



HAI Plan for Vermont 2015

Template for State Healthcare-associated Infection 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 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:

- Progress toward 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

Background: The 2009 Omnibus bill required states who received Preventive Health and Health Services (PHHS) Block Grant funds to certify that they would 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) created a template to assist state planning efforts.

This template helps to ensure progress toward national prevention targets as described in the HHS Action Plan. CDC is leading the implementation of recommendations on national prevention targets and metrics and states should tailor the plan 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 which can have a wide-ranging and substantial impact on affected communities. At the same time, 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 to reflect those activities:

- 5. Infection Control Assessment and Response (Ebola-associated activity from FOA Supplement, CK14-1401PPHFSUPP15, Project A)
- 6. Targeted Healthcare Infection Prevention Programs (Ebola-associated activity from FOA Supplement, CK14-1401PPHFSUPP15, Project B)

Framework and Funding for Prevention of HAIs

CDC’s framework for the prevention of HAIs builds on a coordinated effort of federal, state, and partner organizations and is based on a collaborative public health approach that includes surveillance, outbreak response, infection control, research, training, education, and systematic implementation of prevention practices. Legislation in support of HAI prevention provides a unique opportunity to strengthen existing state capacity for prevention efforts.

Template for developing HAI plan

The following template provides choices for enhancing state HAI prevention activities in the six areas identified above. For each section, please choose elements which 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.

1. 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 will allow for greater success in reaching state and national goals. Please select areas for development or enhancement of state HAI surveillance, prevention, and control efforts.

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
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p style="margin-left: 40px;">a. A possible education program for LTCF about inappropriate treatment of asymptomatic bacteriuria in LTCF. and/or</p> <p style="margin-left: 40px;">b. Provide an outline of suggestions for beginning their own ABS program to reduce inappropriate/unnecessary use of antibiotics with an emphasis on asymptomatic bacteriuria. Use program and toolkit developed by _____.</p> <p>Education on ABS is on-going with both LTCF and acute care through the statewide MDRO Collaborative. In 2016-2017 we will consider a formal program of education on ABS. We conducted an IHI expedition on ABS for the MDRO Collaborative facilities in 2013.</p> <p style="margin-left: 40px;">iv. NEW: Engage HAI advisory committee in activities to increase health department's access to data and subsequently use those data in prevention efforts</p> <p style="margin-left: 40px;">v. Identify specific HAI prevention targets consistent with HHS priorities and Vermont Act 53 Mandates</p> <ol style="list-style-type: none"> 1. CLABSI Central Line Blood Stream Infection- State mandate 2. Surgical Site Infections for the following surgical procedures : State Mandate HPRO Hip arthroplasty. KPRO Knee arthroplasty ABD-HYST Abdominal Hysterectomy. 3. CDI –under consideration for future addition to State mandated HAI reporting 4. MRSA Blood stream infections- CMS Mandate 5. CRE- reportable and Voluntary submission to NHSN as MDRO LabID event HAI Advisory Group will discuss and recommend possible additions or subtractions to the targets already in use and consistent with HHS priorities. 	<p>v. Jan. 2016</p>
		<p><i>Other activities or descriptions:</i></p>	

<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<p>2. Establish an HAI surveillance, prevention and control program</p> <ul style="list-style-type: none"> i. Continue support for a State HAI Prevention Coordinator ii. Develop dedicated, trained HAI staff with at least one FTE (or contracted equivalent) to oversee HAI activities areas (Integration, Collaboration, and Capacity Building; Reporting, Detection, Response, and Surveillance; Prevention; Evaluation, Oversight, Communication, and Infection Control) The HAI Coordinator is the only staff member at this time. <ul style="list-style-type: none"> a. The Epi Designee in each Vermont District Health office is being oriented to the HAI Program and will take a more active role in the local MDRO Collaborative Cluster. Half of the EPI Designees are attending EPI 101 or 102 at the APIC Academy in Sept 2015 and remaining will attend in the following year. This training will give them a better understanding of healthcare facility Infection prevention and control. They will be better prepared to train and guide the HCF IPs particularly in the LTCF where turnover in the IP role is a continuing challenge. The Epi Designees will assist with education and competency demos to mitigate any gaps discovered in the Infection Prevention Assessments. We believe their involvement will help this program become sustainable on an annual basis. b. 12 Vermont MDRO Collaborative “Clusters” meet on a regular basis in 12 geographic areas of the state. We ask for 4 times each year as a minimum. Some meet more often and others less. Vermont “Clusters” include infection preventionists and other staff from acute care, LTCF, Home Health and Adult Day Centers 	<p>On-going since 2010</p> <p>Beginning September 2015</p>
		<p><i>Other activities or descriptions:</i></p> <ol style="list-style-type: none"> 1. <i>Apply for a CSTE Applied Epi Fellow to work with the HAI Coordinator on several HAI Projects.</i> 	<p>October 2015</p>

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>3. Integrate laboratory activities with HAI surveillance, prevention, and control efforts.</p> <ul style="list-style-type: none"> 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) ii. A new State Public Health Laboratory opened in August 2015. The Lab will begin providing CRE testing in 2016. 	<p>i. 2016</p>
		<p><i>Other activities or descriptions: Contract with WHONET</i></p> <ul style="list-style-type: none"> iii. <i>Vermont’s MDRO Collaborative has been working with WHONET since 2010. Microbiology data from most VT hospitals is sorted by WHONET software in preparation for sending to NHSN. WHONET software has many underutilized capabilities. Under our contract with WHONET they perform more in-depth analysis of the microbiology data from Vermont Hospital laboratories with a plan to recognize and alert HCF about developing antibiotic resistance in real time.</i> <p><i>During the 3 year contract with WHONET they will report progress to Vermont Department of Health on a regular basis and report findings to Our MDRO Collaborative at the annual meeting.</i></p> <p><i>By the end of the contract we anticipate WHONET software that will provide an “Early Warning System” for new or developing antibiotic resistance in Vermont healthcare facilities.</i></p> <p>By January 2016 WHONET will conduct surveillance of microbiology data for any local emerging antibiotic resistance. By Spring 2018 WHONET will be in use in Vermont healthcare facilities providing early warning of developing and dangerous resistance patterns.</p>	<p>January 2016 – surveillance Spring 2018 – early warning</p>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>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)</p> <ul style="list-style-type: none"> a. Vermont like the rest of the United States has a New QIO for 2014-2019. Vermont QIO Project Coordinators for Hospitals and Long Term Care receive invitations to all MDRO Collaborative functions all over the State. They are welcome and invited to every Cluster Meeting and the HAI Coordinator communicates frequently with the Project Coordinators for Hospital and Long Term Care. They attend as availability allows. The New QIO is just getting started in New England and we see great potential 	

		<p>for collaborative efforts to help prevent transmission of MDROs and development of new resistance.</p> <ul style="list-style-type: none"> i. VHCA and VHHS are both Advisory Council and HAI Group Members. Vermont Department of Health welcomes their input. ii. The HAI Coordinator has done Infection prevention and control “updates” for all the Surveyors annually for the past 2 years. We are sending a surveyor to the APIC Academy for Infection Prevention Training in Sept 2015 and another in 2016 using ELC grant funds. They will in turn assist Vermont Department of Health HAI Program with assessment of infection prevention practices and training to mitigate infection prevention and control gaps found during the assessment process. We have asked for a surveyor to become a member of the HAI Advisory Group before the end of 2015. 	i September 2015-16
		<i>Other activities or descriptions:</i>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>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 electronic laboratory reporting (ELR). Facilitating use of standards-based solutions for external reporting also can strengthen relationships between healthcare facilities and regional nodes of healthcare information, such as Regional Health Information Organizations. (RHIOs) and Health Information Exchanges (HIEs). These relationships, in turn, can yield broader benefits for public health by consolidating electronic reporting through regional nodes.</p> <p>WHONET reports HAI data electronically in CDA format to NHSN.</p>	2016-Request the Ongoing
		<i>Other activities or descriptions:</i>	

2. 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.¹ 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 1):

- 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.

¹ Thacker SB, Berkelman RL. Public health surveillance in the United States. *Epidemiol Rev* 1988;10:164-90.

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		
<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<p>1. Improve HAI outbreak detection and investigation</p> <p>i. Work with partners including CSTE, CDC, state legislatures, and providers across the healthcare continuum to improve outbreak reporting to state health departments</p> <p>ii. Establish protocols and provide training for health department staff to investigate outbreaks, clusters, or unusual cases of HAIs. Protocols are in place. The State Epidemiologist revises these protocols as needed.</p> <p>iii. 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</p> <p>iv. 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)</p> <p>WHONET conducts surveillance of microbiology data for any local emerging antibiotic resistance.</p>	<p>i. Ongoing</p> <p>ii. Ongoing</p> <p>iii. Ongoing</p> <p>iv. January 2016 (See Sec. 1 #3 related to WHONET Contract)</p>		
		<p><i>Other activities or descriptions:</i></p>			
		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>2. Enhance laboratory capacity for state and local detection and response to new and emerging HAI issues. The new Public Health Laboratory will begin Modified Hodge Testing for CRE in 2016.</p>	<p>2016 (See Sec. 1)</p>
		<p><i>Other activities or descriptions:</i></p>			

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>3. Improve communication of HAI outbreaks and infection control breaches</p> <p>i. Develop standard reporting criteria including, number, size, and type of HAI outbreak for health departments and CDC. Standard reporting criteria are in place.</p>	<p>i. Ongoing</p>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>ii. Establish mechanisms or 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). Written outbreak protocols include notification of State survey agency.</p>	<p>ii. Ongoing</p>
		<p><i>Other activities or descriptions:</i></p>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>4. Identify at least 2 priority prevention targets for surveillance in support of the HHS HAI Action Plan</p> <p>i. Central Line-associated Bloodstream Infections (CLABSI)</p>	<p>i. Ongoing since 2010</p>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>ii. <i>Clostridium difficile</i> Infections (CDI) CDI Lab ID Events are reported to NHSN and under consideration for public reporting in VT beginning in 2016 or 2017.</p>	<p>ii. Under discussion for 2016 Advisory Group Meeting</p>
<input type="checkbox"/>	<input type="checkbox"/>	<p>iii. Catheter-associated Urinary Tract Infections (CAUTI) CAUTI surveillance is done by facilities on an individual facility basis and will be discussed with the advisory group. It may be a QIO focus in 2016.</p>	<p>iii. 2016</p>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>iv. Methicillin-resistant Staphylococcus aureus (MRSA) Infections NHSN Lab ID event reporting is done for all acute care facilities on a voluntary basis. Not a reportable condition in Vermont and not mandated by the state of Vermont to be reported publically.</p>	<p>iv. Ongoing</p>

<input checked="" type="checkbox"/>	<input type="checkbox"/>	v. Surgical Site Infections (SSI) including but not limited to: HPRO, KPRO and HYST. NHSN reporting of HYST, HPRO, KPRO is mandated and reported publically on an annual basis.	v. Ongoing since 2010
<input type="checkbox"/>	<input type="checkbox"/>	vi. Ventilator-associated Pneumonia (VAP) is not being considered for public reporting in VT at this time.	vi. N/A
		<i>Other activities or descriptions:</i>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. Adopt national standards for data and technology to track HAIs (e.g., NHSN).	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	i. Develop metrics to measure progress towards national goals (align with targeted state goals). (See Appendix 1).	
		ii. Establish baseline measurements for prevention targets NHSN has been used since it began.	
		<i>Other activities or descriptions:</i>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	6. Develop state surveillance training competencies.	2016-2017
		i. Conduct local training for appropriate use of surveillance systems (e.g., NHSN) including facility and group enrollment, data collection, management, and analysis. Vermont enrolled approximately 27 LTCF in NHSN in 2013-14. When funding was reduced in 2014 we were unable to maintain NHSN enrollment in those facilities. We plan to explore how to re-enroll and maintain HAI reporting to NHSN in LTCF in 2016-2017.	
		<i>Other activities or descriptions:</i>	

<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. Develop tailored reports of data analyses for state or region prepared by state personnel. Reports are done quarterly.	On-going since 2010
		<i>Other activities or descriptions:</i>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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	
		Data has been validated annually since 2011.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	i. Develop a validation plan: Vermont began validation in 2010-11. We now use the CDC/NHSN Validation Toolkit.	i. Ongoing
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ii. Pilot test validation methods in a sample of healthcare facilities: Pilot completed 2011.	ii. Completed
<input checked="" type="checkbox"/>	<input type="checkbox"/>	iii. Modify validation plan and methods in accordance with findings from pilot project: Modifications are completed annually. In 2016 we will validate both CLABSI and SSI data in one annual site visit, not two.	iii. Ongoing
<input checked="" type="checkbox"/>	<input type="checkbox"/>	iv. Implement validation plan and methods in all healthcare facilities participating in HAI surveillance. : Data from all hospitals in Vermont is validated annually.	iv. Ongoing
<input checked="" type="checkbox"/>	<input type="checkbox"/>	v. Analyze and report validation findings: Data are analyzed and reported annually.	v. Ongoing
<input checked="" type="checkbox"/>	<input type="checkbox"/>	vi. Use validation findings to provide operational guidance for healthcare facilities that targets any data shortcomings detected	vi. Ongoing
		<i>Other activities or descriptions:</i>	

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>9. Develop preparedness plans for improved response to HAI</p> <p>i. Define processes and tiered response criteria to handle increased reports of serious infection control breaches (e.g., syringe reuse), suspect cases/clusters, and outbreak.</p> <p>This is under discussion and will be explored with the Advisory Group. We are considering a table-top exercise for a serious infection control breach.</p>	<p>2016</p>
		<p><i>Other activities or descriptions:</i></p>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>10. Collaborate with professional licensing organizations to identify and investigate complaints related to provider infection control practice in non-hospital settings and set standards for continuing education and training.</p> <p>We will explore this suggestion with the HAI Advisory Group.</p>	<p>March 2016</p>
		<p><i>Other activities or descriptions:</i></p>	
<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<p>11. Adopt integration and interoperability standards for HAI information systems and data sources</p> <p>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</p> <p>ii. Promote definitional alignment and data element standardization needed to link HAI data across the nation.</p> <p>Further exploration and discussion with the HAI Advisory Group is needed.</p>	<p>2017</p>
		<p><i>Other activities or descriptions:</i></p>	

<input checked="" type="checkbox"/>	<input type="checkbox"/>	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	On-going since 2011-2012
		<i>Other activities or descriptions:</i>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. Make available risk-adjusted HAI data that enable state agencies to make comparisons between hospitals. Hospital report cards are published annually. They are posted on the Vermont Department of Health website.	On-going
		<i>Other activities or descriptions:</i>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	14. Enhance surveillance and detection of HAIs in nonhospital settings We will revisit re-enrollment of LTCF in NHSN.	2016-2017
		<i>Other activities or descriptions:</i>	

3. 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. Please select areas for development or enhancement of state HAI prevention efforts.

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
☒	☐	<p>1. Implement HICPAC recommendations</p> <p>Develop strategies for implementation of HICPAC recommendations for at least 2 prevention targets specified by the state multidisciplinary group.</p> <ul style="list-style-type: none"> a. Reduce facility-onset <i>Clostridium difficile</i> infections in facility-wide health care. This work is underway as part of the MDRO Collaborative. b. Reduce the incidence of invasive health care-associated methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) infections Bring to the HAI Advisory Group for further input. 	<ul style="list-style-type: none"> a. Ongoing since 2010 b. 2016
		<i>Other activities or descriptions:</i>	
☒	☐	<p>2. Establish prevention working group under the state HAI advisory council to coordinate state HAI collaborative.</p> <ul style="list-style-type: none"> i. Assemble expertise to consult, advice, and coach inpatient healthcare facilities involved in HAI prevention collaborative. <ul style="list-style-type: none"> a. Vermont has functioned with ONE State-wide HAI Prevention Collaborative - the MDRO Prevention Collaborative. We are very focused now on Antibiotic Stewardship to prevent increasing resistance. 	Ongoing since 2009-2010
		<i>Other activities or descriptions:</i>	

<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<p>3. Establish HAI collaboratives with at least 10 hospitals (this may require a multi-state or regional collaborative in low population density regions) Vermont’s MDRO Collaborative includes 17 hospitals – every hospital in Vermont, as well as Dartmouth Hitchcock Medical Center.</p> <ul style="list-style-type: none"> 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 from standardized outcome data to track progress 	<p>Ongoing since 2010</p>
		<p><i>Other activities or descriptions:</i></p>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>4. Develop state HAI prevention training competencies</p> <ul style="list-style-type: none"> 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. Vermont does and will continue to encourage APIC and SHEA Training as well as promote CBIC Certification. We will bring this to the HAI Advisory Group for input during the first half of 2016. 	<p>January – June 2016</p>
		<p><i>Other activities or descriptions:</i></p>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>5. Implement strategies for compliance to promote adherence to HICPAC recommendations</p> <ul style="list-style-type: none"> 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/liaise with regulation and oversight activities such as inpatient or outpatient facility licensing/accrediting bodies and professional licensing organizations to prevent HAIs 	<ul style="list-style-type: none"> i. January - March 2016 ii. January - March 2016

<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<p>iii. Improve regulatory oversight of hospitals, enhance surveyor training and tools, and add sources and uses of infection control data.</p> <p>iv. Consider expanding regulation and oversight activities to currently unregulated settings where healthcare is delivered and work with healthcare partners to establish best practices to ensure adherence</p> <p>These items will be brought to the HAI Advisory Group for input. A state surveyor was added to the HAI Advisory Group in October 2015. The Health Department sent a state surveyor to the APIC Academy Epi 101 course in September 2015 and a second surveyor will attend the APIC Academy Epi 101 course in Spring 2016.</p>	<p>iii. January - March 2016</p> <p>iv. Spring 2016</p>
		<p><i>Other activities or descriptions:</i></p>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>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)</p> <p>i. All 16 of Vermont’s hospitals and one large NH medical center comprise Vermont’s one and only Collaborative, preventing MDROs and encouraging antibiotic stewardship. The Collaborative includes all Vermont Hospitals, and many Long-term care facilities, Visiting Nurses and Adult Day Facilities. We will explore the idea with the HAI Advisory Group of inviting other hospitals in bordering states to participate in our Collaborative.</p>	<p>January – March 2016</p>
		<p><i>Other activities or descriptions:</i></p>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>7. Establish collaborative(s) to prevent HAIs in nonhospital settings (e.g., long term care, dialysis)</p> <p>i. Our HAI Collaborative has included LTCF from the beginning in 2010. For the past 5 years we have been adding other nonhospital settings such as residential care, Home Health Care, and Adult Day Care. We will continue to “grow” Vermont Clusters and provide appropriate infection prevention interventions for various settings.</p>	<p>Ongoing since 2010</p>
		<p><i>Other activities or descriptions:</i></p>	

Evaluation and Communication

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. Please select areas for development or enhancement of state HAI prevention efforts.

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
<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	1. Conduct needs assessment and/or evaluation of the state HAI program to learn how to increase impact <ul style="list-style-type: none"> i. Establish evaluation activity to measure progress toward targets and ii. Establish systems for refining approaches based on data gathered 	2016-2017
		<i>Other activities or descriptions (not required):</i>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. Develop and implement a communication plan about the state’s HAI program and about progress to meet public and private stakeholders needs <ul style="list-style-type: none"> i. Disseminate state priorities for HAI prevention to healthcare organizations, professional provider organizations, governmental agencies, non-profit public health organizations, and the public 	Vermont Department of Health HAI Website http://healthvermont.gov/prevention/hai/index.aspx
		<i>Other activities or descriptions:</i> <ul style="list-style-type: none"> a. We have a communication plan in place but would like to improve our communications. 	

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>3. Provide consumers access to useful healthcare quality measures</p> <p>i. Disseminate HAI data to the public</p>	<p>Hospital Report Cards are published on VDH Website http://healthvermont.gov/hc/hospitalreportcard/index.aspx</p>
		<i>Other activities or descriptions:</i>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>4. Guide patient safety initiatives</p> <p>i. Identify priorities and provide input to partners to help guide patient safety initiatives and research aimed at reducing HAIs</p> <p>a. Priorities need to be identified and support provided at the individual organization level. Vermont Department of Health will provide assistance, if possible, when requested, or if obvious need is identified.</p>	2016-2017
		<i>Other activities or descriptions:</i>	

Healthcare Infection Control and Response (Ebola-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
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<p>1. Create an inventory of all healthcare settings in state. List must include at least one infection control point of contact at the facility</p> <p>2. Identify current regulatory/licensing oversight authorities for each healthcare facility and explore ways to expand oversight</p>	<p>Items 1 and 2- Planning is on-going since July 2015. First report will be submitted on or before December 31, 2015.</p>
		<p><i>Other activities or descriptions:</i></p>	
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<p>3. Assess readiness of Ebola-designated facilities within the state.</p> <p>i. Use CDC readiness assessment tool and determine gaps in infection control</p> <p>a. One VT hospital In process. Assessment, mitigation and follow- up is being done by VDH Office of Public Health Preparedness with assistance from Epi Surveillance and the State Epidemiologist.</p> <p>ii. Address gaps (mitigate gaps) Will assess the best way to mitigate the gaps when we discover what they are.</p> <p>iii. Conduct follow-up assessments- Annual IC assessments are planned.</p>	<p>Planning is on-going since July 2015</p> <p>Assessments will begin in October 2015 with an initial report due to be submitted on or before December 31, 2015</p>
		<p><i>Other activities or descriptions:</i></p>	

<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<p>11. Assess outbreak reporting and response in healthcare facilities</p> <ul style="list-style-type: none"> i. Use standard assessment tool and determine gaps in outbreak reporting and response ii. Address gaps (mitigate gaps) iii. Track HAI outbreak response and outcome 	<p>October 2015</p> <p>This activity is planned and we await further instructions from CDC.</p>
<p><i>Other activities or descriptions:</i></p>			

Table 6: Targeted Healthcare Infection Prevention Programs

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<p>1. Expand infection control assessments</p> <ul style="list-style-type: none"> i. Expand assessments to other additional facilities and other healthcare settings and determine gaps in infection control ii. Address gaps (mitigate gaps) iii. Conduct follow-up assessments 	<p>October 1, 2015</p>
<p><i>Other activities or descriptions:</i></p>			
<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<p>2. Increase infection control competency and practice in all healthcare settings through training</p> <ul style="list-style-type: none"> 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. <ul style="list-style-type: none"> a. VDOH will consider this CDC suggestion very seriously. 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 	<p>2016-17 discuss with the Advisory Group.</p> <p>2016-17 VDOH will seek support</p>

		control, including the incorporation of hands on evaluations and competency assessments of best practices and a system to monitor ongoing compliance and competency.	from the advisory group. State Epi Designees are being trained with the hope that a sustainable program can be developed.
		<i>Other activities or descriptions:</i>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. Enhance surveillance capacity to improve situational awareness, describe emerging threats, and target onsite assessments to implement prevention programs	October 1, 2015 Contract with WHONET pending.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	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	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ii. Work with CDC to guide analytic direction and identify facilities for prioritized assessments/response	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	iii. Improve outbreak reporting capacity by developing an infrastructure that includes clear definitions of infectious threats of epidemiologic importance that are communicated to facilities	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	iv. Implement a response plan to address potential emerging threats identified by using enhanced surveillance	
		<i>Other activities or descriptions:</i>	October 01, 2015-2018
		i. WHONET has been gathering microbiology data from Vermont Hospital laboratories since 2011 and continues today.	
		ii. WHONET and VDH will work with the CDC to guide analytic direction.	
		iii. Outbreak reporting capacity will improve with assistance from WHONET.	
		iv. WHONET will be able to identify emerging resistance and warn facilities of emerging threats in their geographic area of VT.	

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, 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. 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 <i>Clostridium difficile</i> Infections	Hospitalizations with <i>C. difficile</i> per 1000 patient discharges	Hospital discharge data	2008 (proposed 2008, in consultation with states)	At least 30% reduction in hospitalizations with <i>C. difficile</i> per 1000 patient discharges	AHRQ	No
3b. C diff 2 (new)		<i>C. difficile</i> SIR	CDC NHSN MDRO/CDAD Module LabID [‡]	2009-2010	Reduce the facility-wide healthcare facility-onset <i>C. difficile</i> 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*

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

*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

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

† 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
$\text{SIR} = \frac{\text{observed}}{\text{expected}} = \frac{228 + 636}{287 + 853.8} = \frac{864}{1140.8} = 0.76 \quad 95\% \text{CI} = (0.673, 0.849)$						

† SSI (surgical site infection)