

Tennessee’s Plan for Prevention of Healthcare Associated Infections [HAI]: A Framework

The Tennessee Department of Health has used the template provided by CDC to prepare this framework for HAI prevention activities.

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>1. Establish statewide HAI prevention leadership through the formation of multidisciplinary group or state HAI advisory council</p> <p style="padding-left: 40px;">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).</p> <p>We have convened a multidisciplinary advisory group [MDAG] for prevention of HAIs three times per year since October 2009. Membership of the MDAG was initially drawn from two existing groups: the HAI taskforce and the Tennessee Center for Patient Safety [TCPS] advisory group. The group is chaired by Dr. Marion Kainer (TDH) and Dr. Tom Talbot (Vanderbilt University Medical Center). Membership currently includes: infection preventionists (representatives from all 4 APIC chapters and large, small, academic, non-academic, rural, and urban hospitals), healthcare epidemiologists, infectious diseases physicians, quality improvement staff, hospital leadership (chief executive officers, chief medical officer, a chief</p>	<p>Ongoing</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

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>hospital information officer, and chief nursing), and consumers, as well as representatives from THA (Tennessee Hospital Association), QSource (Quality Innovation Network [QIN]), the Tennessee Pharmacists Association, long-term acute care [LTAC] facilities, a clinical microbiology laboratory, End Stage Renal Disease Network 8 (representing dialysis facilities), and the Tennessee Healthcare Association (representing nursing homes), among others.</p> <p style="text-align: center;">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.</p> <p>Over the past year, we have expanded our MDAG membership to include hospital preparedness partners, including healthcare coalitions, regional hospital coordinators and TDH emergency preparedness staff, including the hospital preparedness program coordinator.</p>	<p>Ongoing</p>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p style="text-align: center;">iii. Engage HAI advisory committee in potential roles and activities to improve antibiotic use in the state (antibiotic stewardship)</p> <p>Our MDAG is engaged in antimicrobial stewardship and resistance topics. The antimicrobial stewardship (AS) steering committee is a subgroup of our MDAG; we are in the process of reviewing membership of the AS steering committee and identifying new members as needed. For instance, THA has had a longstanding pharmacy coalition. After strong encouragement by TDH, this pharmacy coalition has just formed a subgroup on antimicrobial stewardship; we plan to invite the chair of that subgroup to the AS steering committee. Similarly we will review membership of the workgroup on Carbapenem resistant Enterobacteriaceae</p>	<p>Ongoing</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

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>(CRE).</p> <p>We have already determined that we will need to add representation from our state public health laboratory (SPHL) to the MDAG and the CRE working group. We also plan to encourage better attendance of the MDAG by clinical microbiologist members.</p> <p>If we choose to convene a separate Antimicrobial Resistance Taskforce, this will include partners from the MDAG and smaller working groups, to include, at a minimum, THA, THCA, the Tennessee Pharmacists Association, Chief Medical Officer Society, Qsource, the Tennessee State Laboratory, Dialysis Network 8, academic institutions, and individual facilities (acute care hospitals, long-term acute care hospitals, and long-term care facilities). This subcommittee would solely focus on tasks for Tennessee's AR prevention program and would meet about 3 times per year and report back to the MDAG.</p> <p style="padding-left: 40px;">iv. Engage HAI advisory committee in activities to increase health department's access to data and subsequently use those data in prevention efforts</p> <p>Our MDAG makes a formal recommendation to the Tennessee Department of Health each year to set the state HAI reporting requirements. Each meeting we evaluate proposed/upcoming CMS reporting requirements to ensure our facilities will be prepared for new requirements. MDAG recommendations generally closely mirror the CMS reporting requirements.</p>	Ongoing
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>v. Identify specific HAI prevention targets consistent with HHS priorities</p>	Ongoing

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation														
		<p>Current Tennessee HAI Reporting Requirements are as follows:</p> <p style="text-align: center;"><u>2015 TN HAI Reporting Requirements</u></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%; text-align: center;">HAI</th> <th style="text-align: center;">Locations/Procedures</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><u>CLABSI</u></td> <td>All adult, pediatric, and neonatal ICUs in acute care hospitals* All adult and pediatric medical, surgical, and medical/surgical wards in acute care hospitals* All long-term acute care facilities</td> </tr> <tr> <td style="text-align: center;"><u>CAUTI</u></td> <td>All adult, pediatric, and neonatal ICUs in acute care hospitals* All adult and pediatric medical, surgical, and medical/surgical wards in acute care hospitals* All long-term acute care facilities All inpatient rehabilitation facilities</td> </tr> <tr> <td style="text-align: center;"><u>SSI</u></td> <td>CBGB/C, COLO, HYST</td> </tr> <tr> <td style="text-align: center;"><u>MRSA Bacteremia and CDI LabID Events</u></td> <td>FacWideIN, ED and Observation locations in acute care hospitals* All long-term acute care facilities All inpatient rehabilitation facilities</td> </tr> <tr> <td style="text-align: center;"><u>Dialysis Events</u></td> <td>All outpatient dialysis facilities/settings</td> </tr> <tr> <td style="text-align: center;"><u>Healthcare Personnel Influenza Vaccination</u></td> <td>All acute care hospitals* All long-term acute care facilities All inpatient rehabilitation facilities All ambulatory surgery centers</td> </tr> </tbody> </table> <p>*Excluding critical access hospitals</p> <p>Our state reporting requirements, guided by data and MDAG recommendations,</p>	HAI	Locations/Procedures	<u>CLABSI</u>	All adult, pediatric, and neonatal ICUs in acute care hospitals* All adult and pediatric medical, surgical, and medical/surgical wards in acute care hospitals* All long-term acute care facilities	<u>CAUTI</u>	All adult, pediatric, and neonatal ICUs in acute care hospitals* All adult and pediatric medical, surgical, and medical/surgical wards in acute care hospitals* All long-term acute care facilities All inpatient rehabilitation facilities	<u>SSI</u>	CBGB/C, COLO, HYST	<u>MRSA Bacteremia and CDI LabID Events</u>	FacWideIN, ED and Observation locations in acute care hospitals* All long-term acute care facilities All inpatient rehabilitation facilities	<u>Dialysis Events</u>	All outpatient dialysis facilities/settings	<u>Healthcare Personnel Influenza Vaccination</u>	All acute care hospitals* All long-term acute care facilities All inpatient rehabilitation facilities All ambulatory surgery centers	
HAI	Locations/Procedures																
<u>CLABSI</u>	All adult, pediatric, and neonatal ICUs in acute care hospitals* All adult and pediatric medical, surgical, and medical/surgical wards in acute care hospitals* All long-term acute care facilities																
<u>CAUTI</u>	All adult, pediatric, and neonatal ICUs in acute care hospitals* All adult and pediatric medical, surgical, and medical/surgical wards in acute care hospitals* All long-term acute care facilities All inpatient rehabilitation facilities																
<u>SSI</u>	CBGB/C, COLO, HYST																
<u>MRSA Bacteremia and CDI LabID Events</u>	FacWideIN, ED and Observation locations in acute care hospitals* All long-term acute care facilities All inpatient rehabilitation facilities																
<u>Dialysis Events</u>	All outpatient dialysis facilities/settings																
<u>Healthcare Personnel Influenza Vaccination</u>	All acute care hospitals* All long-term acute care facilities All inpatient rehabilitation facilities All ambulatory surgery centers																

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		currently closely mirror requirements set forth by the Centers for Medicare and Medicaid Services (CMS) and seek to be data-driven while minimizing reporting burden on frontline staff.	
		<i>Other activities or descriptions:</i>	
☒	☐	2. Establish an HAI surveillance prevention and control program i. Designate a State HAI Prevention Coordinator Tennessee’s current state HAI coordinator has been an Epidemiologist with the TDH HAI program since May 2013.	Ongoing
☒	☐	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 TDH HAI program consists of staff funded through several cooperative agreements with CDC, including the Epidemiology and Laboratory Capacity, Epidemiology and Laboratory Capacity – Ebola, and Emerging Infections Programs. TDH HAI staff includes epidemiologists and public health nurse consultants with training and experience in healthcare epidemiology and infection control across the healthcare spectrum. Members of the HAI team regularly attend webinars and trainings related to infection control, as well as attend and present at national conferences, including APIC, SHEA, and CSTE. In addition, several team members are preparing for CIC certification.	Ongoing
		<i>Other activities or descriptions:</i>	

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>3. Integrate laboratory activities with HAI surveillance, prevention, and control efforts.</p> <p style="padding-left: 40px;">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)</p> <p>Tennessee’s State Public Health Lab (SPHL) has completed validation of the CarbaNP (and replaced the MHT) and currently performs PCR For KPC and NDM for CRE. The SPHL is validating PCR testing for OXA-48. We also plan to perform other resistance mechanism testing and will explore whole genome sequencing. Tennessee has an Illumina MiSeq instrument to help with any overflow of next generation sequencing surveillance specimens, PulseNet Area Lab needs or outbreak samples (e.g., CRE or other Multidrug resistant organisms). TDH strives to be on the cutting edge regarding laboratory capacity and depends heavily on CDC/ ELC funding support for personnel, equipment, reagents, and training. We anticipate working collaboratively with CDC and other partners (academia) to enhance our bioinformatics capacity and synergistically identify analytical methods for who genome sequencing data. The SPHL has the capacity to perform PFGE on isolates, following approval from the HAI team.</p> <p>The Surveillance Systems and Informatics Program within TDH has been working closely with the SPHL to implement ELR. So far, this ELR has been implemented for the messaging of MERS-CoV results.</p>	<p style="text-align: center;">Jan 31, 2016</p> <p style="text-align: center;">March 31, 2017</p>
		<i>Other activities or descriptions:</i>	
<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,</p>	October 1, 2016

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		<p>state licensing boards)</p> <p>The communicable disease section within the TDH already has a relationship with the state licensing boards, and state survey agencies. The regulatory part of the Department of Health (the Bureau of Health Services Licensure and Regulation] is organizationally distinct from the Bureau of Health Services, the bureau within which Communicable and Environmental Diseases and Emergency Preparedness Division (including the Healthcare-associated infections and Antimicrobial Resistance Program) is located. They are also physically separated. However, we have had opportunities to work together on legislation (mandatory public reporting and MRSA), regulations (e.g., influenza declination, central line bundle) and have served together on committees (e.g., Tennessee’s Improving Patient Safety, MDAG). Recently, we have built a strong relationship with the Tennessee Board of Pharmacy in response to outbreaks associated with compounding pharmacies. However, there still is opportunity to improve coordination.</p>	
		<p><i>Other activities or descriptions:</i></p>	
<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</p>	<p>Ongoing</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		<p>broader benefits for public health by consolidating electronic reporting through regional nodes.</p> <p>The Healthcare-Associated Infections team has strong, long-standing relationships with the Surveillance Systems and Informatics Program, led by an HL7-co-Chair. Program staff are certified in HL7 messages and are heavily involved in the on-boarding process of laboratories for electronic laboratory result reporting (ELR). To move to ELR production status a laboratory has to completely comply with HL7 implementation guides. Currently, several commercial laboratories, and a 7-hospital healthcare system report reportable conditions to TDH through ELR. The surveillance systems and informatics team is working closely with many other hospitals and healthcare systems across the state to implement ELR.</p>	
		<p><i>Other activities or descriptions:</i></p>	

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.

State Plan for Prevention of Healthcare Associated Infections: Tennessee

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 type="checkbox"/>	<input checked="" type="checkbox"/>	<p>1. Improve HAI outbreak detection and investigation</p> <p style="padding-left: 40px;">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>Current capacity for detecting, reporting, and responding to outbreaks at the individual facilities, including ACH, LTACs, OPHD, ASC, LTCFs, IRFs, etc... will be assessed through a variety of mechanisms including in-person and/or phone surveys with healthcare facility personnel using CDC's standardized assessment tool. We will utilize a 3 level scoring system to characterize capacities for HAI outbreak detection, reporting, and investigation at each facility. We will address identified gaps. Shareable slide sets will be created with input from CDC for use for different healthcare facilities/practitioners.</p>	March 1, 2016
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p style="padding-left: 40px;">ii. Establish protocols and provide training for health department staff to investigate outbreaks, clusters, or unusual cases of HAIs.</p> <p>Training will be provided to healthcare facility and public health staff and include elements of outbreak detection, response including defining reportable events, communication protocol, and methods of reporting suspected clusters/outbreaks to simplify and streamline communication and foster trusting relationships.</p>	November 1, 2017
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p style="padding-left: 40px;">iii. Develop mechanisms to protect facility/provider/patient identity when</p>	June 30, 2016

State Plan for Prevention of Healthcare Associated Infections: Tennessee

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="text-align: center;">investigating incidents and potential outbreaks during the initial evaluation phase, where possible, to promote reporting of outbreaks</p> <p>We will explore mechanisms that may have been developed by other jurisdictions. However, Tennessee is an “open records state,” and is therefore able to protect patient identifiers, but not facility or provider identities; this may hinder such efforts.</p> <p style="text-align: center;">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>We have been using NHSN dialysis event data to identify clusters of infections and/or specific organisms in outpatient dialysis facilities. We are still working to identify appropriate thresholds that require follow up from public health, but the experience has fostered positive relationships with facilities and improved communication. We are also developing similar cluster detection using the NHSN data reported by acute care hospitals.</p> <p>The TDH HAI team regularly reviews hepatitis B, hepatitis C, multi-drug resistance organisms, including CRE reported to TDH through NBS (NEDSS Base System) to ensure timely detection of any healthcare-associated outbreak and prevent further transmission. Reviewing these reports has led to the identification of hepatitis C transmission in an outpatient dialysis clinic as well as a case of CRE with a resistance mechanism that hadn’t been identified in TN before.</p>	<p style="text-align: center;">Ongoing</p> <p style="text-align: center;">April 1, 2016</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		Early recognition of these situations allowed TDH to work with healthcare facilities to prevent further spread of infection.	
		<i>Other activities or descriptions:</i>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>2. Enhance laboratory capacity for state and local detection and response to new and emerging HAI issues.</p> <p>Recently, the SPHL completed validation of the CarbaNP (to replace the MHT), and PCR for NDM and is validating PCR testing for OXA-48. We also plan to perform other resistance mechanism testing and will explore whole genome sequencing. Tennessee has an Illumina MiSeq instrument to help with any overflow of next generation sequencing surveillance specimens, PulseNet Area Lab needs or outbreak samples (e.g., CRE or other Multidrug resistant organisms). We anticipate working collaboratively with CDC and other partners (academia) to enhance our bioinformatics capacity and synergistically identify analytical methods for who genome sequencing data.</p>	Jan 31, 2016
		<i>Other activities or descriptions:</i>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>3. Improve communication of HAI outbreaks and infection control breaches</p> <p style="padding-left: 40px;">i. Develop standard reporting criteria including, number, size, and type of HAI outbreak for health departments and CDC</p> <p>Tennessee will participate in the CSTE/CDC working group to help develop these standards. These standards will likely be organism</p>	October 1, 2016

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>specific.</p> <p style="padding-left: 40px;">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)</p> <p>The TDH HAI program is working to strengthen our relationship with the TN licensure and certification agencies and ensure open lines of communication. A nurse on the TDH HAI team has considerable experience as a surveyor of long-term care facilities and is working to improve our communication and coordination.</p>	<p>March 31, 2016</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 style="padding-left: 40px;">i. Central Line-associated Bloodstream Infections (CLABSI)</p> <p>Tennessee acute care hospitals have been reporting CLABSI in adult, pediatric and neonatal ICUs, as well as all locations in LTAC facilities. Most recently, we expanded CLABSI surveillance to include adult and pediatric medical, surgical, and medical/surgical wards in acute care hospitals in 2014.</p>	<p>Ongoing</p>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p style="padding-left: 40px;">ii. <i>Clostridium difficile</i> Infections (CDI)</p>	<p>Ongoing</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	<p>We have been performing ongoing surveillance of CDI LabID events in acute care hospitals and LTAC facilities. We expanded this surveillance to include inpatient rehabilitation facilities in 2015.</p> <p style="text-align: center;">iii. Catheter-associated Urinary Tract Infections (CAUTI)</p> <p>Tennessee acute care hospitals have been reporting CAUTI in adult, and pediatric ICUs, as well as all locations in LTAC facilities and inpatient rehabilitation facilities since 2012. Most recently, we expanded CAUTI surveillance to include adult and pediatric medical, surgical, and medical/surgical wards in acute care hospitals in 2014.</p>	Ongoing
☒	☐	<p style="text-align: center;">iv. Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) Infections</p> <p>We have been performing ongoing surveillance of MRSA bloodstream LabID events in acute care hospitals and LTAC facilities. We expanded this surveillance to inpatient rehabilitation facilities in 2015.</p>	Ongoing
☒	☐	<p style="text-align: center;">v. Surgical Site Infections (SSI)</p> <p>Tennessee acute care hospitals have been reporting SSIs following CBGB/CBGC procedures since 2008 and COLO and HYST procedures since 2012. Facilities also can voluntarily report SSIs following HPRO and KPRO procedures; our MDAG is currently in discussion about when to require reporting of these SSIs.</p>	Ongoing
☒	☐	<p style="text-align: center;">vi. Ventilator-associated Pneumonia (VAP)</p> <p>Acute care hospitals can voluntarily report VAE data through NHSN to</p>	Jan 1, 2016

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		TDH. In 2016, we will require LTAC facilities to perform and report VAE data from all locations.	
		<i>Other activities or descriptions:</i>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>5. Adopt national standards for data and technology to track HAIs (e.g., NHSN).</p> <p>The metrics in Tennessee will align with the National HHS Action Plan, following the proposed 2020 goals.</p> <p style="padding-left: 40px;">i. Develop metrics to measure progress towards national goals (align with targeted state goals). (See Appendix 1).</p> <p>CLABSI: 50% reduction in CLABSI in intensive care unit (ICU) and ward-located patients or 0.50 Standardized Infection Ratio (SIR) compared to the NHSN 2015 national baseline</p> <p>CAUTI: 25% reduction in CAUTI in intensive care unit (ICU) and ward-located patients or 0.75 Standardized Infection Ratio (SIR) compared to the NHSN 2015 national baseline</p> <p>MRSA: 50% reduction in facility-onset MRSA bacteremia in inpatients facility-wide or 0.50 Standardized Infection (SIR) compared to the NHSN 2015 national baseline</p> <p>CDI: 30% reduction in facility-onset <i>Clostridium difficile</i> infections in inpatients facility-wide or 0.70 Standardized Infection Ratio (SIR) compared to the NHSN 2015 national baseline</p>	<p>Ongoing</p> <p>October 1, 2016</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>SSI: 30% reduction in SSI admission and readmission or 0.70 Standardized Infection Ratio (SIR) compared to the NHSN 2015 national baseline</p> <p style="text-align: center;">ii. Establish baseline measurements for prevention targets</p> <p>To maintain consistency with the NHSN 2015 national baseline, Tennessee will establish new baseline measurements for all NHSN-reportable HAIs with Tennessee data reported for calendar year 2015.</p> <p>Note: Target dates for implementation reflect the date when data will be available for analysis (6 months after the baseline period)</p>	<p>October 1, 2016</p>
		<p><i>Other activities or descriptions:</i></p> <p>Based on the targets identified in the executive order for Combating Antibiotic-Resistance Bacteria (CARB) we will also adopt the following goals:</p> <ul style="list-style-type: none"> - 50% decrease in overall <i>C. difficile</i> (compared to 2011) based on Emerging Infections Program (EIP) data from Davidson County - 60% decrease in CRE acquired during hospitalization (compared to 2011) based on NHSN data - 35% decrease in multi-drug resistant <i>Pseudomonas</i> spp. acquired during hospitalization (compared to 2011) based on NHSN data - 50% decrease in overall MRSA bloodstream infections (compared to 2011) based on EIP data from Davidson County 	<p>Ongoing</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	<p>6. Develop state surveillance training competencies</p> <ul style="list-style-type: none"> i. Conduct local training for appropriate use of surveillance systems (e.g., NHSN) including facility and group enrollment, data collection, management, and analysis <p>The TDH HAI team conducts monthly statewide user calls, using an expanded webinar format quarterly or when needed. Large group training webinars are held annually in January on new definitions for CLABSI/CAUTI, SSI, and MRSA/CDI LabID events, typically attended by over 100 attendees each. Small group interactive webinars are held on the following topics: NHSN reporting basics, NHSN Data Analysis, and NHSN CMS Reporting. In January 2015, two half-day in-person interactive training sessions were held. TDH HAI staff assist facilities on a one-on-one basis by phone and email as needed. Slides, recordings and resources from trainings are posted to our TN HAI Online Workspace (https://sites.google.com/site/tnhaionline/home).</p>	Ongoing
		<i>Other activities or descriptions:</i>	
☒	☐	<p>7. Develop tailored reports of data analyses for state or region prepared by state personnel</p> <p>Tennessee’s report on healthcare-associated infections is published on a semi-annual basis. Most recently, Tennessee is preparing to publish the tenth public report that provides statewide aggregate and facility-specific data on CLABSI, CAUTI, SSIs, MRSA bacteremia, CDI, and healthcare personnel influenza vaccination. This report will be released September 2015 and will be posted as a pdf file on the TDH website (http://tn.gov/health/topic/hai). In addition to the technical</p>	Ongoing

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		<p>format, a “consumer-friendly” format of the report will be published at the same time as the technical report; this “consumer-friendly” report will be published on an annual basis.</p> <p>The TDH HAI team is exploring options to allow for an interactive presentation of HAI data on the TDH website through a dashboard or other mechanism. This would likely require additional funding.</p> <p>TDH also distributes quarterly facility-specific data reports for all HAIs (including those which are not publicly reported), which is de-identified and provided to reporting facilities. This allows facilities to track their progress towards meeting the HHS HAI prevention goals as well as compare their performance with that of their peers. These reports are similar to CDC’s Targeted Assessment for Prevention (TAP) strategy reports which are available for facilities within the NHSN application (http://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/tapreports_facilities.pdf) but also include de-identified rankings for all TN hospitals and reports for HAIs not currently available through NHSN (MRSA and SSIs). We will continue to distribute and update/improve these reports based on feedback from facilities and our partners. We are also planning to expand these reports to cover other healthcare settings, including outpatient dialysis facilities, long-term care facilities, and ambulatory surgery centers as they report more HAI data to NHSN.</p> <p>TDH created and maintains a HAI Prevention Calculator available through our website (http://tn.gov/health/article/hai-prevention-calculator) to allow facilities to track their progress towards meeting their HAI goals. Facilities can calculate the number of HAIs they would need to prevent to reach the HHS five-year goal or a custom target SIR. We plan to update this resource as needed based on feedback</p>	

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		from facilities and partner organizations.	
		<p><i>Other activities or descriptions:</i> In partnership with Vanderbilt University, the Tennessee Department of Health would leverage the data currently collected in the in the electronic reportable surveillance system, with the capabilities of the Research Electronic Data Capture (REDCap) application, to develop a registry of CRE cases. The registry would be available to approved users at Tennessee healthcare facilities to identify newly admitted patients who have a history of CRE infection. This coordination between public health and facilities is expected to raise awareness for CRE, and reduce transmission within and between facilities, by improving the timeliness with which enhanced infection control measures are implemented when necessary. Complex algorithms would be employed to allow for automated matching of admitted patients with registry cases, thereby limiting the manual search requirements. This approach would minimize the resources required by the facilities to utilize the registry and also protect the health information of the patients.</p>	January 1, 2017
☒	☐	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	Ongoing
☒	☐	<p>i. Develop a validation plan</p> <p>Previously, the TDH HAI team conducted validation of CLABSI data reported to NHSN for adult and pediatric ICUs. We were able to share our validation experience with CDC and other states to help develop CDC’s validation guidance. Most recently, we conducted validation of NHSN dialysis event data reported from January-June 2014 in 30 outpatient hemodialysis facilities.</p>	Ongoing

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	<p>Pending CDC approval, TDH plans to validate MRSA blood and CDI LabID events in acute care hospitals in 2015/2016.</p> <p style="text-align: center;">ii. Pilot test validation methods in a sample of healthcare facilities</p>	Ongoing
☒	☐	<p>We have had the opportunity to pilot test validation methods through our CLABSI and dialysis event validation experiences.</p> <p style="text-align: center;">iii. Modify validation plan and methods in accordance with findings from pilot project</p>	Ongoing
☒	☐	<p>Based on our experience validating NHSN CLABSI and dialysis event data, we will use our lessons learned to shape our future validation work.</p> <p style="text-align: center;">iv. Implement validation plan and methods in all healthcare facilities participating in HAI surveillance</p> <p>With our current resources, we do not have the staff or funding conduct on-site external validation of all HAI measures in all facilities reporting HAI data to NHSN. We will prioritize which HAI measures we will validation and use a sampling method to determine which healthcare facilities will be visited.</p> <p>Currently, we conduct monthly data quality checks of the HAI data reported by acute care hospitals, long-term acute care hospitals, and inpatient rehabilitation facilities to NHSN. These automated data quality checks identify inconsistent, missing and outlier data and</p>	Ongoing

State Plan for Prevention of Healthcare Associated Infections: Tennessee

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>notify the facility of any identified errors through email with a pdf document. We are working to develop similar data quality checks for dialysis event data. The TDH HAI team also encourages facilities to utilize internal validation tools available from CDC (http://www.cdc.gov/nhsn/validation/index.html) to audit their own data reported to NHSN. If we maintain current staffing and funding levels, we will continue to conduct on-site external validation of one HAI yearly. In addition, we will be able to continue to examine innovative, less resource-intensive methods of validation, including expanded data quality checks and performing off-site electronic medical record review.</p> <p style="text-align: center;">v. Analyze and report validation findings</p> <p>After performing validation, we will analyze and report our findings to CDC, reporting facilities and stakeholders, as well as share our experience and resources with other states performing validation.</p>	Ongoing
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p style="text-align: center;">vi. Use validation findings to provide operational guidance for healthcare facilities that targets any data shortcomings detected</p> <p>We plan to use findings from validation to provide guidance and additional training to facilities, in a similar fashion as we have used validation findings from our CLABSI validation work. Based on the results of validation, we were able to identify common reporting issues and provide targeted training on these issues to facilities. We plan to do the same for after dialysis event validation.</p>	Ongoing
		<p><i>Other activities or descriptions:</i></p>	

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>9. Develop preparedness plans for improved response to HAI</p> <p>We plan to create a preparedness plan for addressing unsafe infection practices breaches or drug diversion events. We will incorporate lessons learned from other jurisdictions. We expect that there will be overlap in response as the HIV/STD/Hepatitis group works on response-plan to rapid dissemination of HV attributable to unsafe injection practices</p> <p style="padding-left: 40px;">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</p> <p>In an effort to prevent a serious infection control breach, we plan to conduct infection control assessments on healthcare facilities in Tennessee. During the assessments we will utilize the CDC Infection Control Assessment Tool to perform direct observations of infection control practices. We plan to identify gaps in infection control and communicate with healthcare staff involved in infection control to mitigate these gaps.</p>	Ongoing
		<i>Other activities or descriptions:</i>	
<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>Because an increasing amount of healthcare occurs outside general</p>	Ongoing

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		<p>acute care hospitals, we plan to collaborate with licensing organizations to identify and investigate complaints related to provider infection control practices in non-hospital settings such as dialysis centers and long term care facilities and take appropriate measures including legislation, standard setting, education and training. We will look to CDC/CSTE and other states to provide models that may be applicable to Tennessee.</p>	
		<p><i>Other activities or descriptions:</i></p>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>11. Adopt integration and interoperability standards for HAI information systems and data sources</p> <ul style="list-style-type: none"> 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>Currently, TDH uses NHSN dialysis event data to identify clusters of bloodstream infections in outpatient hemodialysis facilities. Cluster-detection for NHSN HAI data reported from other settings is being developed.</p> <p>The TDH HAI team regularly reviews hepatitis B, hepatitis C, multi-drug resistance organisms, including CRE reported to TDH through NBS (NEDSS Base System) to ensure timely detection of any healthcare-associated outbreak and prevent further transmission. Reviewing these reports has led to the identification of hepatitis C</p>	<p>Ongoing</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

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>transmission in an outpatient dialysis clinic as well as a case of CRE with a resistance mechanism that hadn't been identified in TN before. Early recognition of these situations allowed TDH to work with healthcare facilities to prevent further spread of infection.</p> <p style="text-align: center;">ii. Promote definitional alignment and data element standardization needed to link HAI data across the nation.</p> <p>The Healthcare-Associated Infections team has strong, long-standing relationships with the TDH Surveillance Systems and Informatics Program, led by an HL7-co-Chair. The TDH has had a long-standing history of promoting definitional alignment and data element standardization, through active participation in CSTE public health informatics related working groups, CSTE HAI working groups, as well as HICPAC and the NHSN steering workgroup.</p> <p>Definitional alignment and adherence to standards is essential for interoperability and to reduce data collection burden. We will enthusiastically continue to promote this effort. Harmonization of data elements for electronic laboratory reporting to NHSN for HAI events and to general communicable disease surveillance systems for reportable conditions is just one such example.</p>	Ongoing
		<i>Other activities or descriptions:</i>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>12. Enhance electronic reporting and information technology for healthcare facilities to reduce reporting burden and increase timeliness, efficiency, comprehensiveness, and reliability of the data</p> <p style="text-align: center;">i. Report HAI data to the public</p>	Ongoing

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		<p>The TDH will release its tenth report on HAI to the public in September 2015. This report will include statewide aggregate and facility-specific data on CLABSI, CAUTI, SSI, MRSA, CDI, and healthcare personnel influenza vaccination. This report will be released as a pdf file on the TDH website. In addition, a “consumer-friendly” version of the report will be published, based on the recommendations of the CSTE/CDC work group on HAI data analysis and presentation standardization.</p>	
		<p><i>Other activities or descriptions:</i> If funded, the TDH plans to incentivize facilities to report to the NHSN AUR (Antimicrobial Use and Resistance) Modules and support antimicrobial stewardship activities by reimbursing successful completion of antimicrobial stewardship training courses by pharmacists (e.g., MAD-ID) for facilities which successfully submit data to the NHSN AUR module. The TDH would also hire an Epidemiologist to provide very targeted and specialized support to hospitals communicating antimicrobial resistance and susceptibility information in accordance with Tennessee reporting requirements and associated with Meaningful Use.</p>	<p>Dependent on funding</p>
<p style="text-align: center;"><input checked="" type="checkbox"/></p>	<p style="text-align: center;"><input type="checkbox"/></p>	<p>13. Make available risk-adjusted HAI data that enable state agencies to make comparisons between hospitals.</p> <p>The TDH will release its tenth report on HAI to the public in September 2015. This report will include statewide aggregate and facility-specific data on CLABSI, CAUTI, SSI, MRSA, CDI, and healthcare personnel influenza vaccination. This report will be released as a pdf file on the TDH website. In addition, a “consumer-friendly” version of the report will be published, based on the recommendations of the</p>	<p>Ongoing</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		<p>CSTE/CDC work group on HAI data analysis and presentation standardization.</p> <p>The TDH HAI team is exploring options to allow for an interactive presentation of HAI data on the TDH website through a dashboard or other mechanism. This would likely require additional funding.</p>	
		<i>Other activities or descriptions:</i>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>14. Enhance surveillance and detection of HAIs in nonhospital settings</p> <p>The TDH has expanded HAI surveillance to include reporting requirements for LTAC facilities (2010), inpatient rehabilitation facilities (2012), outpatient hemodialysis facilities (2012), and ambulatory surgery centers (2015). In addition, as part of our <i>C. difficile</i> collaborative activities, we will be assisting long-term care facilities in enrolling and reporting to NHSN on a voluntary basis.</p>	Ongoing
		<i>Other activities or descriptions:</i>	

State Plan for Prevention of Healthcare Associated Infections: Tennessee

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 <ul style="list-style-type: none"> i. Develop strategies for implementation of HICPAC recommendations for at least 2 prevention targets specified by the state multidisciplinary group. Tennessee will implement HICPAC recommendations for the following prevention targets: <ul style="list-style-type: none"> • CLABSI • CAUTI • SSI For MRSA and CDI, Tennessee will implement the recommendations from the updated SHEA compendium.	Ongoing
		<i>Other activities or descriptions:</i>	
☒	☐	2. Establish prevention working group under the state HAI advisory council to coordinate state HAI collaboratives <ul style="list-style-type: none"> i. Assemble expertise to consult, advise, and coach 	Ongoing

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
☒	☐	<p>statewide meetings. We will also continue to support the efforts led by the Tennessee Center for Patient Safety (TCPS) and Q-Source (quality improvement organization).</p> <p style="text-align: center;">iii. Establish and adhere to feedback from standardized outcome data to track progress</p> <p>The TDH HAI team supports HAI prevention efforts by providing data feedback through the bi-annual state HAI report as well as providing facility-specific quarterly prevention reports (using CDC’s TAP strategy) to facilities to assist them in tracking their progress towards meeting targets.</p>	October 1, 2015
		<i>Other activities or descriptions:</i>	
☐	☒	<p>4. Develop state HAI prevention training competencies</p> <p style="text-align: center;">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</p> <p>The TDH requests technical assistance from CDC and/or APIC/SHEA to prepare low-cost online training modules for healthcare providers. Preliminary discussions indicate that until such materials are readily available, it will not be feasible to establish such requirements in Tennessee. The TDH HAI staff will be performing infection control and readiness (ICAR) assessments of facilities across the healthcare spectrum and will use the gaps identified through these assessments to provide targeted webinar and in-person trainings for healthcare facilities across</p>	January 1, 2017

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		the state.	
		<i>Other activities or descriptions:</i>	
<input checked="" type="checkbox"/>	<input 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 <p>The TDH currently has established regulatory standards for the insertion of central lines (central line bundle), hand-hygiene, and influenza vaccination of staff (requiring vaccination or signed declination statement). These State of Tennessee Standards and other CMS guidelines/regulations related to Infection Control are observed during facility surveys by the Tennessee Office of Health Care Facilities. With assistance from the Office of General Council, the TDH HAI team was proposed reviewing the guidelines and regulations related to infection control and updating them if needed.</p>	Ongoing
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> ii. Coordinate/liaise with regulation and oversight activities such as inpatient or outpatient facility licensing/accrediting bodies and professional licensing organizations to prevent HAIs <p>We will work with licensure/regulation to ensure that the HAI team gets updated to any changes in oversight/licensing authority and any proposed changes (in rules and regulations or legislation/bills). We will explore the possibility of engaging partners at ASTHO and/or CSTE (e.g., public health law committee) for suggestions on ways this can be accomplished. The</p>	Ongoing

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>TDH will coordinate with the Office of General Council and the Office of Health Care Facilities</p> <p style="text-align: center;">iii. Improve regulatory oversight of hospitals, enhance surveyor training and tools, and add sources and uses of infection control data</p> <p>We will train surveyors on key elements of infection control to examine when visiting licensed facilities. We also will ensure that investigators working for professional boards are made aware of key infection control principles and the consequences of not adhering to these. A new member of our TDH HAI team was previously a state surveyor and we will use her relationships and expertise to build on this area.</p> <p>We will utilize CDC’s infection control and readiness (ICAR) assessment tools to conduct assessments in a sampling of health care facilities across the state, and also distribute these tools to all facilities to encourage the use of ICAR tools for self-assessment and gap identification.</p>	<p>Ongoing</p>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p style="text-align: center;">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>Settings such as urgent care centers are not licensed in Tennessee; there currently is no oversight. We plan to group in collaboration with the Office of General Council and the Office and Health Care Facilities to identify these facilities, perform on-site assessments and mitigate gaps in infection control infrastructure and explore oversight mechanisms. The TDH HAI program will also review the recommendations of the</p>	<p>July 31, 2017</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		CDC/ASTHO working group on infection control in outpatient settings when the toolkit is available.	
		<i>Other activities or descriptions:</i>	
☒	☐	<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>The TDH HAI team supports Tennessee hospitals in reporting to NHSN through training, data quality checks and one-on-one support by email and phone as needed. We also work with partner organizations, such as TCPS, to support their HAI prevention collaboratives. Ninety-two Tennessee Hospitals participated in one of the Hospital Engagement Networks (HEN) through 2015; the largest Tennessee HEN was led by the Tennessee Hospital Association’s Tennessee Center for Patient Safety (TCPS) and engaged 54 hospitals focusing on adverse drug events (ADE), CAUTI, CLABSI, injuries from falls and immobility, obstetrical adverse events, pressure ulcers, SSI, VTE, VAP, and preventable readmissions. The TCPS plans to continue its’ work as a HEN 2.0.</p> <p>Through 2015, TCPS has worked in prevention collaboratives for CAUTI (98 facilities), CLABSI (98 facilities), VAE (51 facilities), MRSA (95 facilities), and CDI (95 facilities). Q-Source, Tennessee’s quality improvement organization has recruited 23 hospitals to participate in its’ HAI prevention collaboratives for CDI (22 facilities), CLABSI (13 facilities), and CAUTI (16 facilities). The TDH HAI team supports these efforts through NHSN user support and training, as well as providing quarterly prevention reports (using CDC’s TAP strategy) to facilities to assist them in tracking their progress towards meeting targets.</p>	Ongoing

State Plan for Prevention of Healthcare Associated Infections: Tennessee

Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
		<i>Other activities or descriptions:</i>	
<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>The <i>Clostridium difficile</i> infection prevention collaborative led by the TDH HAI team includes long term care facilities that share patients with the acute care hospitals. We are currently recruiting long term care facilities for this collaborative. TDH is also developing a collaborative targeting approximately 50 outpatient hemodialysis facilities, promoting the use of CDC’s core interventions for dialysis bloodstream prevention and reporting prevention process measures through NHSN.</p>	Ongoing
		<i>Other activities or descriptions:</i>	

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 <ul style="list-style-type: none"> i. Establish evaluation activity to measure progress toward targets and <p>We will measure statewide SIR for CLABSI, CAUTI, SSI, MRSA and <i>C. difficile</i> LabID Events, and Dialysis Events to measure progress towards targets. We will measure progress at minimum, every 6 months. We will also review rates of healthcare personnel influenza vaccination each influenza season. We also use data on CRE reported to NBS (NEDSS Base System) to assess geographic and temporal trends in CRE incidence and distribution across Tennessee.</p>	Ongoing
☒	☐	<ul style="list-style-type: none"> ii. Establish systems for refining approaches based on data gathered <p>The TDH examines data submitted to NHSN on a regular (bi-monthly) basis and uses these data to refine approaches (e.g., feedback at meeting through the Tennessee Center for Patient Safety, MDAG meetings). The TDH HAI team provides quarterly prevention reports to facilities using the TAP strategy. In addition to the TAP strategy, which measures the excess number of healthcare-associated infections, we</p>	Ongoing

State Plan for Prevention of Healthcare Associated Infections: Tennessee

		also use a similar strategy to measure the total excess number of infections for MRSA and <i>C. difficile</i> Infections which takes into account community-onset infections. Observational data gathered at the time of validation (e.g., process measures) has also been very valuable. The TDH HAI team reviews data reported to NHSN through annual facilities surveys to assess infection prevention, lab and antimicrobial stewardship practices.	
		<i>Other activities or descriptions (not required):</i>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>2. Develop and implement a communication plan about the state’s HAI program and about progress to meet public and private stakeholders needs</p> <p style="padding-left: 40px;">i. Disseminate state priorities for HAI prevention to healthcare organizations, professional provider organizations, governmental agencies, non-profit public health organizations, and the public</p> <p>The TDH regularly communicates with healthcare facilities through monthly conference calls and maintains a contact list of infection prevention contacts at facilities, regular MDAG meetings and partner organizations (Tennessee Hospital Association, Qsource (TN QIN), End Stage Renal Disease Network 8, TN Ambulatory Surgery Center Association, TIPQC) to disseminate information about the TDH HAI program and state priorities. In addition, the TDH publishes a bi-annual state report on HAI to the TDH website (http://tn.gov/health/topic/hai).</p>	Ongoing
		<i>Other activities or descriptions:</i>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>3. Provide consumers access to useful healthcare quality measures</p> <p style="padding-left: 40px;">i. Disseminate HAI data to the public</p>	Ongoing

State Plan for Prevention of Healthcare Associated Infections: Tennessee

		<p>The TDH will release its tenth report on HAI to the public in September 2015. This report will include statewide aggregate and facility-specific data on CLABSI, CAUTI, SSI, MRSA, CDI, and healthcare personnel influenza vaccination. This report will be released as a pdf file on the TDH website. In addition, a “consumer-friendly” version of the report will be published, based on the recommendations of the CSTE/CDC work group on HAI data analysis and presentation standardization.</p> <p>The TDH HAI team is exploring options to allow for an interactive presentation of HAI data on the TDH website through a dashboard or other mechanism. This would likely require additional funding.</p>	
		<i>Other activities or descriptions:</i>	
<input checked="" type="checkbox"/>	<input 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>The TDH will continue to identify priorities and provide input to partners to help guide patient safety initiatives. Dr. Kainer from the TDH has been engaged in such efforts for a long time. Examples of venues where such feedback occurs include: the NHSN steering workgroup, HICPAC, the public policy and governmental affairs committee for SHEA and senior APIC leadership on a national level, as well as local state APIC chapters, Tennessee Hospital Association CMO Society, Emerging Infections Program (EIP) Annual Scientific day, as well as the Tennessee Partnership for Patients (comprised of TDH, the state QIN, the Tennessee Center for Patient Safety and the Tennessee Hospital Association).</p>	Ongoing
		<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 type="checkbox"/>	<input checked="" 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>TDH will continue expansion of the current Access database that is used for the inventory of all healthcare settings in state. The Access database includes long term care and urgent care centers, as well as regulatory/licensure oversight. We will work with state licensure and the Emergency Preparedness program to capture facility information and initial points of contact for long term care facilities. A REDCap survey will be sent out to healthcare facilities to update contact information in Access database.</p>	<p>Ongoing</p> <p>March 31, 2016</p>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>2. Identify current regulatory/licensing oversight authorities for each healthcare facility and explore ways to expand oversight</p> <p>We will gain an understanding of current regulatory/licensing oversight authorities by meeting with TOSHA (state OSHA), State licensure staff (including attorneys), and Office of General Council.</p>	<p>June 30, 2016</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

		<i>Other activities or descriptions:</i>	
<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> <ul style="list-style-type: none"> i. Use CDC readiness assessment tool and determine gaps in infection control ii. Address gaps (mitigate gaps) iii. Conduct follow-up assessments <p>Staff has been hired to assess readiness of Ebola-designated facilities with Tennessee. A CDC assessment tool will be used to determine gaps in infection control at Ebola Assessment Hospitals. The nurses will conduct on-site assessments using a REDCap survey to capture data, and work with hospitals to develop a plan to mitigate identified gaps in infection control. The HAI team staff will review the documentation and track the timeline of planned corrective actions. Once a facility believes they have mitigated gaps, facility will upload supportive documentation to REDCap. The HAI team staff will review this information and schedule a follow-up visit if needed.</p>	<p>Ongoing</p> <p>March 31, 2016</p>
		<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>4. 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>An Epidemiologist on the HAI team will provide input to the CDC in the creation of a facility assessment tool to assess capacity of healthcare facilities to detect, report, and respond to potential outbreaks threats to determine gaps in outbreak reporting and outbreak responses for all</p>	<p>Dependent on availability of CDC tool</p> <p>March 31, 2017</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

		healthcare settings. In-person and/or phone surveys with healthcare facility personnel will be used along with the assessment tool to determine gaps in outbreak reporting response.	
		<i>Other activities or descriptions:</i>	

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>With input from the MDAG, the TDH HAI team will use NHSN HAI data, health care facility complaints and data from facility surveys to target facilities for assessment. For acute care hospitals, NHSN HAI data will be used to rank facility performance on each HAI using the SIR and TAP strategy to identify facilities with the greatest potential for gaps in infection control. We will conduct assessments in a sample of acute care hospitals, long term acute care hospitals, urgent care centers, outpatient hemodialysis, outpatient diagnostic centers, ambulatory surgical centers [ASC], and long term care facilities. We will then focus on facility types/providers that pose greatest risk and/or common themes in gaps. A REDCap database will be modified to allow for tracking of expanded assessments for EAH and non-EAH hospitals, LTACs, and other facility types including ability to perform follow-up.</p>	March 31, 2017
		<i>Other activities or descriptions:</i>	

State Plan for Prevention of Healthcare Associated Infections: Tennessee

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>2. Increase infection control competency and practice in all healthcare settings through training</p> <p>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.</p> <p>The TDH requests technical assistance from CDC and/or APIC/SHEA to prepare low-cost online training modules for healthcare providers. Preliminary discussions indicate that until such materials are readily available, it will not be feasible to establish such requirements in Tennessee.</p>	<p>March 31, 2017</p>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>ii. Develop a sustainable training program based on CDC guidance and technical assistance to perform training, prioritizing on-site train-the-trainer programs in key domains of infection control, including the incorporation of hands on evaluations and competency assessments of best practices and a system to monitor ongoing compliance and competency.</p> <p>TDH will develop interactive infection prevention training courses, incorporating CDC guidance and materials. We will collaborate with the 4 APIC chapters in Tennessee, as well as appropriate healthcare associations (e.g., THA, Ambulatory Surgery Center Association, etc.) to offer regional, in-person “train-the-trainer” trainings every year for different healthcare settings. Trainings will focus on common infection control gaps and basic infection control principles, in addition to providing resources and materials for attendees to train staff at their own facilities. Tools for evaluation and assessing infection prevention competencies will be provided. Training will be modular; some will be specific to certain healthcare settings (e.g., dialysis) and some general.</p>	<p>March 31, 2016</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

		We aim to provide Continuing Education credits. We will deliver the same modules as a series of interactive webinars to allow those unable to travel to regional training to participate. Materials/recordings will be available online.	
		<i>Other activities or descriptions:</i>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>3. Enhance surveillance capacity to improve situational awareness, describe emerging threats, and target onsite assessments to implement prevention programs</p> <p>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.</p> <p>TDH has access to HAI data through the NHSN group function; our state reports are available at: http://tn.gov/health/topic/hai. Our hospitals receive reports on the number of infections of each type they need to prevent to reach goals (i.e., TAP report); the TAP strategy allows us to target facilities for prevention/recruitment for collaboratives. A plan has been developed for TN facilities to submit antimicrobial use and resistance (AUR) data to NHSN, so that TDH can analyze these. Carbapenem resistant Enterobacteriaceae (CRE) are reportable to our National Electronic Disease Surveillance System (NBS). We plan to improve situational awareness of CRE and other pathogens identified in CDC Antimicrobial Resistance Threat Report by displaying geospatial data in a timely manner to stakeholders. We will explore dashboard capabilities to communicate these data to our stakeholders so that providers can take appropriate infection control measures and modify antibiotic usage.</p>	March 1, 2016
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>ii. Work with CDC to guide analytic direction and identify facilities for prioritized assessments/response</p>	March 1, 2016

State Plan for Prevention of Healthcare Associated Infections: Tennessee

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>TDH will work with CDC to guide analytic direction and identify facilities for prioritized assessments. In addition, we would like to develop facility ranking metrics for MRSA and CDI that identify facilities that have "excess" community-onset infections of MRSA and CDI.</p> <p>iii. Improve outbreak reporting capacity by developing an infrastructure that includes clear definitions of infectious threats of epidemiologic importance that are communicated to facilities</p> <p>TDH will pilot the REDCap outbreak template in local, regional, and metro health departments and hospitals. The pilot will identify areas for improvement, train PH staff and healthcare facilities in data entry and reporting with REDCap, and result in a better trained workforce for outbreak response and increase response capacity. MDAG and HPIC will discuss ways to strengthen relationships with hospitals and surrounding facilities to increase regional surveillance and establish a workflow/communication protocol that may utilize REDCap. A 1-page outbreak guide will be developed for any facility type/provider. This will include clear definitions of infectious threats of epidemiologic importance, including definition of outbreaks and what must be reported to public health. This should assist in reducing transmission of pathogens. This 1-page guide will also be distributed through APIC chapters to all existing and new Infection Preventionists.</p>	<p>March 1, 2017</p>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>iv. Implement a response plan to address potential emerging threats identified by using enhanced surveillance</p> <p>In 2014, TDH implemented a response plan to address potential emerging threats identified by using enhanced surveillance. TDH will create a generalizable and useful outbreak template for any outbreak threat such as MERS, Ebola, Measles, or CRE. TDH would like to enable joint monitoring by both healthcare and public health regions. REDCap will be utilized for data management.</p>	<p>March 31, 2018</p>

State Plan for Prevention of Healthcare Associated Infections: Tennessee

		<i>Other activities or descriptions:</i>	

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.

State Plan for Prevention of Healthcare Associated Infections: Tennessee

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*

State Plan for Prevention of Healthcare Associated Infections: Tennessee

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

State Plan for Prevention of Healthcare Associated Infections: Tennessee

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

State Plan for Prevention of Healthcare Associated Infections: Tennessee

† 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)