short timeline required by that language and to facilitate coordination with national HAI prevention efforts, the CDC provided a template to assist state planning efforts in the prevention of HAI. The following plan uses the provided template format. CDC is leading the implementation of recommendations on national prevention targets and metrics and states will tailor the plan(s) to their state-specific needs.

Initial emphasis for HAI prevention focused on acute care, inpatient settings, and then expanded to outpatient settings. The public health model of population-based healthcare delivery places health departments in a unique and important role in this area, particularly given shifts in healthcare delivery from acute care settings to ambulatory and long term care settings. In non-hospital settings, infection control and oversight have been lacking which have resulted in outbreaks and patient notification, which can have a wide-ranging and substantial impact on affected communities. Concurrently, trends toward mandatory reporting of HAIs from hospitals reflect increased demand for accountability from the public.

The State HAI Action Plan template targets the following areas:
1. Enhance HAI Program Infrastructure
2. Surveillance, Detection, Reporting, and Response
3. Prevention
4. Evaluation, Oversight, and Communication

With new Ebola-related, infection control activities, the following two tables have been added:
5. Infection Control Assessment and Response (Project A) [1]
6. Targeted Healthcare Infection Prevention Programs (Project B)[1]

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[1] Ebola-associated activity from FOA Supplement, CK14-1401PPHFSUPP15

II. PAST, CURRENT AND FUTURE HEALTHCARE-ASSOCIATED INFECTION PROGRAM PLANS

A. Enhance HAI program infrastructure

Successful HAI prevention requires close integration and collaboration with state and local infection prevention activities and systems. Consistency and compatibility of HAI data collected across facilities allows for greater success in reaching state and national goals.

Table 1: **State infrastructure planning for HAI surveillance, prevention and control**

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	1. Establish statewide HAI prevention leadership through the formation of multidisciplinary group or state HAI advisory council i. Collaborate with local and regional partners (e.g., state hospital associations, professional societies for infection control and healthcare epidemiology, academic organizations, laboratorians and networks of acute care hospitals and long term care)	Implemented and ongoing 1i-1v
☒	☐	ii. Include hospital preparedness partners. Additional representation from accrediting and/or licensing agency with surveyor authority is ideal.	
☒	☐	iii. Engage HAI advisory committee in potential roles and activities to improve antibiotic use in the state (antibiotic stewardship)	
☒	☐	iv. Engage HAI advisory committee in activities to increase health department's access to data and subsequently use those data in prevention efforts	
☒	☐	v. Identify specific HAI prevention targets consistent with HHS priorities	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Other activities or descriptions: The purpose of the TAW is to provide scientific and infection prevention expertise to the HAI Program. The TAW meets three times a year as a forum for stakeholder participation in decision-making around the HAI Program and potential roles and activities. The TAW is currently a 21-member group that includes representation from stakeholders across NH and includes representatives from various sizes and types of hospitals and ambulatory surgery centers, infection control associations, emergency preparedness, State health facility licensing and certification authority, consumer group or advocate, the NH Hospital Association, the New Hampshire Healthcare Quality Assurance Commission, the New Hampshire Ambulatory Surgery Association, and the Centers for Medicare and Medicaid (CMS) contracted quality improvement organization. The HAI prevention targets selected for surveillance and prevention are CLABSI, CAUTI, and SSI.	Implemented and ongoing

☒ ☒	☐ ☐	2. Establish an HAI surveillance prevention and control program
		   i. Designate a State HAI Prevention Coordinator
		
		   ii. Develop dedicated, trained HAI staff with at least one FTE (or contracted equivalent) to oversee the HAI activity areas described in this plan.
			Implemented 2i-2ii

		Other activities or descriptions (not required): With receipt of federal money in August 2009, NH DHHS created a full time position to serve as the State HAI Program Coordinator. In 2012, the HAI Program divided job responsibilities into two positions, a Program Manager and an epidemiologist surveillance coordinator position. Following receipt of ELC Supplemental Ebola funds, the HAI Program will establish an HAI Prevention Specialist (nurse or other clinician) position to assist with Ebola and Infectious Disease Readiness and outbreak investigations.	Implemented and ongoing
☒	☐	3. Integrate laboratory activities with HAI surveillance, prevention and control efforts. i. Improve laboratory capacity to confirm emerging resistance in HAI pathogens and perform typing where appropriate (e.g., outbreak investigation support, HL7 messaging of laboratory results)	Implemented

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Other activities or descriptions (not required): Currently, the Public Health Laboratories (PHL) provides confirmatory testing and molecular characterization of outbreak-associated Methicillin-resistant *Staphylococcus aureus* (MRSA), *Clostridium difficile*, and Carbapenem-resistant Enterobacteriaceae (CRE) isolates, organisms which are not routinely reportable (only in outbreak settings). This additional testing provided is useful in assessing extent of the outbreak and possible sources of infection. In previous years, these laboratory methods have been used in healthcare-associated outbreak investigations. The PHL has enabled electronic laboratory reporting (ELR) for sending laboratory test results to the Bureau of Infectious Disease Control (BIDC).	Implemented and ongoing
☒	☐	4. Improve coordination among government agencies or organizations that share responsibility for assuring or overseeing HAI surveillance, prevention and control (e.g., State Survey agencies, Communicable Disease Control, state licensing boards)	Implemented and ongoing
		Other activities or descriptions (not required): The State Survey Agency (NH DHHS Bureau of Health Facilities Administration) has representation on the HAI TAW. Additionally, the HAI Program routinely communicates with this agency during healthcare-related outbreak investigations and the agency participates as appropriate in weekly disease control Outbreak Team meetings where infectious disease outbreaks and cases of interest are discussed. Furthermore, the HAI Program works closely with other external partners, including: the CMS contracted Quality Improvement Organization (QIO), the NH Foundation for Healthy Communities and more recently, licensing Boards.	Implemented and ongoing

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	5. Facilitate use of standards-based formats (e.g., Clinical Document Architecture, electronic messages) by healthcare facilities for purposes of electronic reporting of HAI data. Providing technical assistance or other incentives for implementations of standards-based reporting can help develop capacity for HAI surveillance and other types of public health surveillance, such as for conditions deemed reportable to state and local health agencies using ELR. Facilitating use of standards-based solutions for external reporting can also strengthen relationships between healthcare facilities and regional nodes of healthcare information and can yield broader benefits for public health by consolidating electronic reporting.	Implemented
		Other activities or descriptions (not required): NH DHHS contracted with a vendor to conduct a statewide ELR and electronic data exchange assessment to evaluate hospital laboratory information systems, HL7 message creation capability, and messaging ability at each of the 26 acute care hospitals. NH DHHS, through the contractor, provided funding to six (23%) hospitals to assist them with developing an ELR mechanism in their facility to report laboratory data to NHSN and consider ways to send other clinical information using clinical document architecture messaging.	Implemented

B. Surveillance, Detection, Reporting, and Response

Timely and accurate monitoring remains necessary to gauge progress towards HAI elimination. Public health surveillance has been defined as the ongoing, systematic collection, analysis, and interpretation of data essential to the planning, implementation, and evaluation of public health practice, and timely dissemination to those responsible for prevention and control.[v] Increased participation in systems such as the National Healthcare Safety Network (NHSN) has been demonstrated to promote HAI reduction. This, combined with improvements to simplify and enhance data collection, and improve dissemination of results to healthcare providers and the public are essential steps toward increasing HAI prevention capacity.

The HHS Action Plan identifies targets and metrics for five categories of HAIs and identified Ventilator-associated Pneumonia as an HAI under development for metrics and targets (Appendix 2):

- Central Line-associated Blood Stream 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)

State capacity for investigating and responding to outbreaks and emerging infections among patients and healthcare providers is central to HAI prevention. Investigation of outbreaks helps identify preventable causes of infections including issues with the improper use or handling of medical devices; contamination of medical products; and unsafe clinical practices.

Table 2. **State planning for surveillance, detection, reporting, and response for HAIs**

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		1. Improve HAI outbreak detection and investigation	Implemented and ongoing 1i-1iv
☒	☐	i. Work with partners including CSTE, CDC, state legislatures, and providers across the healthcare continuum to improve outbreak reporting to state health departments	
☒	☐	ii. Establish protocols and provide training for health department staff to investigate outbreaks, clusters or unusual cases of HAIs.	
☒	☐	iii. Develop mechanisms to protect facility/provider/patient identity when investigating incidents and potential outbreaks during initial evaluation to promote outbreak reporting	
☒	☐	iv. Improve overall use of surveillance data to identify and prevent HAI outbreaks or transmission in HC settings	
		Other activities or descriptions (not required): In NH, any recognized or suspected outbreak is reportable by law to NH DHHS. Confidential information provided during an outbreak investigation is held under strict confidentiality and security procedures. NH DHHS investigates all suspected outbreaks. For many types of outbreaks (gastrointestinal, respiratory, multi-drug resistant organisms, etc.). The NH HAI Program also investigates reported breaches in infection control or drug diversion events to determine patient risk and if more robust actions, such as patient notification, are indicated. Protocols exist to guide general outbreak investigations; however, few protocols exist specifically for HAI outbreaks due to the fluid nature of these investigations and changing landscape in healthcare. The HAI Program has and continues to develop protocols for the public health response to drug diversion events and infection control breach investigations with unknown disease transmission. HAI surveillance data and reporting under RSA 141-C is used routinely to detect potential outbreaks, however, there are limitations with our reportable disease list that may cause these outbreaks or infection control breach or drug diversion incidents to go underreported. These limitations are being reviewed and will be addressed through legislative administrative rule changes to RSA 141-C spring 2016.	Implemented and ongoing

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	2. Enhance laboratory capacity for state and local detection and response to new and emerging HAI issues	Implemented and ongoing
		Other activities or descriptions (not required): While the PHL performs testing on MRSA and *C. difficile* during outbreak investigations, little information was available that describes the strains that are circulating in hospitals and communities within NH. Such information is helpful during outbreak investigations, since the significance of outbreak strains identified has often been unclear without baseline strain information. In 2010 and 2011, the PHL recruited three NHSN-participating hospitals to submit isolates of MRSA and *C. difficile* to the PHL for confirmatory testing and molecular characterization. The PHL used Pulsed-Field Gel Electrophoresis to provide strain characterization data. Additional techniques, such as sequencing, were investigated to supplement characterization data. Characterization data was linked to epidemiologic data to evaluate disease characteristics and strain distribution within NH. CRE, which stands for *carbapenem-resistant Enterobacteriaceae*, are bacteria that are difficult to treat because they have high levels of resistance to antibiotics. CRE infections are not a nationally notifiable condition. However, national surveillance data indicates that CRE infections are increasing. Due to growing concern regarding antibiotic resistance, States have included CRE as a reportable condition. As NH assesses making CRE reportable, the HAI Program reiterated to facilities their need to report suspect outbreak or unusual occurrence of disease and surveyed hospitals regarding capacity to detect CRE. In addition, the NH PHL has capacity to detect Carbapenem-resistant Enterobacteriaceae (CRE) which will help with detection and response to this new and emerging HAI issue. The NH PHL is working to develop in-state capacity for next generation sequencing. This could be applied to HAI and would greatly enhance response to emerging HAI issues.	Implemented and ongoing
☒	☐	3. Improve communication of HAI outbreaks and infection control breaches i. Develop standard reporting criteria including, number, size and type of HAI outbreak for health departments and CDC	Implemented and ongoing 3i-3ii

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	ii. Establish mechanisms or protocols for exchanging information about outbreaks or breaches among state and local governmental partners (e.g., State Survey or Licensing agencies, Communicable Disease Control)	
		Other activities or descriptions (not required): HAI outbreaks, infection control breaches, or drug diversion events are communicated to appropriate state and local governmental agencies. Mechanisms for sharing information between Bureau of Health Facilities Administration (BHFA) and BIDC exist. Over the past two years, the HAI Program has collaborated and sought expertise from other partners including the BHFA, regulatory Boards, CDC, FDA, and/or law enforcement during reported outbreaks, breaches, or drug diversion events.	Implemented and ongoing
		4. Identify at least 2 priority prevention targets for surveillance in support of the HHS HAI Action Plan	Implemented 4i and 5v, planned 4iii
☒	☐	i. Central Line-associated Bloodstream Infections (CLABSI)	
☐	☐	ii. *Clostridium difficile* Infections (CDI)	
☐	☒	iii. Catheter-associated Urinary Tract Infections (CAUTI)	
☐	☐	iv. Methicillin-resistant Staphylococcus aureus (MRSA) Infections	
☒	☐	v. Surgical Site Infections (SSI)	
☐	☐	vi. Ventilator-associated Pneumonia (VAP)	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Other activities or descriptions (not required): New Hampshire hospitals are required to report: • Central line-associated blood stream infections in adult, pediatric, and neonatal intensive care units (via NHSN) • Surgical site infections following coronary artery bypass graft, colon, knee arthroplasty, and abdominal hysterectomy procedures (via NHSN) • Catheter-associated Urinary Tract Infections in adult and pediatric intensive care units (via NHSN) New Hampshire ambulatory surgery centers (ASC) are required to report: • Surgical site infections following breast, hernia, and open reduction of fracture procedures (via NHSN) These measures have been selected for monitoring and prevention activities in support of the HHS HAI Action Plan. Authority to monitor any additional measures by DHHS would need to be provided in state law.	Implemented and ongoing
☒ ☒	☐ ☐	5. Adopt national standards for data and technology to track HAIs (e.g., NHSN). i. Develop metrics to measure progress towards national goals (align with targeted state goals). ii. Establish baseline measurements for prevention targets	Implemented and ongoing 5i-5ii

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Other activities or descriptions (not required): NH hospitals currently report CLABSI, CAUTI, and SSI via NHSN. NH ASC report SSI following specific outpatient procedures. These facilities also report measures that help protect patients from HAI. These data include adherence to infection prevention practices during central line insertions in hospitals, the appropriate use of antimicrobials during surgical procedures in ASC, and influenza vaccination coverage among hospital and ASC healthcare personnel. These measures have been selected for monitoring and prevention activities in support of the HHS HAI Action Plan. 2009 data (first full year of public reporting), will be used as an initial baseline for monitoring progress in hospitals. 2011 data will be used as a baseline for ASC. The HAI Program has released 6 hospital and three ASC reports. These reports indicate that there are overall fewer infections observed than predicted in NH hospitals and a similar number of infections than predicted in NH ASC. However, there has been an increase of overall HAI between 2009 and 2014. However, this pattern was not seen between each individual year and many factors may have contributed to this pattern, including the addition of new and expanded reporting requirements in 2012.	Implemented and ongoing
☒	☐	6. Develop state surveillance training competencies i. Conduct local training for appropriate use of surveillance systems (e.g., NHSN) including facility and group enrollment, data collection, management, and analysis	Implemented and ongoing
		Other activities or descriptions (not required): NH DHHS, HAI Program has held an annual training workshop for hospital and ambulatory surgical center NHSN participants in November 2008, October 2009, January 2011-2015 with between 25 and 75 participants each. Trainings included facility and group enrollment, data collection, management, and analysis. Ongoing annual training will be planned and account for needs of NHSN participants. Furthermore, HAI Program staff routinely provide case study updates at regular NH Infection Control and Epidemiology Professional meetings and direct technical assistance and training.	Implemented and ongoing

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	7. Develop tailored reports of data analyses for state or region prepared by state personnel	Implemented and ongoing
		Other activities or descriptions (not required): After completion of internal data validation activities, annual HAI state data reports will be provided to the public each August. Additionally, the HAI Program can provide data reports for hospitals or others as requested.	Implemented and ongoing
		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	Implemented in 2010 and ongoing 8i-8iv
☒	☐	i. Develop a validation plan	
☒	☐	ii. Pilot test validation methods in a sample of healthcare facilities	
☒	☐	iii. Modify validation plan and methods in accordance with findings from pilot project	
☒	☐	iv. Implement validation plan and methods in all healthcare facilities participating in HAI surveillance	
☒	☐	v. Analyze and report validation findings	
☒	☐	vi. Use validation findings to provide operational guidance for healthcare facilities that targets any data shortcomings detected	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Other activities or descriptions (not required): In 2010, NH DHHS contracted with an agency with infection prevention expertise to develop a plan and conduct external validation. This contract went into effect in January 2010, with a final data validation plan developed April 2010 and a written report in January 2012. DHHS worked with the contractor to conduct onsite data validation, work with hospitals to correct errors, and produce a report(s) on data validation findings such that issues could be addressed in future trainings. NH DHHS HAI program staff attended site visits and assisted with data validation activities. In Summer 2015, the HAI Program contracted with the same agency to continue data validation efforts in both hospitals and ASC on an ongoing rolling basis over the next two years with an option to renew. The plan is in development and will be updated to reflect current reporting requirements and methods specific to each setting.	Internal validation ongoing quarterly and annually External validation Implemented in 2010 Planning external validation on a rolling basis, 2015
☒	☐	9. Develop preparedness plans for improved response to HAI i. Define processes and tiered response criteria to handle increased reports of serious infection control breaches (e.g., syringe reuse), suspect cases/clusters, and outbreaks	Implemented and ongoing 9i
		Other activities or descriptions (not required): NH DHHS investigates all suspected outbreaks, including HAI related. NH DHHS, HAI Program also investigates reported breaches in infection control or drug diversion events to determine patient risk and if more robust actions, such as patient notification, are indicated. Protocols exist to guide general outbreak investigations; however, few protocols exist specifically for HAI outbreaks due to the fluid nature of these investigations and changing landscape in healthcare. The HAI Program has and continues to develop protocols for the public health response to drug diversion events and infection control breach investigations with unknown disease transmission. The HAI Program has and continues to develop and update protocols for the public health response to drug diversion events and infection control breach investigations with unknown disease transmission. The program plans to develop more robust plans to handle a suspect outbreak/cluster.	Implemented and ongoing

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	10. Collaborate with professional licensing organizations to identify and investigate complaints related to provider infection control practice in non-hospital settings, and to set standards for continuing education and training	Implemented and ongoing
		Other activities or descriptions (not required): The NH HAI Program developed a drug diversion response protocol and is in the process of developing an infection control (IC) breach protocol. Response activities will depend on the type of breach, Category A or B. Category A breach involves gross error (e.g.., syringe reuse) and will involve more aggressive actions such as patient notification. Category B breach has less defined patient risk (e.g., partial instrument processing) and subsequently has varied public health actions. The NH HAI program has and continues to collaborate with professional licensing organizations to identify and investigate complaints. The licensing board roles, authority, and contact information will be considered and incorporated during protocol development.	Implemented drug diversion protocol IC breach protocol planned March 2016

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		11. Adopt integration and interoperability standards for HAI information systems and data sources
		
		   i. Improve overall use of surveillance data to identify and prevent HAI outbreaks or transmission in HC settings (e.g., hepatitis B, hepatitis C, multi-drug resistant organisms (MDRO), and other reportable HAIs) across the spectrum of inpatient and outpatient healthcare settings
		   ii. Promote definitional alignment and data element standardization needed to link HAI data across the nation.
			No timeline anticipated at this time 11i-11ii.

		Other activities or descriptions (not required): These efforts require national projects and guidelines. NH DHHS can participate in these efforts, but leadership will come from national organizations. NH DHHS, HAI Program is planning to add CRE to the NH Reportable Conditions list.	No timeline anticipated at this time
☒	☐	12. Enhance electronic reporting and information technology for healthcare facilities to reduce reporting burden and increase timeliness, efficiency, comprehensiveness, and reliability of the data i. Report HAI data to the public	Implented August, Annually 12i

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Other activities or descriptions (not required): NH DHHS contracted with a vendor to conduct a statewide ELR and electronic data exchange assessment to evaluate hospital laboratory information systems, HL7 message creation capability, and messaging ability at each of the 26 acute care hospitals. NH DHHS, through the contractor, provided funding to six (23%) hospitals to assist them with developing an ELR mechanism in their facility to report laboratory data to NHSN and to consider ways to send other clinical information using clinical document architecture messaging. An annual HAI state data report will be provided to the public each August.	Implemented
☒	☐	13. Make available risk-adjusted HAI data that enables state agencies to make comparisons between hospitals.	Implented August, Annually
		Other activities or descriptions (not required): Annual HAI state data reports will be provided to the public each August. The report will include risk-adjusted HAI data by hospital and ASC for comparison. Data may be subject to change as HAI epidemiology evolves or reporting requirements are added.	Implented August, Annually
☒	☐	14. Enhance surveillance and detection of HAIs in nonhospital settings	Implemented and ongoing
		Other activities or descriptions (not required): NH ASCs report select outcome (SSI) and process measures (antibiotic timing and healthcare personnel vaccination coverage). These data are reported publically. Expanding surveillance and detection of HAI in nonhospital settings requires authority under state law. In Spring 2015, NH DHHS proposed adding other facility types, such as long-term care and end-stage renal dialysis centers, to current statute (RSA 151). However, that proposal failed and planning continues to enhance surveillance beyond acute care or ASC settings.	Implemented and ongoing

C. Prevention

State implementation of HHS Healthcare Infection Control Practices Advisory Committee (HICPAC) recommendations is a critical step toward the elimination of HAIs. CDC and HICPAC have developed evidence-based HAI prevention guidelines cited in the HHS Action Plan for implementation. These guidelines are translated into practice and implemented by multiple groups in hospital settings for the prevention of HAIs. CDC guidelines have also served as the basis for the Centers for Medicare and Medicaid Services (CMS) Surgical Care Improvement Project. These evidence-based recommendations have also been incorporated into Joint Commission standards for accreditation of U.S. hospitals and have been endorsed by the National Quality Forum.

Table 3. **State planning for HAI prevention activities**

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	1. Implement HICPAC recommendations. i. Develop strategies for implementation of HICPAC recommendations for at least 2 prevention targets specified by the state multidisciplinary group.	Implemented 2010

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Other activities or descriptions (not required): Initial HAI prevention targets selected for monitoring in NH were CLABSI and SSI. Several collaboratives in the state were initiated in 2009 to reduce these infections. Efforts are ongoing and managed by external organizations. The HAI Program has limited capacity to lead such efforts, but staff members participate and provide data as needed. 1. High Five for a Healthy New Hampshire: Five-component statewide initiative to monitor and improve hand hygiene rates among all levels of healthcare workers. *Update: The Foundation for Healthy Communities initially received funding from the HAI Program to conduct these activities. A statewide meeting to discuss the initiative, measurement, and lessons learned occurred in November 2011. Currently, the FHC is reengaging on this topic and focusing on HH compliance audits and measurement.* 2. Patient Safety Checklist: Statewide initiative focused on surgical safety and quality improvement and New Hampshire hospitals and ASC. *Update: All hospitals and ASCs implemented use of the Surgical safety Checklist; audits have indicated good adherence. There have been over 13,000 audits of surgeries and procedures since October 2013. More information can be found at: http://healthynh.com/index.php/commission-documents.html* 3. STOP BSI: Two-year program to reduce the occurrence of CLABSI. The improvement model includes a checklist, staff training, and leadership involvement, collection of surveillance data, and analysis and discussion of defects. *Update: The STOP BSI project was completed in 2011.* Additionally, by law, NH DHHS monitors central line insertion practices and surgical antimicrobial prophylaxis measures for comparison to infection data.	High Five Campaign completed 2011, ongoing activities conducted by partner organizations Patient safety checklist completed 2013, ongoing activities conducted by partner organizations STOP BSI completed 2011
		2. Establish prevention working group under the state HAI advisory council to coordinate state HAI collaboratives	Not planned

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☐	☐	i. Assemble expertise to consult, advise, and coach inpatient healthcare facilities involved in HAI prevention collaboratives	
		Other activities or descriptions (not required): Not planned at this time as working group under the TAW. Currently the New Hampshire Healthcare Quality Assurance Commission serves in this capacity.	Not planned
		3. Establish HAI collaboratives with at least 10 hospitals (i.e. this may require a multi-state or regional collaborative in low population density regions)	Implemented 3i-3iii
☒	☐	i. Identify staff trained in project coordination, infection control, and collaborative coordination	
☒	☐	ii. Develop a communication strategy to facilitate peer-to-peer learning and sharing of best practices	
☒	☐	iii. Establish and adhere to feedback of a clear and standardized outcome data to track progress	
		Other activities or descriptions (not required): As described above, there are several collaboratives in the state that worked to reduce HAIs. These collaboratives were and continue to be coordinated by the New Hampshire Healthcare Quality Assurance Commission.	Implemented
☐	☐	4. Develop state HAI prevention training competencies i. 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	Not planned
		Other activities or descriptions (not required): Not planned at this time with the exception of a review of regulatory infection control and prevention oversight and HAI prevention capacity and competencies at healthcare facilities following Ebola and	Not planned

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Infectious Disease Readiness funding.	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		5. Implement strategies for compliance to promote adherence to HICPAC recommendations	Implemented 5i-5iii, planned 5iv November 2016
☒	☐	i. Consider developing statutory or regulatory standards for healthcare infection control and prevention or work with healthcare partners to establish best practices to ensure adherence	
☒	☐	ii. Coordinate with regulation and oversight activities such as inpatient or outpatient facility licensing/accrediting bodies and professional licensing organizations to prevent HAIs	
☒	☐	iii. Improve regulatory oversight of hospitals, enhancing surveyor training and tools, and adding sources and uses of infection control data	
☐	☒	iv. Consider expanding regulation and oversight activities to currently unregulated settings where healthcare is delivered or work with healthcare partners to establish best practices to ensure adherence	
		Other activities or descriptions (not required): While not comprehensive, NH DHHS maintains some regulatory authority related to infection prevention hospital activities as there are infection control regulatory guidelines that currently exist in the NH Hospital Licensing Rules He-P 802.21. No additional activities in this area are planned at this time.	Implemented
☒	☐	6. Enhance prevention infrastructure by increasing joint collaboratives with at least 20 hospitals (i.e. this may require a multi-state or regional collaborative in low population density regions)	Implemented

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Other activities or descriptions (not required): The 'High Five' campaign is a statewide initiative, which was established in 2008, to monitor and improve hand hygiene compliance and is organized under the auspices of the NH Healthcare Quality Assurance Commission with staff support provided by the Foundation for Healthy Communities (FHC). In order to take fundamental steps towards eliminating HAI in NH hospitals, the aim of the initiative was to have 100% compliance with hand hygiene (HH) as recommended in the CDC Guideline for Hand Hygiene in Health-Care Settings in all NH hospitals. The initiative relies on five components to improve compliance and includes the following: 1) leadership commitment, 2) availability of products, 3) hand hygiene training and competency verification, 4) measurement, and 5) feedback and accountability. In 2013, the reported rate of hand hygiene adherence was 91% based on approximately 91,000 observations. This is compared to initial report of 83% in 2008 with nearly three thousand observations. However, after several years of data collection and high rates, the FHC is reengaging this topic due to concerns regarding HH audit sensitivity and reliability across settings.	Implemented and ongoing
☒	☐	7. Establish collaborative to prevent HAIs in nonhospital settings (e.g., long term care, dialysis)	Implemented
		Other activities or descriptions (not required): In addition to the 26 acute care hospitals, all 26 ambulatory surgical centers in NH have committed to the "High Five" for Hand Hygiene campaign.	Implemented

D. Evaluation and Communications

Program evaluation is an essential organizational practice in public health. Continuous evaluation and communication of findings integrates science as a basis for decision-making and action for the prevention of HAIs. Evaluation and communication allows for learning and ongoing improvement. Routine, practical evaluations can inform strategies for the prevention and control of HAIs.

Table 4. **State HAI communication and evaluation planning**

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☐ ☐	☒ ☒	1. Conduct needs assessment and/or evaluation of the state HAI program to learn how to increase impact i. Establish evaluation activity to measure progress towards targets and ii. Establish systems for refining approaches based on data gathered	Planned September 1, 2016
		Other activities or descriptions (not required): NH DHHS has not completed an HAI Program needs assessment to date. However, the HAI Program is planning to develop measures to assess program performance and improvement by using a State online application to measure progress over time.	Planned September 1, 2016
☐	☒	2. Develop and implement a communication plan about the state's HAI program and progress to meet public and private stakeholders needs i. Disseminate state priorities for HAI prevention to healthcare organizations, professional provider organizations, governmental agencies, non-profit public health organizations, and the public	Planned July 1, 2017
		Other activities or descriptions (not required): In 2017, NH DHHS will develop a more comprehensive State HAI Plan, which will include an HAI communications plan.	Planned October 1, 2018
☒	☐	3. Provide consumers access to useful healthcare quality measures	August, Annually

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Other activities or descriptions (not required): An annual HAI state data report will be provide to the public each August, which will include the measures allowable by law.	Implemented and ongoing
☒	☐	4. Identify priorities and provide input to partners to help guide patient safety initiatives and research aimed at reducing HAIs	Implemented
		Other activities or descriptions (not required): The New Hampshire Healthcare Quality Assurance Commission was established in 2005 by the NH state legislature to look at healthcare quality issues including healthcare-associated infections and patient safety. This group, which includes representatives from all acute care hospitals and ambulatory surgical centers, coordinates several statewide prevention initiatives. A representative from NH DHHS (State Epidemiologist) serves on this group and provides HAI program updates and input into statewide prevention work.	Implemented and ongoing

E. Healthcare Infection Control and Response (Ebola and infectious disease readiness- associated activities)

The techniques and practice on which infection control protocols are based form the backbone of infectious disease containment for pathogens that are otherwise amplified and accelerated in healthcare settings. Investments in a more robust infection control infrastructure will prevent many HAIs transmitted to, and among, patients and health care workers.

Table 5. Infection Control Assessment and Response

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	1. Create an inventory of all healthcare settings in state. List must include at least one infection control point of contact at the facility	Planned July 1, 2016

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	2. Identify current regulatory/licensing oversight authorities for each healthcare facility and explore ways to expand oversight	Planned July 1, 2016
		Other activities or descriptions: The NH Healthcare Facilities Administration (HFA) unit maintains a list of all licensed healthcare facilities in the state and the HAI Program maintains a separate comprehensive list of facilities and infection prevention contacts for all healthcare facility types that are required to report HAI by law. This includes 34 hospitals, 27 ASC, and 169 assisted living, residential care and adult daycare facilities. The HAI Program is currently expanding those lists to serve as an aggregate inventory of all facility types in the state. The inventory will include infection prevention contacts and information on regulatory oversight, infection control capacity, and competency requirements. In 2015, legislation passed to establish a study committee to assess the existing framework for the oversight, regulation and reporting of patient safety and healthcare quality issues among all healthcare delivery settings. This was in response to gaps identified during several infection control breach and healthcare-associated infection (HAI) outbreak investigations. The Study Committee will develop a report and provide recommendations by December 2015. Information obtained from this report will be used to explore ways to expand or improve oversight.	Planned July 1, 2016
		3. Assess readiness of Ebola-designated facilities within the state	Planned 3i-3iii
☐	☒	i. Use CDC readiness assessment tool and determine gaps in infection control	October 1, 2015
☐	☒	ii. Address gaps (mitigate gaps)	July 1, 2016
☐	☒	iii. Conduct follow-up assessments	October 1, 2016

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Other activities or description: NH DHHS, Division of Public Health Services (DPHS) completed its Ebola Response Plan in December 2014. The development and stakeholder review to finalize the plan identified gaps; specifically in training of local responders and concerns with sustainable training opportunities and resources through the duration of the Ebola response (or any infectious disease or high containment event) that may emerge. The NH HAI Program plans to collaborate with stakeholders to assess readiness of Ebola-designated facilities and address and mitigate any identified gaps in real time. HAI Program staff and a contracted medical surge planner will conduct follow-up assessments to those facilities as necessary.	October 1, 2016
		4. Assess outbreak reporting and response in healthcare facilities	Implemented 4iii Planned 4i-4ii
☐	☒	i. Use standard assessment tool and determine gaps in outbreak reporting and response	October 1, 2016
☐	☒	ii. Address gaps (mitigate gaps)	October 1, 2016
☒	☐	iii. Track HAI outbreak response and outcome	
		Other activities or descriptions: The NH HAI program has investigated several outbreak and infection control breach investigations in recent years including Hepatitis C due to drug diversion, fungal infections from contaminated steroid medications, and infection control concerns at an orthodontic office. These investigations revealed gaps in infection control knowledge and lack of regulatory oversight. NH DHHS, DPHS passed legislation to establish a study commission to assess oversight, regulation and reporting of patient safety and healthcare quality issues. This legislation will help inform gaps in outbreak reporting and can later be	Planned October 1, 2016

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		used to tailor a standardized tool available from CDC. The HAI program previously conducted a needs assessment in long-term care settings and plans to expand this assessment in other healthcare settings. The program will use the tool available from CDC and develop a survey to assess capacity of healthcare facilities to detect, report, and respond to potential outbreaks.	

Table 6. **Targeted Healthcare Infection Prevention Programs**

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		1. Expand infection control assessments	Planned 1i-1iii
☐	☒	i. Expand assessments to other additional facilities and other healthcare settings and determine gaps in infection control	March 1, 2016
☐	☒	ii. Address gaps (mitigate gaps)	June 1, 2016
☐	☒	iii. Conduct follow-up assessments	October 1, 2016
		Other activities or descriptions: The HAI program plans to expand infection control assessments to NH acute care hospitals, urgent care centers, and other facilities. HAI Program staff will work collaboratively with NH HFA, the contracted CMS Quality Improvement Organization (QIO), other credentialing organizations, infectious disease clinicians and/or pharmacists, and emergency preparedness staff. Using quality improvement tools, HAI Program staff will perform follow-up assessments to mitigate gaps based on results from original assessments.	Planned March 1, 2016

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☐	☒	2. Increase infection control competency and practice in all healthcare settings through training i. Incorporate general infection control knowledge and practice assessments of competency into state licensing board requirements, credentialing, and continuing education requirements for clinical care providers (e.g., medical license, admitting privileges) and/or licensing/accreditation requirements for healthcare facilities.	Planned December 1, 2016 2i-2ii
☐	☒	ii. Develop a sustainable training program based on CDC guidance and technical assistance to perform training, prioritizing on-site train-the-trainer programs in key domains of infection control, including the incorporation of hands on evaluations and competency assessments of best practices and a system to monitor ongoing compliance and competency.	
		Other activities or descriptions: In 2009-2010, the NH HAI program executed a contract with the Association for Professionals in Infection Control and Epidemiology (APIC) to provide infection prevention training through EPI 101 and 201 courses for hospital, ASC, and long-term care facility staff. These courses were well received and are sporadically requested by new infection preventionists (IP) or those in other non-acute care settings. The NH HAI program plans to enhance statewide expertise in infection prevention and surveillance through infection prevention training which will supplement previous education opportunities. The program is planning a mixed level approach and tailoring training based on proficiency level and facility setting. NH HAI Program staff will attend trainings to build internal capacity and ensure sustainability of continuous training and education across the continuum of care.	Planned December1, 2016

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation

☐ ☐ ☐ ☐	☒ ☒ ☒ ☒	3. Enhance surveillance capacity to improve situational awareness, describe emerging threats, and target onsite assessments to implement prevention programs
		  i. Build capacity to analyze data reported by facilities in a defined region to allow for a comprehensive assessment of potential healthcare-associated infection threats, and communicate results with healthcare facilities.
		  ii. Work with CDC to guide analytic direction and identify facilities for prioritized assessments/response
		  iii. Improve outbreak reporting capacity by developing an infrastructure that includes clear definitions of infectious threats of epidemiologic importance that are communicated to facilities
		  iv. Implement a response plan to address potential emerging threats identified by using enhanced surveillance
			No timeline anticipated at this time 3i-iv

		Other activities or descriptions: Not planned at this time	No timeline anticipated at this time

APPENDIX I: Healthcare-Associated Infections Technical Advisory Workgroup

Members	Organization Representation
Benjamin Chan, MD, MPH	DHHS, State Epidemiologist
Beth Daly, MPH	DHHS, Bureau of Infectious Disease Control, Chief
Michael Fleming	DHHS, Health Facilities Administration
Katrina Hansen, MPH	DHHS, HAI Program Manager
Elizabeth Talbot, MD	DHHS, Deputy State Epidemiologist
Roza Tammer, MPH*	DHHS, HAI Program Surveillance Coordinator
Denise Krol, MS, PMP*	DHHS, PHEP/HPP Coordinator
Joe Conley, COO*	Concord Hospital (New Hampshire Hospital Association)
Anne Nolan, RN, BSN, CIC	New London Hospital (New Hampshire Hospital Association)
Anne Diefendorf, MS, RD, LD	New Hampshire Health Care Quality Assurance Commission
Lynda Caine, RN, MPH, CIC	Concord Hospital (New Hampshire Infection Control and Epidemiology Professionals)
Jan Larmouth, MS, CIC	Southern New Hampshire Medical Center (Acute Care)
Elissa Malcolm, MS	Dartmouth-Hitchcock Medical Center (Acute Care)
Darlene Burrows, RN, BSN, CIC	Franklin Regional Hospital (Critical Access)
Mary Ruppert, RN, BSN, CIC	Speare Memorial Hospital (Critical Access)
Cathy Martin, CPRN*	Northeast Rehabilitation (Rehabilitation)
Terri Kangas-Feller, BS, RN, CIC*	New Hampshire Hospital (Psychiatric)
Tanya Lord, MPH, PhD	Consumer Representative
Donna Quinn, RN, BSN, MBA	Orthopaedic Surgery Center (Ambulatory Surgical Center)
Robin Sheppard, RN	Bedford Ambulatory Surgical Center (Ambulatory Surgical Center)
Beverly Primeau, RN, MBA*	Concord ASC (New Hampshire Ambulatory Surgery Association)
Margaret Crowley, RN, PhD	Qualidigm NH State Program Director (QIO)
Ashley Conley, MS,CPH	City of Nashua, Division of Public Health and Community Service (Emergency Preparedness)
Sarah Blodgett **	New Hampshire Division of Health Professions, Division Director
Brenda Paradis, RN**	HealthSouth Rehabilitation Hospital (Rehabilitation)
Antonia Altomare, DO, MPH**	Dartmouth-Hitchcock Medical Center (Medical Epidemiologist)

*Served on TAW for part of 2015 (either beginning or end of year)
** Served on TAW starting 2016
DHHS: New Hampshire Department of Health and Human Services

APPENDIX II. A Note about the Format of this Plan

In response to the increasing concerns about the public health impact of healthcare-associated infections (HAIs), the US Department of Health and Human Services (HHS) has developed an Action Plan to Prevent Healthcare-Associated Infections (HHS Action Plan). The HHS Action Plan includes recommendations for surveillance, research, communication and metrics for measuring progress towards national goals. Three overarching priorities have been identified:

- Progress towards 5-year national prevention targets (e.g.,50-70% reduction in bloodstream infections);
- Improve use and quality of the metrics and supporting systems needed to assess progress towards meeting the targets; and
- Prioritization and broad implementation of current evidence-based prevention recommendations.

In a concurrent development, the 2009 Omnibus bill requires states receiving Preventive Health and Health Services (PHHS) Block Grant funds to certify that they will submit a plan to reduce HAIs to the Secretary of Health and Human Services not later than January 1, 2010. In order to assist states in responding within the short timeline required by that language and to facilitate coordination with national HAI prevention efforts, the Centers for Disease Control and Prevention (CDC) drafted a template to assist state planning efforts in the prevention of HAIs.

The template will help to ensure progress towards national prevention targets as described in the HHS Action Plan, wherein CDC is leading the implementation of recommendations on National Prevention Targets and Metrics and the implementation of priority prevention recommendations, while allowing flexibility to tailor the plan to each state's specific needs.

The template provides choices for developing or enhancing state HAI prevention activities in the four areas identified above. This completed template serves as the state's HAI plan to meet the requirements of the 2009 Omnibus bill. If a state has an existing plan, the state may choose to incorporate that plan into the template or submit the existing plan in place of the template provided; however, maintaining the format of the template is preferable as it allows for easier aggregation of activities across states. NH DHHS intends to develop a more comprehensive State HAI Plan in 2010, which will include the elements addressed in the CDC template in greater detail.

For each section, elements are chosen that best support current activities or planned activities. Current activities are those in which the state is presently engaged and includes activities that are scheduled to begin using currently available resources. Planned activities represent future directions the state would like to move in to meet currently unmet needs, contingent on available resources and competing priorities. A section for additional activities is included to accommodate plans beyond the principal categories.

APPENDIX III: HHS action plan, metrics, and prevention targets

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, commenters 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, commenters 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.

Below is a table of the revised metrics described in the HHS Action plan that is applicable to NH reporting requirements.

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[†]
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[*]
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

$$\text{SIR} = \frac{\text{observed}}{\text{expected}} = \frac{170+58}{100000 \times \left(\frac{2}{1000}\right) + 58{,}000 \times \left(\frac{1.5}{1000}\right)} = \frac{228}{200+87} = \frac{228}{287} = 0.79 \qquad 95\%\text{CI} = (0.628, 0.989)$$

[*]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

$$\text{SIR} = \frac{\text{observed}}{\text{expected}} = \frac{315 + 210 + 111}{12600 \times \left(\frac{3.0}{100}\right) + 7000 \times \left(\frac{5.0}{100}\right) + 7400\left(\frac{1.7}{100}\right)} = \frac{636}{378 + 350 + 125.8} = \frac{636}{853.8} = 0.74 \qquad 95\%\text{CI} = (0.649, 0.851)$$

[†] 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.

HAI Metric	Observed HAIs			Expected HAIs		
	#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
$$\text{SIR} = \frac{\text{observed}}{\text{expected}} = \frac{228 + 636}{287 + 853.8} = \frac{864}{1140.8} = 0.76 \qquad 95\%\text{CI} = (0.673, 0.849)$$						

[†] SSI (surgical site infection)

APPENDIX IV: References

[i] Magill SS, Edwards JR, Bamberg W, et al. Multistate Point-Prevalence Survey of Health Care–Associated Infections. New England Journal of Medicine. 2014; 370: 1198-208.

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