West Virginia 2016 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
☒	☐	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 facilities).	Ongoing

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	ii. Include hospital preparedness partners (e.g., hospital/healthcare coalitions funded through the ASPR Hospital Preparedness Program). 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	Achieved in 2014 Ongoing Ongoing
☒	☐	iv. Identify specific HAI prevention targets consistent with HHS priorities	Ongoing
		Other activities or descriptions: HAI Multidisciplinary Advisory Group (HAI MAG) membership is reviewed and updated in collaboration on an annual basis and A list of members for 2015 can be found here: http://www.dhhr.wv.gov/oeps/disease/HAI/Documents/hai-multidisciplinary-group.pdf. Our HAI Multidisciplinary Advisory Group (HAI MAG) includes representatives from the WV Health Care Authority (HCAWV – has authority over HAI reporting), the WV Hospital Association, the Office of Health Facility Licensure and Certification, the Office of Laboratory Services (state PH lab), the Association for Infection Prevention and Epidemiology (APIC) WV chapter, the Health Care Association (LTCF trade organization), the WV Center for Threat Preparedness, a major health insurance provider, local health departments, the West Virginia Medical Institute (Medicare quality improvement organization), pharmacist and ID physicians. The HAI Coordinator regularly attempts to involve new	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		stakeholders in order to have a variety of perspectives represented. Two representatives from the Center for Threat Preparedness joined the HAI MAG in 2014 and the Healthcare System Preparedness Program Director, joined in January 2015. A representative from the Office of Health Facility Licensure and Certification has been an HAI MAG member since its formation in 2009. The Hospital Association and WV Medical Institute both have collaboratives focused on antibiotic stewardship and share updates at HAI MAG meetings. The HAI Coordinator also provides updates on ELC funded Get Smart activities, which are focused on outpatient settings. The HAI MAG provided a great deal of input on the language that allowed DIDE to have access to hospital NHSN data through WVHCA and we will discuss assessing whether or not WV hospitals are meeting HHS targets at the next HAI meeting.	
☒	☐	2. Establish an HAI surveillance prevention and control program i. Designate a State HAI Prevention Coordinator	Achieved
☒	☐	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)	Achieved/Ongoing
		Other activities or descriptions: The current state HAI Coordinator, Carrie Thomas, was hired in 2013 to replace the former HAI Coordinator, who was in the position from 2010 – 2012. She is an FTE dedicated to overseeing HAI activities.	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☐	☒	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)	Ongoing
		Other activities or descriptions: The Office of Laboratory Services can test a variety of pathogens from healthcare associated outbreaks, including flu and other respiratory viruses, GI illness, including norovirus, and can perform Diversilab typing for a variety of organisms, including select MDROs. While we do not have the capacity to test all CRE isolates state-wide, we are applying for CDC funding through the 2016-2017 ELC funding cycle to confirm antibiotic resistance and identify mechanisms of resistance..	
☒	☐	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)	Ongoing
		Other activities or descriptions: Membership is reviewed and updated in collaboration with the HAI MAG on an annual basis and the current membership list is posted at www.dide.wv.gov. Our HAI Multidisciplinary Advisory Group (HAI MAG) includes representatives from the WV Health Care Authority (HCAWV – has authority over HAI reporting), the WV Hospital Association, the Office of Health Facility Licensure and	Ongoing

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Certification, the Office of Laboratory Services (state PH lab), the APIC-WV chapter, the Health Care Association (LTCF trade organization), the WV Center for Threat Preparedness, a major health insurance provider, local health departments, the West Virginia Medical Institute (Medicare quality improvement organization), pharmacist and ID physicians. The HAI Coordinator regularly attempts to involve new stakeholders in order to have a variety of perspectives represented. A list of members for 2016 can be found here: http://www.dhhr.wv.gov/oeps/disease/HAI/Pages/default.aspx.	
☐	☐	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.	
		Other activities or descriptions: West Virginia is in the process of bringing hospital laboratories onboard for ELR of conditions defined in the Reportable Disease Rule (64CSR7 found here: http://apps.sos.wv.gov/adlaw/csr/readfile.aspx?DocId=25071&Format=PDF).	

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
		1. Improve HAI outbreak detection and investigation	
☒	☐	i. Work with partners including CSTE, CDC, state legislatures, and providers across the healthcare continuum to improve outbreak reporting to state health departments	Ongoing
☒	☐	ii. Establish protocols and provide training for health department staff to investigate outbreaks, clusters, or unusual cases of HAIs.	Ongoing
☒	☐	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	Ongoing
☒	☐	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)	Ongoing
		Other activities or descriptions: The Division of Infectious Disease Epidemiology (DIDE), Regional Epidemiologists and Local Health Departments (LHDs) constantly work to improve outbreak reporting, including healthcare associated infections outbreaks (HAOs). Outbreak toolkits and our HAO Investigation/Notification Protocol can be found on the DIDE website at http://www.dhhr.wv.gov/oeps/disease/ob/Pages/OutbreakToolkits.aspx and http://www.dhhr.wv.gov/oeps/disease/hai/documents/hai-protocol.pdf, respectively.	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		The WV Rule related to reporting and confidentiality (64CSR7) can be found here: http://apps.sos.wv.gov/adlaw/csr/readfile.aspx?DocId=25071&Format=PDF. The rule was clarified in 2013 to include reporting from a variety of congregate settings, including healthcare facilities. Information about outbreak reporting and confidentiality can be found in Section 7-7 (pg 21-22). The 2013 revisions also included an addition related to HAI reporting and confidentiality, which can be found in Section 7-9 (pg 23). DIDE and the HAI MAG constantly looks for ways to improve overall use of surveillance data to identify and prevent HAI outbreaks or transmission in HC settings. DIDE has recently been involved in two major investigations related unsafe injection practices and other infection control breaches with potential for hepatitis transmission and has increased efforts to identify and respond to these situations, as well as other types HAOs. DIDE regularly offers annual trainings; in 2015 DIDE conducted regional Ebola trainings; the annual WV Public Health Symposium includes a "Best Outbreak" competition where each of the six Regional Epidemiologists presents details of their most interesting outbreak from the past year, many of which are HAOs.	
☒	☐	2. Enhance laboratory capacity for state and local detection and response to new and emerging HAI issues.	Ongoing
		Other activities or descriptions: In recent years, the Office of Laboratory Services (OLS) has acquired bioMerieux Diversilab equipment for molecular typing for strain identification to assist with MDRO outbreak investigation. OLS has also been attempting to obtain bioMerieux Vitek2 equipment for susceptibility testing for MDROs, but has run into	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		purchasing issues. OLS is an LRN Reference Laboratory and maintains capacity to test for emerging infectious diseases, including Ebola, MERS-CoV and influenza AH5, as testing methods become available. OLS develops & validates molecular (PCR) testing methods, provides sentinel laboratory training and is registered with the CDC Federal Select Agent Program. OLS has also acquired capacity to test for viral respiratory pathogens with FilmArray technology, which is used in outbreak investigations.	
☒ ☒	☐ ☐	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 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)	Ongoing Achieved
		Other activities or descriptions: DIDE's HAO Investigation/Reporting Protocol can be found here: http://www.dhhr.wv.gov/oeps/disease/HAI/documents/hai-protocol.pdf. In collaboration with Regional Epis and the LHDs, DIDE creates written reports for HAOs, including recommendations, which are shared with the facility involved in the outbreak and other stakeholders involved in the investigation. An outbreak update is a standard agenda item at the HAI MAG meetings and at APIC-WV chapter meetings, which the HAI Coordinator attends regularly. DIDE also produces monthly and yearly outbreak reports, which can be found here:	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		http://www.dhhr.wv.gov/oeps/disease/ob/Pages/default.aspx	
☒ ☒ ☒ ☒ ☒ ☐	☐ ☐ ☐ ☐ ☐ ☐	4. Identify at least 2 priority prevention targets for surveillance in support of the HHS HAI Action Plan 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)	Ongoing
		Other activities or descriptions: West Virginia law requires that hospitals submit healthcare associated infections to the West Virginia Health Care Authority (HCAWV). The data to be submitted are determined by the West Virginia HAI Infection Control Advisory Panel. Under W. Va. Code §16-5F-1, the West Virginia HCA can collect data and make this data available to the public in a format to be determined by the Infection Control Advisory Panel (ICAP). Details on the Healthcare-Associated Infections Program can be found here: http://www.hca.wv.gov/infectioncontrolpanel/Pages/default.aspx. Currently, HCAWV and the HAI Infection Control Advisory Panel require reporting of CAUTI from acute and critical access hospitals and CLABSI, SSI from colon and abdominal hysterectomy surgical procedures, MRSA bacteremia LabID events and C. difficile LabID events from acute care hospitals to NHSN. Data collection has also been implemented for influenza immunization of healthcare workers in all hospitals in West Virginia since 2009. The 2015, as well as past,	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		WV HAI Reporting Guide can be found here: http://www.hca.wv.gov/infectioncontrolpanel/Pages/HAI-Reporting-Guide.aspx The WV Hospital Association and/or the WV Medical Institute host prevention collaboratives for a variety of HAIs, including CLABSI, CAUTI, SSI, CDI, VAE, long term care and antibiotic stewardship. These organizations provide updates at HAI MAG meetings and it is the general consensus of the HAI MAG that there is no need for state-sponsored prevention collaboratives at this time.	
☒ ☒	☐ ☐	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). (See Appendix 1). ii. Establish baseline measurements for prevention targets	Ongoing Ongoing
		Other activities or descriptions: West Virginia uses the National Healthcare Safety Network (NHSN) for tracking HAIs. Baseline data are available and are included in the HCAWV HAI Annual Reports posted on http://www.hca.wv.gov/infectioncontrolpanel/annualrp/Pages/default.aspx.	
☒	☐	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	Ongoing

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Other activities or descriptions: HCAWV works with individual facilities on an as needed basis to provide technical assistance for NHSN reporting. They refer facilities to NHSN online trainings for training as a reporting facility since they do not have access to the NHSN hospital modules for entering the hospital's data.	
☒	☐	7. Develop tailored reports of data analyses for state or region prepared by state personnel	Ongoing
		Other activities or descriptions: HCAWV publishes annual reports for hospital HAI reporting, which can be found here: http://www.hca.wv.gov/infectioncontrolpanel/annualrp/Pages/default.aspx. The report is also distributed to the WV legislature and hospitals.	
☐ ☐ ☐ ☐ ☐ ☐ ☐	☒ ☐ ☐ ☐ ☐ ☐ ☐	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 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	TBD

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Other activities or descriptions: WV hospitals will be included in an ongoing national effort by CMS to perform validation in a randomly selected 400 hospitals; an addt'l 200 hospitals will be selected for targeting criteria such as for those that have failed previous validations, haven't ever been selected, or are late in submitting. 12 cases per quarter will be reviewed: 2 SSI; 5 MRSA or 5 CLABSI; or 5 CDI or 5 CAUTI.	
☒	☐	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	Ongoing
		Other activities or descriptions: Since 2009, West Virginia investigated five outbreaks in ambulatory care settings, including the national fungal meningitis outbreak. All outbreaks required notification of patients; four for possible exposure to blood-borne pathogens and one for contaminated medication (fungal meningitis). As a result, West Virginia has accumulated examples of letters and websites used for patient notifications in a shared directory. In addition, West Virginia has adopted CDC guidelines for patient notification.	
☒	☐	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.	Ongoing
		Other activities or descriptions: **T**he HAI Coordinator discussed management of infection control breaches with the West Virginia medical, osteopathic, dental and	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		nursing Boards during 2011. A written memorandum documented the agreement is posted to www.dide.wv.gov. The WV Rule related to reporting and confidentiality (64CSR7) can be found here: http://apps.sos.wv.gov/adlaw/csr/readfile.aspx?DocId=25071&Format=PDF. Outbreaks are immediately to local health departments and DIDE encourages reporting of suspected outbreaks in outbreak-related trainings (Section 7-7). The conditions under which DIDE will report ongoing concerns to regulatory agencies are outlined in Section 7-7.8). OHFLAC occasionally consults DIDE on infection control practices in LTCFs. WV has been working towards introducing legislation mandating infection control training for all healthcare facilities performing invasive procedures for the last couple years. The HAI MAG will explore options for legislative sponsors for the 2017 legislative session. The APIC-WV chapter has developed educational resources for these facilities on a variety of topics, including epidemiologic principles of infectious disease, principles and practice of asepsis, sterilization, disinfection and sanitation, standard and transmission-based precautions, safe injection practices, engineering controls and techniques to reduce the risk of sharp injuries, disposal of sharps and hand hygiene to meet the training requirements outlined in the proposed legislation. DIDE and HAI MAG members will have the opportunity to provide feedback on this training material and methods for implementation, which is being debuted at a regional long term care training sponsored by the Kanawha-Charleston Health Department in the summer of 2016.	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☐ ☐	☐ ☐	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.	TBD
		Other activities or descriptions: At this point, there is inadequate staffing to plan for this item. This important part of surveillance will be addressed as West Virginia infrastructure improves. It should be possible to start this process with the assistance of the Epidemiologist I being hired as part of the ELC Ebola supplemental funding. DIDE will be able to use NHSN data from dialysis centers once they receive access (currently working with CDC on access).	
☐	☐	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	TBD
		Other activities or descriptions: West Virginia is in the process of bringing hospital laboratories onboard for ELR of conditions defined in the Reportable Disease Rule (64CSR7 found here: http://apps.sos.wv.gov/adlaw/csr/readfile.aspx?DocId=25071&Forma	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		t=PDF). HCAWV provides annual HAI reports for the public, which can be found here: http://www.hca.wv.gov/infectioncontrolpanel/annualrp/Pages/default.aspx	
☒	☐	13. Make available risk-adjusted HAI data that enable state agencies to make comparisons between hospitals.	Ongoing
		Other activities or descriptions: See Table 4, Items 2 & 3	
☒	☐	14. Enhance surveillance and detection of HAIs in nonhospital settings	Ongoing
		Other activities or descriptions: The revised Reportable Disease Rule (64CSR7) grants DIDE access to NHSN data reported from non-hospital settings and the HAI Coordinator is working with CDC to gain access to this data (Section 7-9).	

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
☒	☐	1. Implement HICPAC recommendations i. Develop strategies for implementation of HICPAC recommendations for at least 2 prevention targets specified by the state multidisciplinary group.	Ongoing
		Other activities or descriptions: A list of hospitals that committed to implement SHEA/IDSA CLABSI prevention recommendations can be found here: http://www.dhhr.wv.gov/oeps/disease/AtoZ/Pages/CLABSI.aspx	
☐	☒	2. Establish prevention working group under the state HAI advisory council to coordinate state HAI collaboratives i. Assemble expertise to consult, advise, and coach inpatient healthcare facilities involved in HAI prevention collaboratives	TBD
		Other activities or descriptions: The WV Hospital Association and WV Medical Institute, which host the majority of HAI prevention collaboratives in the state, both have representatives on the HAI MAG. The need for a formal work group under the HAI MAG will be discussed at the next HAI MAG meeting.	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒ ☒ ☒	☐ ☐ ☐	3. Establish HAI collaboratives with at least 10 hospitals (this may require a multi-state or regional collaborative in low population density regions) 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	Ongoing
		Other activities or descriptions: WVMI/Quality Insights has 25 recruited hospitals signed up for our HAI learning and action network (LAN). Each hospital chose their focus for quality improvement based on NHSN data (CLABSI, CAUTI, and/or CDI).	
☐	☒	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	TBD
		Other activities or descriptions: WV has been working towards introducing legislation mandating infection control training for all healthcare facilities performing invasive procedures for the last couple years. The HAI MAG will explore options for legislative sponsors for the 2017 legislative session. The APIC-WV chapter has developed educational resources for these facilities on a variety of topics, including epidemiologic principles of infectious disease, principles and	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		practice of asepsis, sterilization, disinfection and sanitation, standard and transmission-based precautions, safe injection practices, engineering controls and techniques to reduce the risk of sharp injuries, disposal of sharps and hand hygiene to meet the training requirements outlined in the proposed legislation. DIDE and HAI MAG members will have the opportunity to provide feedback on this training material and methods for implementation, , which is being debuted at a regional long term care training sponsored by the Kanawha-Charleston Health Department in the summer of 2016.	
☐ ☐ ☐ ☐	☒ ☒ ☒ ☒	5. Implement strategies for compliance to promote adherence to HICPAC recommendations 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 iii. Improve regulatory oversight of hospitals, enhance surveyor training and tools, and add sources and uses of infection control data 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	TBD
		Other activities or descriptions: Other than the proposed legislation from Table 3, Item 4, there are no current plans to address this item because WV NHSN rates are generally	

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		lower than national rates. This issue will be revisited in the future.	
☒	☐	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)	
		Other activities or descriptions: WVMI/Quality Insights has 25 recruited hospitals signed up for our HAI learning and action network (LAN). Each hospital chose their focus for quality improvement based on NHSN data (CLABSI, CAUTI, and/or CDI). As a QIN-QIO, WVMI/Quality Insights covers five states so in total they have a regional collaborative with 117 recruited participants. Their regional network includes WV, DE, PA, LA, NJ.	
☐	☐	7. Establish collaborative(s) to prevent HAIs in nonhospital settings (e.g., long term care, dialysis)	
		Other activities or descriptions: West Virginia has insufficient resources to plan towards this item at this time.	

4. 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
☒ ☒	☐ ☐	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 toward targets and ii. Establish systems for refining approaches based on data gathered	Ongoing
		Other activities or descriptions (not required): The HAI MAG continually assesses needs based on outbreak data and reports generated by the HCAWV. When the current HAI Cordinator was hired in 2013, she conducted an assessment of the HAI MAG and what members felt they needed from the state HAI program, which included the state HAI program providing education and resources for HAI prevention. The state currently provides education and resources to healthcare facilities during trainings, webinars and outbreak investigations. Another finding from the evaluation was the need for education and training for outpatients settings, which DIDE does not have the infrastructure/resources for at this time.	
☒	☐	2. Develop and implement a communication plan about the state's HAI program and about progress to meet public and private stakeholders needs i. Disseminate state priorities for HAI prevention	Ongoing

		to healthcare organizations, professional provider organizations, governmental agencies, non-profit public health organizations, and the public	
		Other activities or descriptions: The HAI coordinator will prepare an executive summary of this plan for distribution to APIC-WV, WV Hospital Association, WV Healthcare Association, Office of Healthcare Facility Licensure and Certification (OHFLAC), licensing boards and professional organizations and other HAI MAG stakeholders. This HAI plan and the executive summary will be posted at www.dide.wv.gov. The HAI coordinator attends quarterly APIC-WV meetings and shares information on the plan, upcoming trainings and other activities, as well as regular outbreak updates. As required by law, WV Health Care Authority will update the legislature on the status of public reporting of HAI by January 15, annually. The report is posted at http://www.hca.wv.gov/infectioncontrolpanel/annualrp/Pages/default.aspx.	
☒	☐	3. Provide consumers access to useful healthcare quality measures i. Disseminate HAI data to the public	Ongoing
		Other activities or descriptions: Currently, the HCAWV makes available the HAI Annual Report to the public via the website http://www.hca.wv.gov/infectioncontrolpanel/annualrp/Pages/default.aspx. And the HAI Coordinator posts the annual State HAI Progress Reports generated by CDC on the DIDE website and distributes that report via email to the HAI MAG, infection preventionsists and LHDs statewide.	

☒	☐	4. Guide patient safety initiatives i. Identify priorities and provide input to partners to help guide patient safety initiatives and research aimed at reducing HAIs	Ongoing
		Other activities or descriptions: The HAI MAG and ICAP regularly discusses the needs of the state based on outbreak data from DIDE and HAI data from the HCAWV so partners can target prevention initiatives accordingly.	

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
☐ ☐	☒ ☒	1. Create an inventory of all healthcare settings in state. List must include at least one infection control point of contact at the facility 2. Identify current regulatory/licensing oversight authorities for each healthcare facility and explore ways to expand oversight	June 30, 2016
		Other activities or descriptions: The Infection Control Assessment and Response (ICAR) Epidemiologist	

		was hired March 1, 2016, has developed an Excel database of appropriate emergency contacts and compiled lists from DIDE and OHFLAC of administrator contacts for long term care facilities, dialysis clinics and ambulatory surgery centers and administrative and Infection Preventionist contacts for hospitals. He will add relevant HAI data once granted access to NHSN.	
☒ ☐ ☐	☐ ☒ ☒	3. Assess readiness of Ebola-designated facilities within the state i. Use CDC readiness assessment tool and determine gaps in infection control ii. Address gaps (mitigate gaps) iii. Conduct follow-up assessments	Ongoing December 8, 2015 June 30, 2016 June 30, 2016
		Other activities or descriptions: CDC assessed WV's single Ebola Treatment facility in November of 2014. DIDE plans to assess WV's Ebola Assessment facility during a CDC ERA site visit on December 7-9, 2015. DIDE will work with CDC and the facility to address any gaps that may be identified and DIDE will conduct a follow-up assessment in June 2016.	
☐ ☐ ☐	☒ ☒ ☒	4. Assess outbreak reporting and response in healthcare facilities 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	March 31, 2018
		Other activities or descriptions: DIDE plans to assess outbreak reporting and response during the ICAR project where all hospitals, dialysis centers and ambulatory surgery centers, as well as select LTCFs, are assessed using the appropriate CDC-designed infection control assessment tools. DIDE is currently in the process of hiring a Project Coordinator and three field staff to conduct these assessments.	

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 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	March 31, 2018
		Other activities or descriptions: Through the ICAR project, all hospitals, dialysis centers and ambulatory surgery centers, as well as select LTCFs, will be assessed using the appropriate CDC-designed infection control assessment tools. DIDE is currently in the process of hiring a Project Coordinator and three field staff to conduct these assessments.	
☐ ☐	☒ ☒	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. 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,	TBD

		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: WV has been working towards introducing legislation mandating infection control training for all healthcare facilities performing invasive procedures for the last couple years. The HAI MAG is exploring options for legislative sponsors for the 2016 legislative session. The APIC-WV chapter has developed educational resources for these facilities on a variety of topics, including epidemiologic principles of infectious disease, principles and practice of asepsis, sterilization, disinfection and sanitation, standard and transmission-based precautions, safe injection practices, engineering controls and techniques to reduce the risk of sharp injuries, disposal of sharps and hand hygiene to meet the training requirements outlined in the proposed legislation. DIDE and HAI MAG members will have the opportunity to provide feedback on this training material and methods for implementation, which will be debuted at a regional long term care training sponsored by Kanawha-Charleston Health Department in the summer of 2016.	
☐ ☐ ☐	☒ ☒ ☒	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	TBD

☐	☒	iv. Implement a response plan to address potential emerging threats identified by using enhanced surveillance	
		Other activities or descriptions: The ICAR Epidemiologist was hired March 1, 2016 and will begin running TAP reports and look at other relevant data, including outbreak logs, to assist with prioritizing facilities for assessment. This information will be provided to the field staff so they can share it with the facilities during ICAR assessments. The WV Center for Threat Preparedness is currently working on an emerging infectious disease preparedness plan.	

Appendix 1

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

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

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

Stakeholder feedback and revisions to the original draft Metrics

Comments on the initial draft metrics published as part of the HHS Action Plan in January 2009 were reviewed and incorporated into revised metrics. While comments ranged from high level strategic observations to technical measurement details, 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 *Clostridium difficile* Infections	Hospitalizations with *C. difficile* per 1000 patient discharges	Hospital discharge data	2008 (proposed 2008, in consultation with states)	At least 30% reduction in hospitalizations with *C. difficile* per 1000 patient discharges	AHRQ	No
3b. C diff 2 (new)		*C. difficile* SIR	CDC NHSN MDRO/CDAD Module LabID‡	2009-2010	Reduce the facility-wide healthcare facility-onset *C. difficile* LabID event SIR by at least 30% from baseline or to zero	CDC	No
4. CAUTI 2	# of symptomatic UTI per 1,000 urinary catheter days	CAUTI SIR	CDC NHSN Device-Associated Module	2009 for ICUs and other locations 2009 for other hospital units (proposed 2009, in consultation with states)	Reduce the CAUTI SIR by at least 25% from baseline or to zero in ICU and other locations	CDC	Yes*

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

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

95%CI = (0.628,0.989)

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

In the table above, there are two strata to illustrate risk-adjustment by location type for which national data exist from NHSN. The SIR calculation is based on dividing the total number of observed CLABSI events by an "expected" number using the CLABSI rates from the standard population. This "expected" number is calculated by multiplying the national CLABSI rate from the standard population by the observed number of central line-days for each stratum

which can also be understood as a prediction or projection. If the observed data represented a follow-up period such as 2009 one would state that an SIR of 0.79 implies that there was a 21% reduction in CLABSIs overall for the nation, region or facility.

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

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

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

Risk Group Stratifiers		**Observed SSI Rates**			**NHSN SSI Rates for 2008 (Standard Population)**		
Procedure Code	**Risk Index Category**	**#SSI†**	**#procedures**	**SSI rate***	**#SSI†**	**#procedures**	**SSI rate***
CBGB	1	315	12,600	2.5	2100	70,000	3.0
CBGB	2,3	210	7000	3.0	1000	20,000	5.0
HPRO	1	111	7400	1.5	1020	60,000	1.7

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

95%CI = (0.649,0.851)

† SSI, surgical site infection
* defined as the number of deep incision or organ space SSIs per 100 procedures

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

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

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

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

† SSI (surgical site infection)