# CONNECTICUT HEALTHCARE ASSOCIATED INFECTIONS (HAI) PREVENTION PLAN

October 1

# 2015

In 2009 in response to the increasing concerns about the public health impact of healthcare-associated infections (HAIs), the US Department of Health and Human Services (HHS) developed an Action Plan template for all states to help prevent HAIs. In wake of the Ebola outbreak in West Africa in 2015 the plan was updated to include new Ebola-related infection control activities. All states have been asked to update their plans by October 1, 2015. The HHS Action Plan includes recommendations for surveillance, research, communication, and metrics for measuring progress toward national goals. This Plan gives an historical overview of infection prevention actives achieved in Connecticut from 2009 forward and continuing into 2015-2018.

**Submitted to the Centers for Disease Control and Prevention (CDC) Division of Healthcare Quality Promotion (DHQP) Infection Control Assessment and Readiness (ICAR) Team**

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Keeping Connecticut Healthy
DPH
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**Introduction**

Healthcare Associated Infections (HAI) are infections that occur during, or as a consequence of, the provision of healthcare. HAIs are a significant medical and public health problem across the nation, and in Connecticut. Not only do HAIs cause suffering for patients and harm that is often preventable, but they also increase hospital lengths of stay and add considerably to healthcare costs.

In acute care hospitals alone in 2011, healthcare associated infections affected an estimated 648,000 patients with 721,800 health care–associated infections.[1] While more current data on hospital-based mortality from this 2011 study has not yet been published, a widely reported estimate from 2002 is that approximately 99,000 deaths occur annually associated with an HAI during an acute care hospitalization. [2] The estimated annual direct medical costs of HAI to hospitals in the United States ranged from $28.4 to $45 billion. The benefits of prevention range from $5.7 to as much as $31.5 billion.[3]

It should also be noted that much patient care is delivered outside of acute care hospitals, across a spectrum of intensity ranging from long term acute care, long term care, ambulatory facilities, to homecare. To account for the true costs of HAI, and to fully appreciate the human and economic costs and importance of this problem, costs in these other settings also need to be taken into account, and research will need to be done to estimate these costs and impact on public health.

The CDC estimates that 2 million persons in the United States develop serious infections with antibiotic resistant bacteria each year, leading to 23,000 deaths. Nearly 250,000 patients are hospitalized and at least 14,000 people die each year due to *Clostridium difficile (C. difficile)* infections, which are facilitated by antibiotic use. This may lead to $20 billion in excess direct healthcare costs, with additional costs to society as high as $35 billion annually.[4] The over or misuse of antibiotics is the single most important factor leading to antibiotic resistance. The development of antibiotic resistance began as soon as antibiotics became widely available in the 1940s, the development of antibiotic resistance has accelerated in recent decades. This coupled with a diminution of new antibiotics and other antimicrobial drugs in the developmental pipeline has created a public health crisis. Some strains of bacteria have developed that are resistant to nearly all or all available antibiotic, raising the specter of a return to the pre-antibiotic ears in which infections would frequently be untreatable. This has led the CDC to call on federal and state public health agencies to collaborate with healthcare providers and facilities to address this serious public health and economic threat through the fostering of antimicrobial stewardship programs in healthcare settings.

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[1] Magill S, Edwards J, et.al. Multistate Point-Prevalence Survey of Health Care–Associated Infections N Engl J Med 2014;370:1198-208.

[2] Klevens RM, Edwards JR, et al. Estimating health care-associated infections and deaths in U.S. hospitals, 2002. *Public Health Reports* 2007 March-Apr; 122(2): 160-6. Scott

[3] Scott, RD, The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention, CDC, accessed on 9/8/15 at: http://www.cdc.gov/HAI/pdfs/hai/Scott_CostPaper.pdf

[4] CDC, Antibiotic Resistance Threats in the United States, 2013, accessed on 9/8/15 at: http://www.cdc.gov/drugresistance/threat-report-2013/pdf/ar-threats-2013-508.pdf#page=11

In addition to addressing antibiotic and antimicrobial resistance, the scope of public health HAI programs has grown to address other HAI related issues beyond the initial focus on surveillance for and reporting of particular types of infections acquired during healthcare associated with medical devices or procedures in individual patients, such as central line associated bloodstream infections, catheter associated urinary tract infections, and surgical site infections. Such areas of expansion include patient exposure to contaminated medical products or equipment that may be associated with infection in patients, or which have not been associated with documented infections, but which have put groups of patients at risk. Another has been addressing outbreaks and clusters of HAIs to find underlying facility-specific risks and rectify them. HAI programs have been asked to participate in the investigation of breaches of infection control and injection safety, sometimes involving impaired healthcare providers, or intentional drug diversion. The impact of the Ebola outbreak in West Africa, and its impact on the United States, has highlighted an important role for HAI programs and their collaborators in the planning and preparedness for adequate infection control while caring for serious emerging infectious diseases, such as the Viral Hemorrhagic Fevers (including Ebola), Middle Eastern Respiratory Virus (MERS) Co-V, pandemic influenza, and others. This has also highlighted the need for active HAI program assessment and technical assistance of the infection prevention infrastructure, training, and quality control in healthcare settings across the spectrum of healthcare. As the drive for quality and cost containment has come to include infections along with other sources of preventable harm, HAI programs have become involved in the collection and analysis of data that is used for the federal Centers for Medicare and Medicaid Services' (CMS) quality improvement and payment programs, which involves both data on HAIs and on vaccination status of healthcare staff.

There is a wide variety of stakeholders affected by HAIs or who have a role in preventing them. These include healthcare providers, patients, patient advocates, professional associations, facility associations, payors, and public health agencies. There is a critical need to collaborate among these groups to foster coordinated and effective action, and to find solutions that involve coordinated action among the stakeholders. One of the traditional activities of public health programs, such as HAI programs, has been to act as a convener of stakeholders to lead concerted coordinated action. Such collaboration is fostered by multidisciplinary groups and technical advisory groups to advise HAI programs on strategies and activities and to evaluate the progress in achieving program goals.

As the scope and complexity of the HAI programs grow, it is more important than ever to identify priorities to address the currently preventable fraction and not waste time and action, and avoid opportunity costs. This indicates the need to carefully plan. The detailed living plan, such as the one that follows, gives an historical record of what has been accomplished since 2009 when it was first published, and the continuing plans for 2015-2018 of the HAI program and its collaborators to guide their actions going forward. It can ensure coordination, foster evaluation of progress, incorporate changes, and find synergies. Further, it can ensure proactive rather than reactive efforts that will accomplish the goal of eliminating the preventable fraction of HAIs effectively and efficiently, without interfering with the other core functions of the provision of healthcare.

**Template for State Healthcare-associated Infection Plan**

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

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

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

This template helps to ensure progress toward national prevention targets as described in the HHS Action Plan. CDC is leading the implementation of recommendations on national prevention targets and metrics and states should tailor the plan to their state-specific needs.

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

The State HAI Action Plan template targets the following areas:

1. Enhance HAI Program Infrastructure
2. Surveillance, Detection, Reporting, and Response
3. Prevention
4. Evaluation, Oversight, and Communication

With new Ebola-related, infection control activities, the following two tables have been added to reflect those activities:

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

**Framework and Funding for Prevention of HAIs**

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

**Template for developing HAI plan**

The following template provides choices for enhancing state HAI prevention activities in the six areas identified above. For each section, please choose elements which best support current activities or planned activities. Current activities are those in which the state is presently engaged and includes activities that are scheduled to begin using currently available resources. Planned activities represent future directions the state would like to move in to meet currently unmet needs, contingent on available resources and competing priorities. A section for additional activities is included to accommodate plans beyond the principal categories.

**1. Enhance HAI program infrastructure**

Successful HAI prevention requires close integration and collaboration with state and local infection prevention activities and systems. Consistency and compatibility of HAI data collected across facilities will allow for greater success in reaching state and national goals. Please select areas for development or enhancement of state HAI surveillance, prevention, and control efforts.

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

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| ☒ Complete | | **1. Establish statewide HAI prevention leadership through the formation of multidisciplinary group or state HAI advisory council**<br>**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).**<br><br>In 2006, the Connecticut (CT) General Assembly passed Public Act 06-142, *An Act Concerning Hospital Acquired Infections,* now codified in state statue as CGS 19a 490 o. It created an 11-member Advisory Committee on Healthcare Associated Infections to advise the Department of Public Health (DPH) on the development, operation, and monitoring of a mandatory Healthcare Associated Infections (HAI) reporting system. The Committee included representation from consumers, the public, hospital infection preventionists, infectious disease physicians, the CT State Medical Society (CSMS), the CT Hospital Association (CHA), and DPH as outlined in Appendix 2.[5] The Advisory Committee has met quarterly since inception. | **Initiated 2006 and ongoing** |
| ☒ | ☒ | **ii. NEW: 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.**<br>Beginning in 2015, members of the current HAI Advisory Committee were asked to propose addition members to expand the committee in the wake of the Ebola outbreak. Proposed members are:<br>Pro Health (Group of private MDs)<br>Long Term Care Association<br>Long Term Care Infection Preventionists<br>CT Association of Ambulatory Surgical Centers<br>Long Term Acute Care Facilities (LTACs)<br>Hospice | **October 2015** |

[5] CDC template footnote documentation begins with Appendix 1 (page 15). DPH footnote documentation of Appendix 2 begins on this page.

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | School Based Clinics<br>Urgent Care Centers<br>Other Out Pt Clinics (MD owned)<br>Nursing Homes<br>Home Health Agencies<br>Private Insurance Company healthcare payors<br>Veterinarians<br>Dentists<br>Hospital Preparedness Coordinators<br>Connecticut Medical Society<br><br>**iii. NEW: Engage HAI advisory committee in potential roles and activities to improve antibiotic use in the state (antibiotic stewardship)**<br>The Committee has also discussed developing and revising subcommittees:<br>1. Antimicrobial Stewardship<br>2. HAI Prevention<br>3. HAI Public Education<br><br>**iv. NEW: Engage HAI advisory committee in activities to increase health department's access to data and subsequently use those data in prevention efforts**<br><br>The HAI Advisory Committee made its initial recommendations in 2007 which launched the program in CT:<br>1. Participate in the CDC's National Healthcare Safety Network (NHSN) reporting system,<br>2. Utilize one NHSN Patient Safety Module,<br>3. Provide education and training on CDC and NHSN enrollment, HAI definitions, data entry, and analysis,<br>4. Report outcome data on Central Line Associated Blood Stream Infections (CLABSIs) in one adult intensive care unit (ICU) per acute care hospital, and one pediatric ICU in acute care children's hospital(s) in the state, | |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| ☒ | ☐ | 5. Utilize first year data collection as a pilot to assure accuracy and completeness of reporting,<br>6. Plan validation testing of year two data and beyond,<br>7. Expand DPH technical staff for data analysis, education and training,<br>8. Use results to implement evidence-based prevention methods.<br><br>Beginning in 2008 CT acute care hospitals reported CLABSIs from one adult ICU per hospital and all pediatric ICUs via the NHSN data system.<br><br>In 2012 the federal Centers for Medicaid and Medicare Services (CMS) expanded HAI reporting requirements for healthcare institutions as a condition of receiving annual payments. As a result of these requirements the HAI Advisory Committee recommended that HAI reporting in CT followed the CMS reporting schedule. In January 2012, CMS required that acute care hospitals continue to report CLABSIs in adult, pediatric and neonatal ICUs and added catheter associated urinary tract infections (CAUTIs), and surgical site infections (SSI) in two operative sites. Long term care hospitals had to begin reporting CLABSIs and CAUTIs, and hemodialysis centers had to begin reporting dialysis events using NHSN definitions.<br><br>Beginning in 2013 CMS required acute care hospitals in the state to report healthcare personnel (HCP) influenza vaccination rates for their employees, contract workers, students, licensed independent practitioners and volunteers. CMS schedule for HAI reporting and additional reporting criteria for reporting is outlined in Appendix 3.<br><br>**v. Identify specific HAI prevention targets consistent with HHS priorities**<br>1. Central Line-associated Blood Stream Infections (CLABSI)<br>2. *Clostridium difficile* Infections (CDI)<br>3. Catheter-associated Urinary Tract Infections (CAUTI)<br>4. Methicillin-resistant *Staphylococcus aureus* (MRSA) Infections<br>5. Surgical Site Infections (SSI) | **2009 and Ongoing** |
| | | *Other activities or descriptions:* | |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | | |
| ☒ Complete | ☐ | **2. Establish an HAI surveillance prevention and control program**<br>**i. Designate a State HAI Prevention Coordinator**<br><br>In 2006, the Connecticut Legislature directed the DPH to create a state public health HAI program and to establish a state HAI Advisory Committee. In 2008, 3 FTE state-funded positions were created to oversee the HAI program. These positions included the state HAI coordinator, Richard Melchreit, a public health physician with 25 years of experience; a senior epidemiologist, Lauren Backman with nursing, microbiology and MHS degree and work experience as an infection preventionist; and an epidemiologist who provided data analysis skills and National Healthcare Safety Network (NHSN) technical assistance. In 2014, The HAI program experienced a permanent reduction in state funding that eliminated a key epidemiology position. This lost position makes it difficult to maintain the high quality HAI program standards now expected by CT healthcare facilities. The HAI program is part of the Infectious Disease (ID) Section under the direction of Matthew Cartter, MD, MPH, the State Epidemiologist. The ID Section also contains the Epidemiology and Emerging Infections (EIP) Program that works in partnership with HAI. | **2006** |
| ☒ Complete | ☐ | **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)**<br><br>As above | **2008** |
| | | *Other activities or descriptions:* | |
| ☒ Complete | | **3. Integrate laboratory activities with HAI surveillance, prevention, and control efforts.**<br><br>**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)**<br><br>The ELC program was initiated in 1995 as one of the key activities under CDC's plan to address emerging infectious disease threats. Its purpose is to protect the public health and safety of the American people by enhancing the capacity of public health agencies to effectively detect, respond, prevent and control known and emerging (or re-emerging) infectious diseases. This is accomplished by providing financial and technical resources to: | **1995 and Ongoing** |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | 1. Strengthen epidemiologic capacity;<br>2. Enhance laboratory capacity;<br>3. Improve information systems; and<br>4. Integrate epidemiology, laboratory, and information systems components of public health departments.<br><br>ELC Logic Model Overview<br>A logic model provides a graphic depiction of activities and expected outcomes. It helps ensure better alignment between what CDC asks DPH staff to do to build laboratory capacity, what DPH is expected to accomplish, and how DPH activities and achievement of outcomes will be measured. (see Figure 1) | |

**Figure 1**

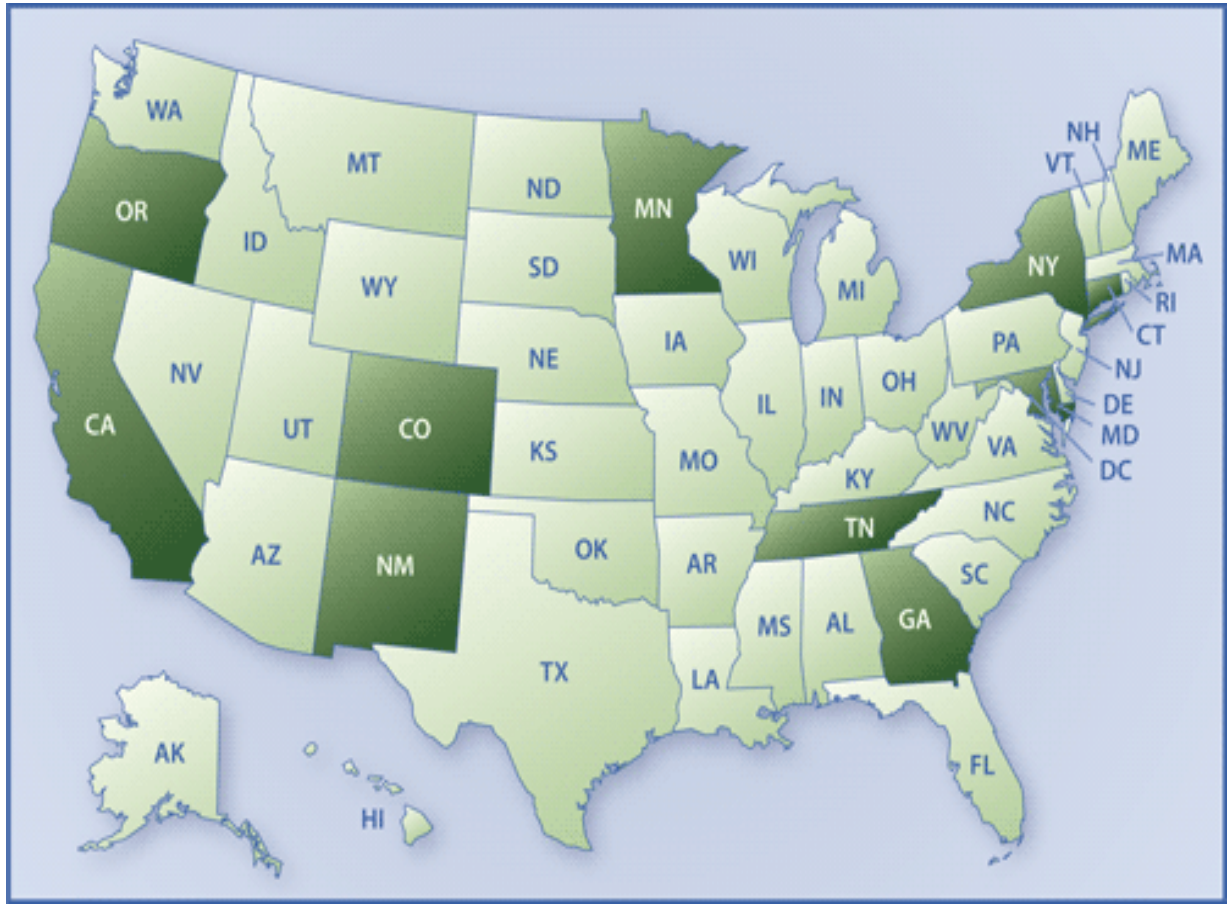
**ELC Logic Model Overview**

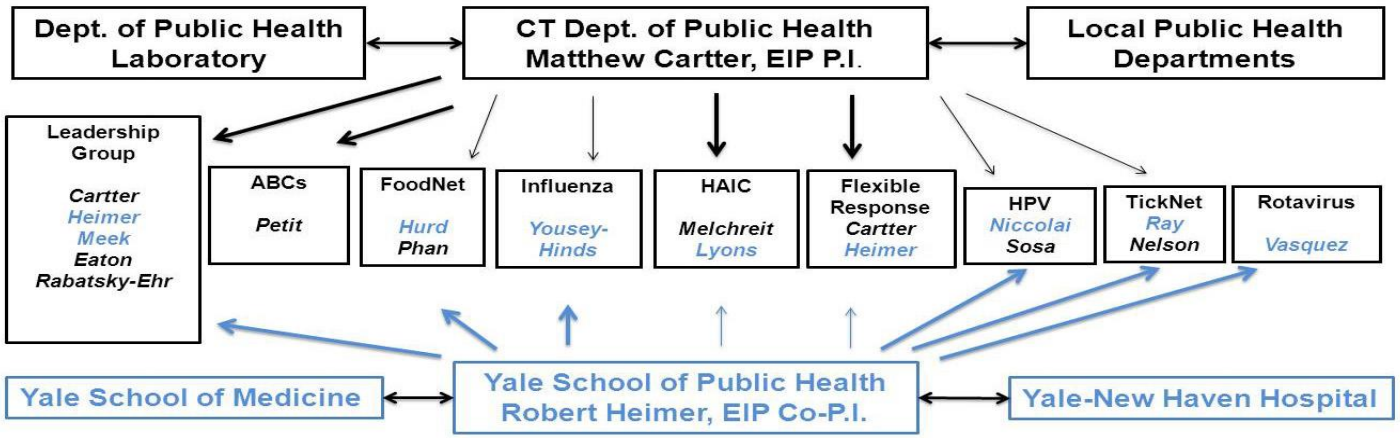
| Core Areas/Strategies | Short-term/Proximal Outcomes | Mid-term Outcomes | Long-term/Distal Outcomes |
|---|---|---|---|
| <u>1. Strengthen Epidemiological Capacity</u><br>• **Strategy 1a: Enhance investigation response and reporting**<br>• **Strategy 1b: Improve surveillance to drive public health action**<br>• **Strategy 1c: Implement and evaluate public health practice, and prevention and control strategies**<br>• **Strategy 1d: Coordinate and collaborate**<br><br><u>2. Enhance Laboratory Capacity</u><br>• **Strategy 2a: Sustain and enhance laboratory diagnostic capacity**<br>• **Strategy 2b: Improve laboratory coordination and outreach/information flow**<br><br><u>3. Improve Health Information Systems</u><br>• **Strategy 3a: Enhance Health Information Systems Workforce**<br>• **Strategy 3b: Advance Electronic Information Exchange Implementation**<br>• **Strategy 3c: Sustain and enhance integrated surveillance information systems** | • Trained workforce better prepared to respond<br>• Better coordination and exchange of data<br>• Improved surveillance<br>• Improved completeness and timeliness of reporting<br>• More timely and efficient efforts:<br>○ Detection of outbreaks<br>○ Response to outbreaks<br>○ Investigation of outbreaks<br>○ Implementation of control measures | Data used to:<br>• Improve PH response and control<br>• Improve public health practice<br>• Inform clinical medicine/ treatment<br>• Set priorities<br>• Inform program and policy development<br><br>Development and implementation of strong:<br>• Public health interventions<br>• Prevention guidelines<br><br>Earlier detection of EIDs<br><br>Increased awareness of:<br>• Public regarding EID risks and protective action<br>• Providers regarding appropriate action | • Improved treatment and prevention of infectious diseases<br>• Minimized transmission of infectious diseases<br>• Future outbreaks prevented<br>• Reduction in incidence/prevalence of preventable infectious diseases<br>• Decreased morbidity/mortality<br>• Restrained growth of health care costs<br>• Improved health outcomes, quality, and equity |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | ☒ | **Connecticut Laboratory Capacity Project Summaries**<br><br>**Project A: Epidemiology Capacity:** Ensure health departments are equipped with staff, surveillance systems and tools to provide rapid response to infectious disease threats.<br>**Project B: Laboratory Capacity:** Develop well-equipped public health laboratories, with well-trained staff, that foster communication and appropriate integration between laboratory and epidemiology functions.<br>**Project C: Health Information Systems – Electronic Lab Reporting Capacity:** Develop and enhance health information systems infrastructure in public health agencies.<br>**Project D: Laboratory Efficiencies Initiative:** Develop and enhance PHL capacity to share testing, training and services across states<br>**Project F: Cross-Cutting Outbreak Capacity:** Provide surge capacity for effective response to outbreak emergency.<br>**Project G1: OutbreakNet and NORS:** Outbreak Response and Surveillance Activities that support Connecticut statewide epidemiology capacity to respond to foodborne disease outbreaks.<br>**Project G2: FoodCORE:** Supports Connecticut statewide epidemiology and laboratory capacity to identify foodborne pathogens and monitor for clusters of disease.<br>**Project G4: PulseNet:** Supports laboratory capacity to identify foodborne pathogens and report them to PulseNet.<br>**Project G6: CaliciNet:** Capacity for Molecular Identification of Noroviruses supports laboratory capacity for molecular detection of noroviruses.<br>**Project G8: NARMS:** Supports submission of isolates to the CDC for further testing.<br>**Project 11: Prevention Infrastructure:** Supports critical health program, epidemiology and infection control staff to support healthcare-associated infection activities.<br>**Project I2: Antimicrobial Stewardship:** Supports a contractor to promote best practices for AMS in Connecticut.<br>**Project I3: Clostridium difficile Infection (CDI) Prevention:** Supports a contractor to work with CT long term care facilities on prevention of CDI.<br>**Project I5: Data Validation:** Supports continued training of the DPH HAI data validation coordinator and additional staff to conduct the project as well as dialysis data validation<br>**Project I6: Hemodialysis BSI:** Supports a contractor to work to increase infection control capacity.<br>**Project J: West Nile Virus and other Arbovirals:** Develop and implement effective surveillance, prevention, and control of arboviruses that occur. CT activities include support of a laboratory capacity at the DPH State Laboratory as well as at the Connecticut Agricultural Experiment Station.<br>**Project K: Lyme Disease:** Assist state and local health departments to develop and implement effective surveillance for | |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | diagnosis, prevention, and control of human infections of Lyme Disease supports epidemiology capacity to conduct surveillance for Lyme Disease in CT.<br>**Project M: Influenza:** Implement enhanced capacity for surveillance and diagnostic testing of respiratory viruses. Provide laboratory and epidemiologic surge capacity necessary for response to a respiratory virus-related emergency.<br>**Project M1: Influenza Surveillance and Diagnostic Testing:** Supports epidemiology and laboratory capacity for influenza testing, surveillance and analysis in CT.<br>**Project M2: Influenza Outbreak Response:** Supports additional epidemiology and laboratory capacity in Connecticut to respond to an influenza pandemic.<br>**Project N: Non-Influenza Respiratory Viruses:** Strengthen laboratory capacity to identify non-influenza respiratory viruses essential for case finding of non-influenza respiratory diseases.<br>**Project N2: Non-Influenza Respiratory Diseases:** Supports additional epidemiology and laboratory capacity during severe non-influenza respiratory outbreaks.<br>**Project U: Tickborne (non-Lyme):** Epidemiology, laboratory and/or informatics support for projects designed to improve the detection, investigation, reporting, and response to public health issues related to tickborne diseases.<br>**Project W. Advanced Molecular Detection:** Supports laboratory capacity to implementing the ability to use advanced techniques to distinguish foodborne outbreak pathogens.<br><br>**DPH State Laboratory:**<br>During 2014-2015 the DPH State Laboratory had two microbiologists fully dedicated to molecular subtyping activities including pulsed-field gel electrophoresis (PFGE). In August 2014, staff were reassigned to work on establishing protocols for whole genome sequencing of select enteric isolates<br>The Connecticut DPH has been able to develop in-house capacity to support informatics needs for electronic data exchange. This capacity includes staff from the Information Technology (IT) and the Infectious Disease (ID) Sections, in particular, the Epidemiology and Emerging Infections Programs Unit. The Informatics Specialist oversees the integrated surveillance system and electronic laboratory reporting activities and staff. The Informatics Unit is based in the Epidemiology and Emerging Infections Program. Connecticut's electronic disease surveillance system is a Consilience Software Maven-based application that supports the majority of reportable disease surveillance. DPH has completed the DPH "Electronic Laboratory Reporting (ELR) System" which is comprised of the PHIN MS secure message transport using the CDC's RnR hub, the PilotFish Technologies PilotFish integration engine and console, and an xml based vocabulary management system built on the BaseX library. The PilotFish integration engine and xml vocabulary management system together comprise the "Messaging Bus" that has been developed to process HL7 2.5.1 ELR messages that are conformant to the national ELR and Meaningful Use (MU) | **2014 and Ongoing** |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | standards as well as non-HL7 messages. The DPH ELR System can be easily modified to support older version HL7 2.3.1 messages if needed.<br><br>By August 2015, DPH will be in production ELR processing with 4 hospital laboratories using the Cerner Health Sentry System, and the DPH State Laboratory using the ChemWare HORIZON LIMS, for HIV, Hepatitis A, B, and C results. Additional disease testing from these laboratories will be underway, including testing for blood lead. This work is being supported by ID program staff. DPH will have in place an on-boarding process for bringing new laboratories into ELR production. This process will be based on the "ELR Steps and Definitions" document published by the CSTE ELDR subcommittee, and includes a readiness assessment, sharing of documents and processes such as the Connecticut DPH ELR HL7 2.5.1 messaging guide (local guide), the DPH on-boarding protocols, test message validation, vocabulary mapping, acceptance testing and production processes, and data quality validation and monitoring. | |
| | | *Other activities or descriptions:* | |
| ☒<br><br>☒ | ☐ | **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)**<br><br>**<u>Emerging Infections Program:</u>**<br><br>The ID Section also contains the Connecticut Epidemiology and Emerging Infections (EIP) Program. Since 1995 the mission of the Epidemiology and Emerging Infections Program is to prevent illness, disability, and death in Connecticut residents caused by infectious diseases. The Epidemiology and Emerging Infections Program accomplishes its mission by conducting surveillance for more than 30 infectious diseases of public health importance, investigating disease outbreaks, epidemiologic studies of emerging infectious diseases, training, and public education programs to develop, evaluate, and promote prevention and control strategies for infectious diseases. The EIP has sites in ten states, and works in partnership with medical practitioners, local and federal public health officials, other state agencies, medical and public health professional associations, infectious disease experts from academic and clinical practice, and public service organizations. (Figure2 and 3) | **1995 and Ongoing** |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| ☒<br><br>☒ | | **Figure 2. The EIP Network has sites in 10 states**:<br>  <br> | |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | **Figure 3.** **Connecticut Epidemiology and Emerging Infections (EIP) Program Structure:**   **Activities Conducted Throughout the EIP Network:**<br><br>**Active Bacterial Core surveillance (ABCs)**: Active population-based laboratory surveillance for invasive bacterial disease. Pathogens included: groups A and B *streptococcus*, *Haemophilus influenzae*, *Neisseria meningitidis*, *Streptococcus pneumoniae*, and methicillin-resistant *Staphylococcus aureus*.<br>**FoodNet**: Active population-based laboratory surveillance to monitor the incidence of foodborne diseases. Surveillance is conducted for seven bacterial and two parasitic pathogens: *E. coli* O157:H7, *Campylobacter*, *Listeria*, *Salmonella*, *Shigella*, *Yersinia*, *Vibrio*, *Cryptosporidium*, and *Cyclospora*.<br>**Influenza activities**: Active population-based surveillance for laboratory confirmed influenza-related hospitalizations. EIP sites also conduct influenza vaccine effectiveness evaluations among groups for which ACIP recommends annual vaccination.<br>**Healthcare Associated Infections-Community Interface (HAIC) projects**: Active population-based surveillance for *Clostridium difficile* infection and other healthcare associated infections caused by pathogens such as MRSA, *Candida*, and multi-drug resistant gram-negative bacteria.<br>Surveillance efforts of these core EIP activities generate reliable estimates of the incidence of certain infections and provide the foundation for a variety of epidemiologic studies to explore risk factors, spectrum of disease, and prevention strategies. | |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | **<u>State Licensing Boards:</u>**<br><br>DPH Health Care Systems (HCS) Branch is the Connecticut survey agency for CMS, and has participated with the HAI Advisory Committee since its inception in 2006, this includes putting the state HAI program on the agenda of the state licensure boards (medical, nursing), convened by DPH, on a regular basis.<br><br>**<u>Quality Collaboratives:</u>**<br><br>Qualidigm, (the state quality improvement organization) is a national healthcare consulting and research company that provides innovative and scientifically-based solutions to transform and improve care delivery and patient outcomes. In 2014 Qualidigm was contracted to conduct two state collaboratives:<br><br>**The Antimicrobial Stewardship (AMS) prevention collaborative** DPH contracted with Qualidigm, Inc. to establish an antimicrobial stewardship prevention collaborative that performed an environmental scan, enrolled five "Communities of Care" which included acute care hospitals, and collecting six months of baseline MDRO data using the National Healthcare Safety Network (NHSN) LabID module as a benchmark.<br><br>**The *Clostridium difficile* (CDI) prevention collaborative** worked with 33 participating long term care facilities to reduce CDI and multi-drug resistant infections using rapid cycle quality improvement techniques. The collaborative had a kick off meeting in April 2014 that discussed CDI pathophysiology, treatment and prevention. Participants also developed AIM statements and completed self-assessment tools utilizing APIC standards. Participants identified targeted areas for improvement such as hand hygiene, early diagnosis, rapid containment and environmental cleaning. | **2006 and Ongoing**<br><br>**2014 and Ongoing** |
| | | *Other activities or descriptions:* | |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| ☒ | ☐ | **5. Facilitate use of standards-based formats (e.g., Clinical Document Architecture, electronic messages) by healthcare facilities for purposes of electronic reporting of HAI data. Providing technical assistance or other incentives for implementations of standards-based reporting can help develop capacity for HAI surveillance and other types of public health surveillance, such as for conditions deemed reportable to state and local health agencies using 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.**<br><br>Before the expansion of HAI reporting in Connecticut in 2012, hospitals were reluctant to use the CDA of HLA massaging in NHSN as it was a burden to set up and required much data entry for very narrow disease reporting. Since disease reporting has expanded, there was a greater interest in using the CDA beginning in 2013. The HAI program has distributed guidance and has consulted with hospital IT departments and IPs to facilitate development of this capacity. Currently 12 hospitals are using CDA. | **2013 and Ongoing** |
| | | *Other activities or descriptions:* | |

**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.[6] 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):

6. Central Line-associated Blood Stream Infections (CLABSI)
7. *Clostridium difficile* Infections (CDI)
8. Catheter-associated Urinary Tract Infections (CAUTI)
9. Methicillin-resistant *Staphylococcus aureus* (MRSA) Infections
10. Surgical Site Infections (SSI)
11. 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.

[6] 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 |
|---|---|---|---|
| ☒<br>☒<br>☒<br>☒ | ☐<br>☐<br>☐<br>☐ | **1. Improve HAI outbreak detection and investigation**<br>**i. Work with partners including CSTE, CDC, state legislatures, and providers across the healthcare continuum to improve outbreak reporting to state health departments**<br>**ii. Establish protocols and provide training for health department staff to investigate outbreaks, clusters, or unusual cases of HAIs.**<br>**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**<br>**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)** | **1995 and ongoing** |
| | | ***Other activities or descriptions:***<br>As above:<br>i. Connecticut has a reportable disease list that is developed by the State Epidemiologist and authorized by the legislature annually. The list is capable of identifying diseases of interest, and can indicate an outbreak by the numbers reported.<br>ii. DPH received federal funding and can hire and train additional HAI staff. As part of their duties these staff will assist in developing training for HAI outbreak response and HAI prevention.<br>iii. Connecticut has a stringent public health confidentiality law, 19a-25, which protects the identity of patients, providers, and facilities during any investigation of infectious diseases (whether in healthcare facilities or community settings).<br>iv. The Epidemiology and Emerging Infections Program conducts surveillance for more than 30 infectious diseases of public health importance, investigating disease outbreaks, epidemiologic studies of emerging infectious diseases, training, and public education programs to develop, evaluate, and promote prevention and control strategies for infectious diseases. This program works in partnership with medical practitioners, local and federal public health officials, other state agencies, medical and public health professional associations, infectious disease experts | **1995 and ongoing** |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| ☒ | | from academic and clinical practice, and public service organizations.<br>v. A sole source contract was executed between IPRO Network of New England and DPH in early December 2014. The project director, Shelli Eason, a nurse with extensive project management and evaluation experience was hired. On March 10 forty-eight nurse trainers from 44 centers (100%) attended the opening day-long conference to inform these key personnel on the benefit of using NHSN to guide training and to evaluate the degree facilities are implementing best practices, policy changes, training, and evaluation with feedback. Information on NHSN included how NHSN data relates to ESRD CMS coverage; the CDC collaborative project; the interventions that led to tangible change in centers; the importance of NHSN data for QI review and intervention; the implications of NHSN data being shared on the CT DPH public website; and how surveys provide opportunities to verify patient safety in facilities. The training also covered infection control practices, including commonly seen infections. Recommended infection control practices were reviewed, including CDC tools and guidance for infection control in the dialysis setting. In year 2, DPH will renew its contract with IPRO. The contract requires that CDC recommendations, tools, and materials are the primary source for all assessment, training and technical assistance. IPRO will continue monthly conference calls of its Advisory Committee, made up of representatives from Large Dialysis Organizations, independent centers, hospitals, DPH HAI program staff, Mass DPH, Qualidigm (the Connecticut QIO), and infection preventionists | **December 2014 and ongoing** |
| ☒ | | vi. The new ELC 2015 Ebola funding will add nurse consultant/IPs and data analysis staff to support the development of a state infection control (IC) assessment program. The staff will provide increased data collection, management, analysis, reporting, training and technical assistance that will lead to identifying and mitigating gaps in infection control practices and outbreak reporting. | **2015** |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| ☒ | ☐ | **2. Enhance laboratory capacity for state and local detection and response to new and emerging HAI issues.**<br>CRE:<br>Managers at all 18 clinical laboratories were trained on the Connecticut CRE surveillance protocol and case definition in 2014. Connecticut has been receiving reports from 18 clinical laboratories and has entered the data into a database. Laboratory audits have not yet been completed to validate the data. In 2014, 117 isolates were reported and resistance profiles were received on 68% of these. All had appropriate data on clinical site (all were active infections as we are not receiving reports on tests for colonization, e.g., stool samples). Clinical follow-up is not routine yet. We have received reports of one novel resistance mechanism isolate, confirmed by CDC. | **2014 and ongoing** |
| | | *Other activities or descriptions:* | |
| ☒<br>☒ | ☐<br>☐ | **3. Improve communication of HAI outbreaks and infection control breaches**<br>**i. Develop standard reporting criteria including, number, size, and type of HAI outbreak for health departments and CDC**<br>**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)**<br><br>The new ELC 2015 Ebola funding will add nurse consultant/IPs and data analysis staff to support the development of a state infection control (IC) assessment program. The staff will provide increased data collection, management, analysis, reporting, training and technical assistance that will lead to identifying and mitigating gaps in infection control practices and outbreak reporting. | **See EIP Program above, page 12-14**<br><br>**2015 and ongoing** |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | | |
| | | *Other activities or descriptions* | |
| ☒<br>☒<br>☒<br>☒<br>☒<br>☒ | | **4. Identify at least 2 priority prevention targets for surveillance in support of the HHS HAI Action Plan:**<br>**I. Central line-associated bloodstream infections (CLABSI)**<br>**II. Catheter–associated urinary tract infections (CAUTI)**<br>**III. Surgical site infections (SSI)**<br>**IV. *Clostridium difficile* infections (CDI)**<br>**V. Methicillin-resistant *Staphylococcus aureus* (MRSA) infections**<br>**VI. Ventilator-associated Pneumonia (VAP)** | **Completed**<br>**I.2009**<br>**II.2012**<br>**III.2012**<br>**IV.2013**<br>**V.2013**<br>**VI. Not yet mandated by CMS** |
| | | *Other activities or description*<br><br>**See results below** | |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | **The following tables provide data on all mandated HAI reporting requirements to CMS via NHSN. Infections are reported using the Standard Infection Ratio (SIR).**<br><br>**Figure 4. What does the standardized infection ratio number mean?**<br><br>**If the SIR is more than 1:** <br><br>There was an increase in the number of infections reported in the nation compared to the national baseline.<br><br>A high SIR usually reflects a need for stronger HAI prevention efforts. Other factors may also play a role in a high SIR, such as intense data validation activities that lead to the discovery and reporting of more infections than in previous years.<br><br>**If the SIR is 1:** <br><br>There were about the same number of infections reported in the nation compared to the national baseline.<br><br>**If the SIR is less than 1:** <br><br>There was a decrease in the number of infections reported in the nation compared to the national baseline. Usually, a low SIR reflects the results of robust HAI prevention strategies. | |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | **Table 1. CT Acute Care Hospital ICU CLABSI Reports to NHSN for CMS Inpatient Prospective Payment System (IPPS) Summary Data Jan 2009 through Dec 2014** | **2009 and ongoing** |

**Acute Care ICUs CLABSI**

| Summary Year | CLABSI Count | Number Expected | Catheter Line Days | CT SIR | SIR 95% Confidence Intervals | Interpretation |
|---|---|---|---|---|---|---|
| 2009 | 109 | 120 | 56707 | 0.905 | 0.747, 1.087 | |
| 2010 | 84 | 118 | 54726 | 0.713 | 0.572, 0.878 | |
| 2011 | 71 | 128 | 59237 | 0.554 | 0.436, 0.695 | |
| 2012 | 138 | 225 | 105191 | 0.613 | 0.517, 0.721 | |
| 2013 | 99 | 212 | 99477 | 0.466 | 0.381, 0.565 | |
| 2014 | 84 | 200 | 94607 | 0.420 | 0.337, 0.518 | |

**Summary of Results 2009-2014:**

Between 2009 and 2014 Connecticut acute care hospital intensive care units (ICUs) were able to reduce their composite SIR from 0.90 to 0.42 for CLABSIs. By 2013 Connecticut had reached the 2013 national prevention target. However, catheter line days increased from approximately 57,000 to 94,600 in the same time period.

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | **Table 2. CT Acute Care Hospital Pediatric ICU CLABSI Reports to NHSN Summary Data 2009-2014** | **2009 and ongoing** |

**Pediatric ICUs CLABSI**

| Summary Year | CLABSI Count | Number Expected | Catheter Line Days | CT SIR | SIR p-value | SIR 95% Confidence Intervals | Interpretation |
|---|---|---|---|---|---|---|---|
| 2009 | 11 | 12 | 4137 | 0.886 | 0.4155 | 0.442, 1.586 | |
| 2010 | 9 | 11 | 3793 | 0.791 | 0.3008 | 0.362, 1.501 | |
| 2011 | 10 | 12 | 3835 | 0.869 | 0.4012 | 0.417, 1.598 | |
| 2012 | 6 | 10 | 3416 | 0.585 | 0.1153 | 0.215, 1.274 | |
| 2013 | 5 | 10 | 3367 | 0.495 | 0.0908 | 0.181, 1.097 | |
| 2014 | 5 | 10 | 3484 | 0.478 | 0.0736 | 0.175-1.060 | |

**Summary of Results 2009-2014:**
Between 2009 and 2014 Connecticut pediatric hospitals ICUs were able to reduce their composite SIR from 0.89 to 0.48.

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | **Table 3. CT Acute Care Hospital Neonatal ICU CLABSI Reports to NHSN Summary Data 2012-2014** | **2012 and ongoing** |

| NICU CLABSI | | | | | | | |
|---|---|---|---|---|---|---|---|
| Summary Year | CLABSI Count | Number Expected | Catheter Line Days | CT SIR | SIR p-value | SIR 95%Confidence Intervals | Interpretation |
| 2012 | 12 | 30 | 12816 | 0.4 | 0.0002 | 0.207, 0.699 | |
| 2013 | 12 | 30 | 12180 | 0.4 | 0.0003 | 0.219, 0.688 | |
| 2014 | 8 | 23 | 10267 | 0.35 | 0.0004 | 0.160, 0.656 | |

**Summary of Results 2012-2014:**
In 2012-2014 Connecticut neonatal ICUs CLABSI SIRs were significantly below the national baseline. Catheter days were reduced by 2549 days in that same time period.

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | | 2012 and ongoing |

**Table 4. CT Acute Care Hospital ICU CAUTI**
**Reports to NHSN for CMS IPPS**
**Summary Data 2012 - 2014**

| Acute Care ICU CAUTIs | | | | | | | |
|---|---|---|---|---|---|---|---|
| Summary Year | CAUTI Count | Number Expected | Catheter Days | CT SIR | SIR p-value | SIR%95 Confidence Intervals | Interpretation |
| 2012 | 510 | 272 | 120232 | 1.872 | 0.000 | 1.715, 2.040 | |
| 2013 | 423 | 254 | 112819 | 1.663 | 0.000 | 1.510, 1.828 | |
| 2014 | 396 | 235 | 104955 | 1.683 | 0.000 | 1.523, 1.855 | |

**Summary of Results 2012-2014:**
Since 2012, CT ICU CAUTIs have been statistically (65%) above the national benchmarks. CT hospitals have participated in CUSP projects and instituted process improvement measures, but rates have remained static.

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | **Figure 5. Surgical Site Infections Definitions of three SIR Models**<br><br>There are three SSI SIR models available from NHSN, each briefly described in the table below.<br><br>All SSI SIR Model: • Includes Superficial, Deep & Organ/Space SSIs • Superficial & Deep incisional SSIs limited to primary incisional SSIs only • Includes SSIs identified on admission, readmission & via post-discharge surveillance<br><br>Complex A/R SSI Model: • Includes only Deep incisional primary SSIs & Organ/Space SSIs • Includes only SSIs identified on Admission/Readmission to facility where procedure was performed • Includes only inpatient procedures • Used for the HAI Progress Report, published annually by CDC<br><br>Complex 30-day SSI model (used for CMS IPPS): • Includes only in-plan, inpatient COLO and HYST procedures in adult patients (i.e., ≥ 18 years of age) • Includes only deep incisional primary SSIs and organ/space SSIs with an event date within 30 days of the procedure • Uses only age and ASA to determine risk • Used only for CMS IPPS reporting and for public reporting on Hospital Compare | |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | | 2012 and ongoing |

**Table 5. CT Acute Care Hospital Reports to NHSN**

**All SSI SIR Model by Procedure – Colon Surgeries**

**2012-2014**

**ALL SSI COLO**
**Includes**
**superficial, deep**
**and organ space**

| Summary Year | Procedure Code | Procedure Count | All SSI Model Infection Count | All SSI Model Number Expected | All SSI Model SIR | SIR p-value | All SSI Model 95% Confidence Interval | Interpretation |
|---|---|---|---|---|---|---|---|---|
| 2012 | COLO | 3612 | 324 | 201 | 1.611 | 0.0000 | 1.443, 1.794 | |
| 2013 | COLO | 3652 | 309 | 202 | 1.526 | 0.0000 | 1.363, 1.703 | |
| 2014 | COLO | 3746 | 311 | 212 | 1.470 | 0.0000 | 1.313, 1.640 | |

**Summary of Results 2012-2014:**
Overall rates for "All SSI SIR Model" COLO SSIs have remained unchanged and statistically above the national benchmarks for this time period.

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | | 2012 and ongoing |

**Table 6. CT Acute Care Hospital Reports to NHSN**

**All SSI SIR Model by Procedure – Abdominal Hysterectomies**

**2012-2014**

| ALL SSI HYST Includes superficial, deep and organ space | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Summary Year | Procedure Code | Procedure Count | All SSI Model Infection Count | All SSI Model Number Expected | All SSI Model SIR | SIR p-value | All SSI Model 95% Confidence Interval | Interpretation |
| 2012 | Abd. HYST | 3955 | 96 | 74 | 1.29 | 0.02 | 1.051, 1.569 | |
| 2013 | Abd. HYST | 4040 | 105 | 76 | 1.38 | 0.00 | 1.136, 1.666 | |
| 2014 | Abd. HYST | 3979 | 91 | 75 | 1.20 | 0.08 | 0.976, 1.473 | |

**Summary of Results 2012-2014:**

Overall rates for "All SSI SIR Model" Abd. HYST SSIs have remained unchanged and statistically above the national benchmarks for 2012 and 2013, with improvement in 2014.

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | | 2012 and ongoing |

**Table 7. CT Acute Care Hospital Complex 30 Day SSI Model***
**For CMS IPPS: Colon Surgery**
**Summary Data 2012 -2014**

**Complex 30 day SSIs**
**Deep and Organ Space**
**COLO**

| Summary Year | Procedure | Procedure count | Number of infections(complex 30 day) | Number of expected infections | CT SIR | SIR p-value | SIR 95% Confidence Intervals | Interpretation |
|---|---|---|---|---|---|---|---|---|
| 2012 | COLO | 3591 | 141 | 109 | 1.295 | 0.004 | 1.094, 1.522 | |
| 2013 | COLO. | 3639 | 141 | 111 | 1.270 | 0.007 | 1.073, 1.493 | |
| 2014 | COLO. | 3714 | 171 | 115 | 1.489 | 0.000 | 1.278, 1.725 | |

* Complex 30 day Definition:
Pt ≥ 18 yrs old, SSI event date within 30 days of procedure, Excludes Superficial excisional & Deep Incisional Secondary SSIs, and only includes those procedures/SSIs with primary closure techniques. Complex 30 Day SSI Model is used for CMS reporting and for public reporting on Hospital Compare website

**Summary of Results 2012-2014:**
These rates have remained statistically above nation benchmarks for this time period.

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | | 2012 and ongoing |

**Table 8. CT Acute Care Hospital Complex 30 Day SSI Model***
**For CMS IPPS: Abdominal Hysterectomy Surgery**
**Summary Data 2012 -2014**

**Complex 30 day SSIs**
**Deep and Organ Space**
**Abd. Hyst**

| Summary Year | Procedure | Procedure count | Number of infections (complex 30 day) | Number of expected infections | CT SIR | SIR p-value | SIR 95% Confidence Intervals | Interpretation |
|---|---|---|---|---|---|---|---|---|
| 2012 | Abd. Hyst. | 3950 | 47 | 33 | 1.417 | 0.023 | 1.053, 1.868 | |
| 2013 | Abd. Hyst. | 4039 | 59 | 34 | 1.713 | 0.000 | 1.316, 2.194 | |
| 2014 | Abd. Hyst. | 3976 | 37 | 35 | 1.058 | 0.716 | 0.756, 1.443 | |

* Complex 30 day Definition:
Pt ≥ 18 yrs old, SSI event date within 30 days of procedure, Excludes Superficial excisional & Deep Incisional Secondary SSIs, and only includes those procedures/SSIs with primary closure techniques. Complex 30 Day SSI Model is used for CMS reporting and for public reporting on Hospital Compare website.

**Summary of Results 2012-2014:**
These rates have remained unchanged and statistically above the national benchmarks for 2012-2013, with improvement in 2014.

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | | 2012 and ongoing |

**Table 9. CT Acute Care Hospital NHSN Data for CMS IPPS:**
**2013-2014**
**MRSA Blood FacwideIN* LabID**

| Hospital Onset (HO) MRSA | Number of HO MRSA | Number predicted HO MRSA | Number of pt. days | SIR | SIR p-value | SIR 95% Confidence Intervals | Interpretation |
|---|---|---|---|---|---|---|---|
| 2013 | 110 | 148 | 1,993,507 | 0.744 | 0.0014 | 0.614, 0.893 | |
| 2014 | 87 | 135 | 1,969,098 | 0.645 | 0.0000 | 0.520, 0.792 | |

**Definition:**

**MRSA = Methicillin-resistant *Staphylococcus aureus***

**FACWideIn = Includes only inpatient-facility wide data relevant to MRSA blood LabID reporting AND separately for outpatient emergency department, and 24-hour observation location(s).**

**Healthcare Facility-Onset (HO): LabID Event collected >3 days after admission to the facility (i.e., on or after day 4).**

**MDRO Bloodstream Infection Incidence Rate = Number of all unique blood source LabID Events per patient per month identified >3 days after admission to the location (if monitoring by inpatient location), or facility (if monitoring by overall facility-wide inpatient=FacWideIN) / Number of patient admissions to the location or facility x 100 (will be removed from NHSN analysis in July**

**Summary of Results 2013-2014:**

In 2013 and 2014 Connecticut acute care hospitals were able to maintain a statically significant reduction in hospital acquired MRSA compared to other hospitals reporting to NHSN.

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | | 2013 and ongoing |

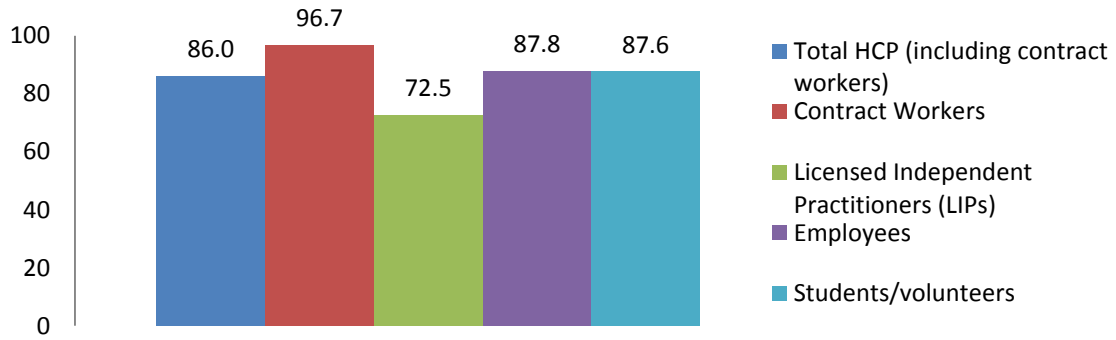
**Table 10. CT Acute Care Hospital NHSN Data for CMS IPPS:**
**2013-2014**
***C. difficle (CDI)* FacwideIN* LabID**

| Hospital Onset (HO) C. diff. | Number of HO C. diff. | Number predicted HO C. diff. | Number of pt. days | SIR | SIR p-value | SIR 95% Confidence Intervals | Interpretation |
|---|---|---|---|---|---|---|---|
| **2013** | **1475** | **1442** | **1,829,590** | **1.023** | **0.3942** | **0.972, 1.076** | |
| **2014** | **1515** | **1406** | **1,828,577** | **1.077** | **0.0044** | **1.024, 1.132** | |

*** Definition**:
FACWideIn = Includes only inpatient-facility wide data relevant to CDI LabID reporting.
Healthcare Facility-Onset (HO): LabID Event collected >3 days after admission to the facility (i.e., on or after day 4).
Facility CDI Healthcare Facility-Onset Incidence Rate = Number of all Incident HO CDI LabID Events per month in the facility/ Number of patient days for the facility x 10,000 (this calculation is only accurate for Overall Facility-wide Inpatient reporting)

**Summary of Results 2013-2014:**

In 2014 Connecticut acute care hospital rates of hospital acquired C. diff. where statically worse than other hospitals reporting to NHSN

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | **Figure 6. CT Acute Care Hospital Healthcare Personnel Influenza Vaccination Compliance by Type Influenza Season 2013-2014**<br>  <br><br>**Summary of Results**<br>During the 2013-2014 influenza season, 86% (range 67%-100%) of all HCP in acute care hospitals were vaccinated. Slight improvement from the 2012-2013 influenza season, 83% HCP vaccinated (range 30%-99%). | **2013 and ongoing** |

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

**Table 11. CT Long Term Acute Care Hospital (LTACH) CLABSI Reports to NHSN for CMS LTCH PPS-Overall Summary Data 2014**

| LTACH CLABSI | | | | | | | |
|---|---|---|---|---|---|---|---|
| Summary Year | CLABSI Count | Number Expected | Catheter Line Days | CT SIR | SIR p-value | SIR 95%Confidence Intervals | Interpretation |
| 2014 | 12 | 18 | 17111 | 0.673 | 0.1565 | 0.364, 1.143 | |

**Summary of Results:**
In 2014 CLABSIs in CT LATACs were comparable to national baseline.

**Table 12. CT Long Term Acute Care Hospital (LTACH) CAUTI Reports to NHSN for CMS LTCH PPS-Overall Summary Data 2014**

| LTACH CAUTI | | | | | | | |
|---|---|---|---|---|---|---|---|
| Summary Year | CAUTI Count | Number Expected | Catheter Days | CT SIR | SIR p-value | SIR 95%Confidence Intervals | Interpretation |
| 2014 | 46 | 32 | 14974 | 1.438 | 0.0191 | 1.065,1.902 | |

**Summary of Results:**
In 2014 CAUTIs in CT LATACs were statistically above the national benchmarks.

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

**Table 13. CT Inpatient Rehabilitation Facilities (IRF)**
**Adult and Pediatric Wards**
**CAUTI Reports to NHSN**
**for CMS PPS-Overall**
**Summary Data 2014**

| IRF CAUTI | | | | | | | |
|---|---|---|---|---|---|---|---|
| Summary Year | CAUTI Count | Number Expected | Catheter Days | CT SIR | SIR p-value | SIR 95%Confidence Intervals | Interpretation |
| 2014 | 11 | 9 | 2571 | 1.253 | 0.4445 | 0.659,2.170 | |

**Summary of Results:**
In 2014 CAUTIs in CT IRF were comparable to national baseline.

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

**Table 14. CT Hemodialysis Access-Related Bloodstream Infection (BSI)**
**Rates per 100 Patient Months**
**Report to NHSN**
**All Access (fistula, graft, catheter)**
**Summary Data 2013-2014**

**Hemo. Access-related BSI**

| Summary year | Access Type | Total # BSI | Total # (count) of Patient Months | BSI rate /100 patient-months | NHSN pooled mean BSI rate/100 patient months | Interpretation |
|---|---|---|---|---|---|---|
| 2013 | All | 279 | 36374 | 0.767 | 1.27 | |
| 2014 | All | 316 | 37127 | 0.851 | 1.27 | |

**Summary of Results:** In 2013 and 2014 Connecticut hemodialysis centers were able to maintain a statically significant reduction in access-related bloodstream infections compared to other centers reporting to NHSN.

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| ☒<br>☒ | ☐<br>☐ | **5. Adopt national standards for data and technology to track HAIs (e.g., NHSN).**<br>**i. Develop metrics to measure progress towards national goals (align with targeted state goals). See Appendix 1.**<br>**ii. Establish baseline measurements for prevention targets** | **Completed 2009** |
| | | *Other activities or descriptions:* | |
| ☒ | ☐ | **6. Develop state surveillance training competencies**<br>**i. Conduct local training for appropriate use of surveillance systems (e.g., NHSN) including facility and group enrollment, data collection, management, and analysis**<br><br>Since 2008, the DPH HAI program has conducted annual NHSN training programs. As of 2015, training has continued for Acute Care Hospitals, Long Term Acute Care Hospitals, Inpatient Rehabilitation Facility staff, and ambulatory surgical centers on the NHSN in preparation for new Centers for Medicaid and Medicare Services (CMS) reporting requirement from those facilities. | **Initiated 2007 and ongoing as new NHSN modules are added** |
| | | *Other activities or descriptions* | |
| ☒ | ☐ | **7. Develop tailored reports of data analyses for state or region prepared by state personnel**<br>Since 2008 DPH HAI Program is mandated, based on state statute, to provide an annual report on program activities. The report includes data analysis of each hospital in the state. | **Initiated 2008** |
| | | *Other activities or descriptions:* | |
| ☒<br>☒<br>☒<br>☒ | ☐<br>☐<br>☐<br>☐ | **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**<br>Data validation – DPH completed CLABSI validation process for CLABSI numerators and denominators in 2010 and 2014 respectively<br><br>**I. Develop a validation plan**<br>**II. Pilot test validation methods in a sample of healthcare facilities**<br>**III. Modify validation plan and methods in accordance with findings from pilot project** | **Completed and Published 2010, 2014**<br>**Ongoing for each new NHSN module** |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| ☒<br>☒<br>☒ | ☐<br>☐<br>☐ | **IV. Implement validation plan and methods in all healthcare facilities participating in HAI surveillance**<br>**V. Analyze and report validation findings**<br>**VI. Use validation findings to provide operational guidance for healthcare facilities that targets any data shortcomings detected** | |
| | | *Other activities or descriptions:*<br>***Publications:***<br>**1.** Backman LA, Melchreit R, Rodriguez R. **Validation of the surveillance and reporting of central line-associated bloodstream infection data to a state health department.** Am J Infect Control. 2010 Dec;38(10):832-8. doi: 10.1016/j.ajic.2010.05.016.<br><br>**2.** Backman LA, Nobert G, Melchreit R, Fekieta R, Dembry LM**. Validation of the surveillance and reporting of central line-associated bloodstream infection denominator data.** Am J Infect Control. 2014 Jan;42(1):28-33. doi: 10.1016/j.ajic.2013.06.014. Epub 2013 Oct 29. | |
| ☒ | ☒ | **9. Develop preparedness plans for improved response to HAI**<br>**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**<br>**Surveillance**<br>i. The state HAI Advisory Committee recommended that public HAI reporting in Connecticut continues to mirror the scope of CMS reporting. The Reportable Conditions Committee concurred and therefore recommended that CLABSI and CAUTI from ACH and LTACs, CAUTI from IRFs, and the MRSA and c. difficile LabID from acute care hospitals be reported along with colon and hysterectomy SSIs. Hemodialysis centers also report NHSN "dialysis events." CMS is requiring hospitals to report healthcare worker influenza vaccination; in Connecticut they already publicly report healthcare worker vaccination publicly through the state Immunizations Program.<br>ii. Since 2008, the DPH HAI program has conducted annual NHSN training programs. As of 2015, training has continued for Acute Care Hospitals, Long Term Acute Care Hospitals, Inpatient Rehabilitation Facility staff, and ambulatory surgical centers on the NHSN in preparation for | **Activities from 2009 – 2015** |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
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| | | new Centers for Medicaid and Medicare Services (CMS) reporting requirement from those facilities.<br>iii. Data validation – DPH completed CLABSI validation process for CLABSI numerators and denominators in 2010 and 2014 respectively<br>iv. The Connecticut HAI Emerging Infections Program participated in the nation's hospital HAI prevalence and antimicrobial use survey. Nationally 4.0 % of 11,282 surveyed patients in 183 hospitals had HAIs.<br><br>**Prevention**<br>i. DPH contracted with Qualidigm, Inc. to establish an antimicrobial stewardship prevention collaborative to perform an environmental scan, enrolling five "Communities of Care" which included acute care hospitals into the collaborative, and collected six months of baseline MDRO and CDI data using the National Healthcare Safety Network (NHSN) LabID module as a benchmark.<br>ii. DPH received a Public Health Foundation Future of Public Health Award to incorporate quality Improvement methods into public health and medical practice. The DPH led a *Clostridium difficile* prevention collaborative with 25 long term care facilities.<br>iii. DPH supported the End Stage Renal Disease Network of New England in its development of the first NHSN dialysis validation protocol in the nation.<br>**Training**<br>i. In 2011, Federal stimulus act (ARRA)-funded APIC training in infection control (EPI 101 and 201).<br>**Policy and Leadership**<br>i. The Multi-Disciplinary HAI Advisory Committee focused on policy changes affecting healthcare associated infections, education campaigns such as promoting hand hygiene; and the evaluation of hospital resources associated with healthcare associated infection prevention.<br>ii. The Technical Advisory Group (TAG) provided technical advice to the DPH Healthcare | |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | Associated Infections Program for HAI surveillance including advice on medical care, epidemiology, statistics, infectious diseases etc.<br>iii. Public Reporting Group is a committee charged with making recommendations to the Connecticut Department of Health on the public reporting of healthcare-associated infections.<br>iv. The Education Sub-Committee provides education and training about healthcare associated infections & prevention of healthcare associated infections to applicable persons and healthcare disciplines.<br>v. Connecticut Leadership for Quality Healthcare Coalition is a multi-disciplinary and multi-stakeholder advisory committee established by Qualidigm as a component of its CMS 10th Scope of Work. HAIs are one of the focus areas for this group, and the DPH HAI Coordinator is one of several DPH staff participating on the group with Commissioner Mullen in 2010.<br><br>**Outbreaks**<br>i. In 2012, Connecticut was heavily involved in the surveillance and response to the Multistate Fungal Meningitis Outbreak as one of the 27 states receiving shipment of the contaminated lots of methyl prednisolone from the New England Compounding Center. We have collaborated with the state Department of Consumer Protection (which regulates pharmacies in Connecticut) on communications with both the medical and pharmacy communities about patient notification and monitoring. | |
| | | ***Other activities or descriptions:***<br><br>With the award of the 2015 Ebola Grant the DPH will enhance outbreak response and reporting<br><br>DPH HAI Program will:<br>i. Identify 2012-2015 NHSN HAI rates and HAI outbreaks by individual acute care hospitals (ACH);<br>ii. Identify 2012-2015 outbreak reports to DPH from Reportable Disease databases;<br>iii. Query individual ACH facility for facility specific outbreak identification and response activities; | **Beginning June 2015 and ongoing** |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | iv. Correlate facility specific NHSN rates with facility specific outbreak/prevention activities;<br>v. Request participation and attend IC Committee meetings in each of the 29 ACH,s beginning with ACHs with HAI rates above baseline;<br>vi. Present NHSN data, identified HAI reporting gaps, outbreak/prevention activities (individual and statewide), and examples of successes, for discussion and problem solving at IC meetings<br>vii. Offer education, consultation, technical assistance, staff trainings, collaboration with state prevention partners, and updates at future IC meetings;<br>viii. Prepare progress reports summarizing DPH HAI program activities for state HAI Advisory group. | |
| ☒ | ☒ | **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**<br><br>DPH is working in collaboration with CT state licensing agency by reviewing all ACH licensing agency visitations (either as state or CMS reviewers) for infection control violations or recommendations. Nurse consultants will be categorizing infection control gaps, and work with stakeholders on improvements. | **July 2015 and ongoing** |
| | | *Other activities or descriptions:* | |
| ☒<br><br>☒ | ☒<br><br>☒ | **11. Adopt integration and interoperability standards for HAI information systems and data sources**<br><br>**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**<br>See Emerging Infections Program description of projects , pg. 12<br><br>**ii. Promote definitional alignment and data element standardization needed to link HAI data across the nation.**<br>NHSN standard definitions | **Complete** |
| | | *Other activities or descriptions:* | |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| ☒ | ☐ | **12. Enhance electronic reporting and information technology for healthcare facilities to reduce reporting burden and increase timeliness, efficiency, comprehensiveness, and reliability of the data**<br>**i. Report HAI data to the public**<br>NHSN data is reported to CMS and healthcare facilities throughout the state. It is reportable to DPH based on state statute. Reports are also available to the public on the DPH website, and Medicare Hospital Compare website | **Complete** |
| | | *Other activities or descriptions:* | |
| ☒ | ☐ | **13. Make available risk-adjusted HAI data that enable state agencies to make comparisons between hospitals.**<br>Using NHSN SIR for comparison between hospitals | **Complete** |
| | | *Other activities or descriptions:* | |
| ☒ | ☒ | **14. Enhance surveillance and detection of HAIs in nonhospital settings**<br><br>CT DPH surveillance is aligned with CMS reporting requirements. CMS schedule for HAI reporting and additional reporting criteria for reporting is outlined in Appendix 3. | **Initiated 2012 and ongoing** |

**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**<br><br>**i. Develop strategies for implementation of HICPAC recommendations for at least 2 prevention targets specified by the state multidisciplinary group.** | **Initiated 2009 and ongoing** |
| | | *Other activities or descriptions:*<br>The HICPAC recommendations for CLABSIs include use of a set of prevention practices that need to be used in concert to be effective in preventing HAIs, commonly referred to as "bundles." The implementation of these bundles is a strategy promoted by DPH. The Comprehensive Unit Based Safety Program developed at Johns Hopkins was introduced in CT in 2009 with 17 intensive care unit (ICU) teams participating from 14 hospitals. The Connecticut hospitals that have participated in the project have committed their ICU teams to work collaboratively to prevent CLABSIs by standardizing processes related to the insertion, maintenance, and removal of central-lines, and measurably improving the culture of safety in the ICU. In its final year (2011) of the project, teams continued to spread their successful interventions hospital-wide and attended a final session to celebrate their collective achievement.<br>In the fall of 2011 CHA expanded the Stop BSI project to encompass the Stop CAUTI project, a national initiative aimed at reducing catheter-associated urinary tract infections (CAUTI). The goal of the project is to reduce CAUTIs by 25 percent through the implementation of best practices for the appropriate placement, continuance, and timely removal of urinary tract catheters. | |
| ☒ | ☐ | **2. Establish prevention working group under the state HAI advisory council to coordinate state HAI collaboratives**<br>**i. Assemble expertise to consult, advise, and coach inpatient healthcare facilities involved in HAI prevention collaboratives** | **Initiated 2009 and ongoing** |
| | | *Other activities or descriptions:*<br>The DPH works in partnership with the Connecticut Hospital Association (CHA) and Qualidigm. Together they collaborate with healthcare providers to facilitate sharing local and national best practices, tools and resources, and strategies for implementing prevention initiatives and garnering | |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | leadership support. The DPH has either hosted or participated in a number of seminars on infection prevention and approaches for promoting quality improvement. DPH Commissioner Mullen has been regularly communicating with hospital Chief Executive Officers through circular letters and memos about HAI reporting initiatives.<br><br>All hospitals licensed by the DPH have a hospital-wide program for the prevention, control, and investigation of infectious diseases. Nurses, physicians, medical technologists, and other professionals who have acquired special training in infection control or epidemiology manage these programs. Hospitals collaborate via the CHA Infection Prevention Coordinators Conference and the DPH HAI Advisory Committee.<br><br>The efforts of these infection prevention and control programs have resulted in the development of several national HAI prevention programs to help eliminate HAIs. One of these is the Comprehensive Unit-based Safety Program (CUSP) described above, and now managed by Health Research and Educational Trust (HRET). This program uses carefully crafted quality improvement and workplace culture change methods to achieve the goal of consistently and sustainably by incorporating proven best practices to prevent CLABSIs and CAUTIs. | |
| ☒<br>☒<br>☒ | ☐<br>☐<br>☐ | **3. Establish HAI collaboratives with at least 10 hospitals (this may require a multi-state or regional collaborative in low population density regions)**<br>**i. Identify staff trained in project coordination, infection control, and collaborative coordination**<br>**ii. Develop a communication strategy to facilitate peer-to-peer learning and sharing of best practices**<br>**iii. Establish and adhere to feedback from standardized outcome data to track progress** | **Initiated 2009 and ongoing** |
| | | ***Other activities or descriptions:***<br>As above<br>Additionally, Qualidigm, a national healthcare consulting and research company that provides innovative and scientifically-based solutions to transform and improve care delivery and patient outcomes, was contracted with the state to conduct two collaboratives through July 2014. | **2014** |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | i. **The Antimicrobial Stewardship (AMS) prevention collaborative** was used to assist 11 participating communities to implement antimicrobial stewardship programs based on their community specific needs.<br><br>ii. **The Clostridium Difficile (CDI) prevention collaborative** worked with 33 participating long term care facilities to reduce CDI and multi-drug resistant infections using rapid cycle quality improvement techniques. The collaborative had a kick off meeting in April 2014 that discussed CDI pathophysiology, treatment and prevention. Participants also developed AIM statements and completed self-assessment tools utilizing APIC standards. Participants identified targeted areas for improvement such as hand hygiene, early diagnosis, rapid containment and environmental cleaning | |
| ☒ | ☐ | **4. Develop state HAI prevention training competencies**<br><br>**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** | **Initiated 2009 and ongoing** |
| | | ***Other activities or descriptions:***<br>• DPH received a Public Health Foundation Future of Public Health Award to incorporate quality Improvement methods into public health and medical practice. The DPH led a *Clostridium difficile* prevention collaborative with 25 long term care facilities<br>• DPH supported the End Stage Renal Disease Network of New England in its development of the first NHSN dialysis validation protocol in the nation. | **2011** |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| | | • Federal stimulus act (ARRA)-funded APIC trainings in infection control (EPI 101 and 201) in 2011.<br>• CT DPH also developed public service ads and announcements, winning a 2012 Silver Award in the Integrated Communications – Not-For-Profit category, the campaign was designed to increase Connecticut residents' awareness of statewide prevention efforts for reducing healthcare associated infections (HAIs) and what Connecticut healthcare patients, visitors, workers and providers could do to aid in these efforts. Through a series of television ads, city transit bus posters, and prevention materials displayed in healthcare facilities around Connecticut, the infection prevention messages were communicated to Connecticut residents.<br><br>Steps that Connecticut residents can do to prevent healthcare associated infections, include;<br><br>1. **Good Hand Hygiene**: Wash your hands<br>2. **Good Respiratory Etiquette**: Sneeze in your Sleeve<br>3. **Know Your Vaccination Status** -- Be up-to-date on immunizations for both childhood diseases and adult diseases: Get your Flu Shot<br>4. **Know the proper use of antibiotics**: Finish Your Antibiotics<br>5. **Pre-Surgery Preparedness**: Make My Day – Follow your pre-surgical instructions.<br>6. **Speak-Up**: Be your own advocate or bring a family member or friend with you to all healthcare appointments. Bring a friend with you to your doctor's appointment.<br><br>http://www.ct.gov/dph/cwp/view.asp?a=3136&q=424188&pp=12 | |
| ☒ | ☐ | **5. Implement strategies for compliance to promote adherence to HICPAC recommendations**<br><br>**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** | **Initiated 2009 and ongoing** |

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| ☒<br>☒<br>☒ | ☐<br>☐<br>☐ | **ii. Coordinate/liaise with regulation and oversight activities such as inpatient or outpatient facility licensing/accrediting bodies and professional licensing organizations to prevent HAIs**<br>**iii. Improve regulatory oversight of hospitals, enhance surveyor training and tools, and add sources and uses of infection control data**<br>**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** | |
| | | ***Other activities or descriptions:***<br><br>The DPH created a statewide health improvement plan that provides a blueprint for action to address some of Connecticut's most challenging health issues. The plan helps to promote *Healthy Connecticut 2020,* the DPH plan for improving the health of Connecticut residents by the end of 2020. The plan provides a common framework for organizations to use in leveraging resources, engaging partners, identifying their own priorities, and strategies for collective action. The DPH will work with the HAI Advisory Committee and other partners and stakeholders on the objectives in the plan. Some of the objectives include:<br>i. Enhancing the State's public reporting infrastructure for healthcare associated infections<br>ii. Reducing the rate of catheter-associated urinary tract infections in long term care facilities<br>iii. Reducing the rate of *Clostridium difficile* infections in long term care facilities<br>iv. Reducing the rate of central line-associated bloodstream infections in hemodialysis facilities<br>v. Reducing the number of surgical site infections in ambulatory surgical centers | |
| ☒ | ☐ | **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)**<br>As above | **Initiated 2009 and ongoing** |
| | | *Other activities or descriptions:* | |
| ☒ | ☐ | **7. Establish collaborative(s) to prevent HAIs in nonhospital settings (e.g., long term care, dialysis)**<br>As above | **Initiated 2009 and ongoing** |
| | | *Other activities or descriptions:* | |

**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 |
|---|---|---|---|
| ☒<br><br>☒ | ☐<br><br>☒ | **1. Conduct needs assessment and/or evaluation of the state HAI program to learn how to increase impact**<br><br>**i. Establish evaluation activity to measure progress toward targets and**<br><br>An assessment survey sent to all ACH IPs in spring 2015; survey results analyzed July 2015.<br>**ii. Establish systems for refining approaches based on data gathered**<br><br>Data from ACH IP survey will be presented to the Multidisciplinary Group and members will work with DPH HAI staff on writing of the relevant section in our new state HAI plan. | **July-August 2015** |
| | | *Other activities or descriptions (not required):* | |
| ☒ | ☐ | **2. Develop and implement a communication plan about the state's HAI program and about progress to meet public and private stakeholders needs**<br><br>**i. Disseminate state priorities for HAI prevention to healthcare organizations, professional provider organizations, governmental agencies, non-profit public health organizations, and the public**<br><br>Transparency and Communication with Public and Private Stakeholders:<br>Connecticut's DPH has alway been open and transparent regarding information and | **Initiated 2008 and ongoing** |

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| | | statistics on outbreaks of disease and infection control and prevention in the state. The DPH provides a variety of on-line publications reporting statistics, outbreaks, and preventive measures for both healthcare agencies and the public, including the following:<br>i. The Connecticut Epidemiologist Newsletter, this publication has been produced by the Connecticut Department of Public Health, since 1982. It is an important tool for the Division of Infectious Diseases to supply current disease information to primary care physicians, infection preventionists, other health professionals, and the public. It includes information on outbreaks of infectious disease and other epidemiologically significant diseases in the state. It is available on the DPH website at: http://www.ct.gov/dph/cwp/view.asp?a=3136&q=388262<br>ii. The DPH HAI website also contains information on types of HAIs, multi-drug resistant bacteria, infection prevention, and links to CDC's website: http://www.ct.gov/dph/cwp/view.asp?a=3136&q=417318<br>iii. Reportable disease statistics can be found at: http://www.ct.gov/dph/cwp/view.asp?a=3136&q=388390&dphNav_GID=1601<br>iv. Connecticut's NHSN reported infection rates can be found at: http://www.cdc.gov/hai/pdfs/stateplans/factsheets/ct.pdf | |
| | | *Other activities or descriptions:* | |
| ☒ | ☐ | **3. Provide consumers access to useful healthcare quality measures**<br><br>**i. Disseminate HAI data to the public**<br>See above.<br>Information can also be found on Medicare's Hospital Compare website: http://www.medicare.gov/hospitalcompare/search.html | **Initiated 1982 and ongoing**<br><br>**2012** |
| | | *Other activities or descriptions:* | |
| ☒ | ☐ | **4. Guide patient safety initiatives**<br>**i.** Identify priorities and provide input to partners to help guide patient safety initiatives and research aimed at reducing HAIs<br><br>Every year since 2008, the DPH HAI program has conducted data validation audits | **2008 and ongoing** |

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| | | followed by HAI training programs for the purpose of reviewing validation results, and reviewing NHSN protocols and surveillance definitions based on common errors, knowledge gaps, and misinterpretations identified from the validation audits. These trainings have included many statewide HAI prevention partners such as: CT HAI Advisory Committee members; Qualidgm; the CT Hospital Association (CHA); the CT Emerging Infections Program (EIP) at Yale University; the CT Infectious Disease Society; APIC-New England; the CT Infection Prevention Group; the Infection Control Nurses of CT; and the IPRO End State Renal Disease (ESDR) Network of New England. Additionaly, these trainings have enhanced communication with the IPs, resulting in DPH acting as a resource and advocate for consistent, objective and independent application of NHSN definitions. A review of the 2012 validation results and intense NHSN surveillance definition review was presented to the Acute care hospitals (ACH), Long term acute care hospitals (LTACs), and Inpatient Rehabilitation Facilities (IRFs) staff on March 27 and April 10, 2014. In addition to sharing the validation audit results with each individual hospital through telephone calls and a formal "CT DPH Audit Discrepancy Report", DPH has discussed this data with the CDC NHSN team through publication of the data, presentation of the data with the NHSN team which included the audit challenges and lessons learned, and participation as a member of the DHQP CAUTI ad-hoc expert panel. | |
| | | *Other activities or descriptions:* | |

**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 |
|---|---|---|---|
| ☒<br><br>☒ | ☐<br><br>☐ | **1. Create an inventory of all healthcare settings in state. List must include at least one infection control point of contact at the facility**<br><br>Since 2008, DPH has maintained a list of healthcare facilities reporting to NHSN. The list is updated annually. As of July 1, 2015, 131 CT facilities report to NHSN. In 2015 DPH is in the process of re- designing an Excel spreadsheet for each category of healthcare facility with name, address, # of beds, type of regulatory/licensure, infection control point of contact, etc. see example, Appendix 4<br><br>**2. Identify current regulatory/licensing oversight authorities for each healthcare facility and explore ways to expand oversight**<br>As above. Working with Wendy Furniss, RNC, MS, Branch Chief, Healthcare Quality and Safety Branch, CT DPH to identify oversight authority for each healthcare facility. | **October 1, 2015** |
| | | *Other activities or descriptions:* | |
| ☒ | ☒ | **3. Assess readiness of Ebola-designated facilities within the state**<br>**i. Use CDC readiness assessment tool and determine gaps in infection control**<br>**ii. Address gaps (mitigate gaps)** | **October 1, 2015** |

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|---|---|---|---|
| ☒<br>☒ | ☒<br>☒ | **iii. Conduct follow-up assessments**<br>There are no designated Ebola treatment centers in CT. CDC came to CT in November 2014 to assess 2 hospitals for Ebola readiness as Assessment Facilities. A third evaluation will be conducted in a third hospital on 8/25/15. From these evaluations gaps will be identified, mitigated, and followed–up assessments will be conducted. | |
| | | *Other activities or descriptions:* | |
| ☒<br>☒<br>☒ | ☒<br>☒<br>☒ | **4. Assess outbreak reporting and response in healthcare facilities**<br>**i. Use standard assessment tool and determine gaps in outbreak reporting and response**<br>**ii. Address gaps (mitigate gaps)**<br>**iii. Track HAI outbreak response and outcome**<br>DPH HAI Program will:<br>• Identify 2012-2015 NHSN HAI rates and HAI outbreaks by individual acute care hospitals (ACH);<br>• Identify 2012-2015 outbreak reports to DPH from Reportable Disease databases;<br>• Query individual ACH facility for facility specific outbreak identification and response activities;<br>• Correlate facility specific NHSN rates with facility specific outbreak/prevention activities;<br>• Request participation and attend IC Committee meetings in each of the 29 ACHs beginning with ACHs with HAI rates above baseline;<br>• Present NHSN data, identified HAI reporting gaps, outbreak/prevention activities (individual and statewide), and examples of successes, for discussion and problem solving at IC meeting;<br>• Offer education, consultation, technical assistance, staff trainings, collaboration with state prevention partners, and updates at future IC meetings;<br>• Prepare progress reports summarizing DPH HAI program activities for state HAI Advisory group | **October 1, 2015 and ongoing** |

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| | | | |
| | | *Other activities or descriptions:* | |

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

| Check Items Underway | Check Items Planned | Items Planned for Implementation (or currently underway) | Target Dates for Implementation |
|---|---|---|---|
| ☒<br>☒<br>☒ | ☒<br>☒<br>☒ | **1. Expand infection control assessments**<br><br>**i. Expand assessments to other additional facilities and other healthcare settings and determine gaps in infection control**<br>**ii. Address gaps (mitigate gaps)**<br>**iii. Conduct follow-up assessments**<br><br>• CT has 131 healthcare facilities reporting data to CMS/NHSN: 29 acute care hospitals (ACH), 6 Long Term Acute Care (LTAC), 8 Inpatient Rehabilitation facilities (IRFs), 44 End Stage Renal Dialysis facilities (ESRD) and 44 Ambulatory Surgical Facilities (ASCs).<br>• Data activities will expand to the other NHSN healthcare facilities once ongoing ACH reports are established.<br>• By September 1, 2015, DPH will prepare and conduct a hands-on, interactive NHSN data training with attendance from all 29 ACHs, 6 LTAC, and 8 IRFs. Since reporting modules are different for the CT ESRDs and ASCs, separate trainings will be conducted. Written guidance on data analysis and preparation of HAI data reports (monthly, quarterly, annual, trends over time) by patient care unit and pathogens will be provided. One-on-one or other additional trainings will be scheduled as needed.<br>• In May 2016, DPH will conduct an annual training on 2016 NHSN Surveillance Definitions. The six state QIO and CT Hospital Association will partner with this training. This training will be attended by all ACH, LTAC, IRF IPs. | **October 1, 2015 and ongoing** |

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| | | • By May 1, 2016, in partnership with the six-state New England QIO and CT hospital association, DPH HAI will organize and present a state conference on HAI Prevention. | |
| | | ***Other activities or descriptions:*** | |
| ☒ | ☐ | **2. Increase infection control competency and practice in all healthcare settings through training**<br><br>**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.**<br><br>CT is in the process of restructuring the HAI Advisory Committee and adding more organizations to the multidisciplinary team. Prospective additional members are:<br>• Pro Health (Group of private MDs)<br>• Long Term Care Association<br>• Long Term Care Infection Preventionists<br>• CT Association of Ambulatory Surgical Centers<br>• Long Term Acute Care Facilities (LTACs)<br>• CT Hospice<br>• School Based Clinics<br>• Urgent Care Centers<br>• Other Out Pt Clinics (MD owned)<br>• Nursing Homes<br>• Home Health Agencies<br>• Insurance Payers (Aetna) | **October 1, 2015 and ongoing** |

| | | | |
|---|---|---|---|
| ☒ | ☒ | • Veterinarians<br>• Dentists<br>• Hospital Preparedness Coordinators<br>• Connecticut Medical Society<br><br>By working closely with these additional stakeholders greater opportunities for improvement can be identified, more focused training can be developed and issues of regulation/licensure/privileges can be addressed.<br><br>**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 system to monitor ongoing compliance and competency.**<br>• The Yale School of Public Health, through its Office of Public Health Practice (OPHP), will develop and deliver a train-the-trainer style continuing education (CE) program on basic infection control (IC) to frontline staff in selected priority outpatient healthcare settings: federally qualified health centers (FQHCs); school based health centers (SCHCs); physician offices and urgent care clinics. The project will consist of three phases: a needs assessment phase, a program development phase and a program delivery phase.<br>• In the needs assessment phase, OPHP will reach out to representatives of the outpatient clinics above to gather information on 1) current IC CE training being provided to staff (content and delivery method); 2) ideal length of training program; 3) training audiences/staff composition; 4) potential trainers/ IC staff; 5) perceived barriers to consistently implementing IC protocols in the work setting and 5) possible relationships between this IC training program and other agency goals (performance management, licensure, etc.). A summary report of findings will be written by OPHP.<br>• Based on the needs assessment results, OPHP will lead the development of the | |

| | | | |
|---|---|---|---|
| | | IC curricula and the train-the-trainer program.<br>• OPHP will contract with an IC subject matter expert (SME) to design and develop the curricula and a basic learning assessment and evaluation.<br>• OPHP will contract with a consultant with expertise in the design and development of workplace train-the-trainer programs to develop training program materials and a training schedule. The curricula will be reviewed by representatives of the outpatient settings and approved by CT DPH.<br>• OPHP will partner with representatives of the outpatient clinics, and other community groups as needed, to identify appropriate trainers to be trained to deliver the curricula either as "master trainers" and/or as trainers in the workplace.<br>• OPHP will coordinate the train-the-trainer program implementation in partnership with representatives of the outpatient clinics, the SME and the consultant.<br>• OPHP will arrange for the training sessions for trainers, including the training venues, instructors and program materials. In partnership with representatives of the outpatient clinics,<br>• OPHP will assist trainers in planning program delivery, developing their delivery schedules and administering the assessment and evaluation.<br>• As is practicable, OPHP will work with the trainers/worksites to track the delivery of the training and results of the assessment and evaluation, such as sampling. | |
| ☒ | | ***Other activities or descriptions:***<br>**Infection Prevention in Hemodialysis – Nurse "Train the Trainer" Session**<br><br>IPRO and the Connecticut Dept. of Public Health (Healthcare Associated Infection Division) have collaborated to create a program that trains one RN from each licensed hemodialysis facility in CT to obtain the skills needs to train the staff in their respective | **March 2015** |

| | | | |
|---|---|---|---|
| | | facilities, using the Centers of Disease Control and Prevention guidance and materials. | |
| ☒<br><br>☒<br>☒<br><br>☒ | ☐<br><br>☒<br>☒<br><br>☒ | **3. Enhance surveillance capacity to improve situational awareness, describe emerging threats, and target onsite assessments to implement prevention programs**<br>**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.**<br>**ii. Work with CDC to guide analytic direction and identify facilities for prioritized assessments/response**<br>**iii. Improve outbreak reporting capacity by developing an infrastructure that includes clear definitions of infectious threats of epidemiologic importance that are communicated to facilities**<br>**iv. Implement a response plan to address potential emerging threats identified by using enhanced surveillance** | **October 1, 2015 and ongoing** |
| | | ***Other activities or descriptions:***<br>i. Since 9/11/2001 CT acute care hospital have had to report state-wide syndromic surveillance based on unscheduled hospital admissions (HASS). The system's objectives are to monitor for outbreaks caused by Category A biologic agents and evaluate limits in space and time of identified outbreaks. Twenty nine acute-care hospitals are required to report their previous day's unscheduled admissions for 11 syndromes: pneumonia, hemoptysis, respiratory distress, acute neurologic illness, nontraumatic paralysis, sepsis and nontraumatic shock, fever with rash, fever of unknown cause, acute gastrointestinal illness, possible cutaneous anthrax, and suspected illness clusters.<br>ii. Ebola Response: There are no designated Ebola treatment centers in CT. CDC came to CT in spring 2015 to assess 2 hospitals for Ebola readiness as Assessment Facilities. A third evaluation will be conducted in a third hospital on | **2001 and ongoing** |

| | | |
|---|---|---|
| | 8/25/15. From these evaluations gaps will be identified.<br>iii. DPH in in the process of assessing all current outbreak reporting systems (HASS, reportable diseases, etc.) to develop a more inclusive and comprehensive outbreak reporting plan. DPH is currently reviewing other state plans for guidance.<br>iv. The HAI Advisory Committee is analyzing NHSN data through TAP reports | |

**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**<br><br>**(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<br><br>(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<br><br>(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<br><br>(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<br><br>(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<br><br>2009 for other hospital units<br><br>(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**<br><br>**(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<br><br>(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<br><br>(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<br><br>(proposed 2009, in consultation with states) | Reduce the admission and readmission SSI[§] SIR by at least 25% from baseline or to zero | CDC | Yes[¶] |
| 7. SCIP 1 (formerly SSI 2) | Adherence to SCIP/NQF infection process measures | SCIP Adherence percentage | CMS SCIP | To be determined by CMS | At least 95% adherence to process measures to prevent surgical site infections | CMS | Yes |

[*] NHSN SIR metric is derived from NQF-endorsed metric data

[†] NHSN does not collect information on daily review of line necessity, which is part of the NQF

[‡] LabID, events reported through laboratory detection methods that produce proxy measures for infection surveillance

[§] Inclusion of SSI events detected on admission and readmission reduces potential bias introduced by variability in post-discharge surveillance efforts

[¶] The NQF-endorsed metric includes deep wound and organ space SSIs only which are included the target.

**Understanding the Relationship between HAI Rate and SIR Comparison Metrics**

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

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

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

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

*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)

## APPENDIX 2

### 2014 CT Healthcare Associated Infection Advisory Committee Members
***Public Act No. 06-142***

### AN ACT CONCERNING HOSPITAL ACQUIRED INFECTIONS

There is established a Committee on Healthcare Associated Infections, which shall consist of the commissioner or the commissioner's designee, and the following members appointed by the commissioner:

- Two members representing the Connecticut Hospital Association;

- Two members from organizations representing health care consumers;

- Two members who are either hospital-based infectious disease specialists or epidemiologists with demonstrated knowledge and competence in infectious disease related issues;

- One representative of the Connecticut State Medical Society;

- One representative of a labor organization representing hospital based nurses; and

- Two public members.

**Healthcare Associated Infections Advisory Committee Composition: June 2014**
**Commissioner or Commissioner's designee:**
1. Wendy Furniss, RNC, MS, Branch Chief, Healthcare Quality and Safety Branch, CT DPH, Hartford, CT

**Two Representatives from the Connecticut Hospital Association**
1. Allison L. Hong, MD, Interim VP, Quality and Patient Safety, CT Hospital Association, Wallingford, CT
2. Carl Schiessel, CT Hospital Association, Wallingford, CT

**Two Representatives from Organizations Representing Health Care Consumers**
1. Valerie Wyzykowski, Office of Healthcare Advocate, State of CT, Hartford, CT
2. Jean Rexford, Exec. Dir., CT Center for Patient Safety, Hartford, CT

**Two Representatives from Hospital-based Infectious Disease Specialist or Epidemiologist**
1. Louise Dembry, MD, Hospital Epidemiologist, Yale-New Haven Hospital, New Haven, CT
2. Brenda Grant, RN, MPH, CIC, CHES, Manager, Infection Prevention Stamford Hospital, Stamford, CT

**One Representative from Connecticut State Medical Society**
1. Jack Ross, MD, Chief, Infectious Diseases & Epidemiology, Hartford Hospital, Hartford, CT

**One Representative from Labor organization Representing Hospital-based Nurses**
1. Dale Cunningham, American Federation of Teachers, Rocky Hill, CT

**One Member from the public**
1. Lynne Garner, PhD, President and Trustee, The Donaghue Medical Research Foundation, West Hartford, CT
2. Raymond S. Andrews, retired, West Hartford, CT

**Total Voting Membership: 11 members**

## APPENDIX 3

**Healthcare Facility HAI Reporting Requirements to CMS via NHSN--**
**Current or Proposed Requirements**

| CMS Reporting Program | HAI Event | Reporting Specifications | Reporting Start Date |
|---|---|---|---|
| Hospital Inpatient Quality Reporting (IQR) Program | CLABSI | Adult, Pediatric, and Neonatal ICUs | January 2011 |
| | CAUTI | Adult and Pediatric ICUs | January 2012 |
| | SSI: COLO | Inpatient COLO Procedures | January 2012 |
| | SSI: HYST | Inpatient HYST Procedures | January 2012 |
| | MRSA Bacteremia LabID Event | FacWideIN | January 2013 |
| | *C. difficile* LabID Event | FacWideIN | January 2013 |
| | Healthcare Personnel Influenza Vaccination | All Inpatient Healthcare Personnel | January 2013 |
| | Medicare Beneficiary Number | All Medicare Patients Reported into NHSN | July 2014 |
| | CLABSI | Adult & Pediatric Medical, Surgical, & Medical/Surgical Wards | January 2015 |
| | CAUTI | Adult & Pediatric Medical, Surgical, & Medical/Surgical Wards | January 2015 |
| Hospital Outpatient Quality Reporting (OQR) Program | Healthcare Personnel Influenza Vaccination | All Outpatient Healthcare Personnel | October 2014 |
| ESRD Quality Incentive Program (QIP) | Dialysis Event (includes Positive blood culture, I.V. antimicrobial start, and signs of vascular access infection) | Outpatient Hemodialysis Facilities | January 2012 |
| | Healthcare Personnel Influenza Vaccination | All Healthcare Personnel | October 2015 |
| Long Term Care Hospital* Quality Reporting (LTCHQR) Program | CLABSI | Adult & Pediatric LTAC ICUs & Wards | October 2012 |
| | CAUTI | Adult & Pediatric LTAC ICUs & Wards | October 2012 |
| | Healthcare Personnel Influenza Vaccination | All Inpatient Healthcare Personnel | October 2014 |
| | MRSA Bacteremia LabID Event | FacWideIN | January 2015 |
| | *C. difficile* LabID Event | FacWideIN | January 2015 |
| | VAE | Adult LTAC ICUs & Wards | January 2016 |
| Inpatient Rehabilitation Facility Quality Reporting (IRFQR) Program | CAUTI | Adult & Pediatric IRF Wards | October 2012 |
| | Healthcare Personnel Influenza Vaccination | All Inpatient Healthcare Personnel | October 2014 |
| | MRSA Bacteremia LabID Event | FacWideIN | January 2015 |
| | *C. difficile* LabID Event | FacWideIN | January 2015 |
| * Long Term Care Hospitals are called Long Term Acute Care Hospitals in NHSN | | | |

| CMS Reporting Program | HAI Event | Reporting Specifications | Reporting Start Date |
|---|---|---|---|
| Ambulatory Surgery Centers Quality Reporting (ASCQR) Program | Healthcare Personnel Influenza Vaccination | All Healthcare Personnel | October 2014 |
| PPS-Exempt Cancer Hospital Quality Reporting (PCHQR) Program | CLABSI | All Bedded Inpatient Locations | January 2013 |
| | CAUTI | All Bedded Inpatient Locations | January 2013 |
| | SSI: COLO | Inpatient COLO Procedures | January 2014 |
| | SSI: HYST | Inpatient HYST Procedures | January 2014 |
| Inpatient Psychiatric Facility Quality Reporting (IPFQR) Program | Healthcare Personnel Influenza Vaccination | All Inpatient Healthcare Personnel | October 2015 |

## APPENDIX 4

# Sample Excel Spreadsheet to Be Expanded To Include Infection Control Point of Contact, Regulatory/Licensure Authority, Etc.

| CHILDREN'S GENERAL HOSPITAL (1) | | | | | | |
|---|---|---|---|---|---|---|
| **Facility Name[a]** | **Provider Name** | **Facility Address** | **City** | **Zip code** | **Licensed Beds** | **Licensed Bassinets** |
| Connecticut Children's Medical Center | Connecticut Children's Medical Center | 282 Washington Street | Hartford | 06106 | 115 | 72 |
| **GENERAL HOSPITALS (27)** | | | | | | |
| **Facility Name[a]** | **Provider Name** | **Facility Address** | **City** | **Zip code** | **Licensed Beds** | **Licensed Bassinets** |
| Bridgeport Hospital | Bridgeport Hospital | 267 Grant Street | Bridgeport | 06610 | 373 | 10 |
| Bristol Hospital, Inc. | Bristol Hospital, Inc., The | 41 Brewster Road | Bristol | 06010 | 134 | 20 |
| Charlotte Hungerford Hospital, The | Charlotte Hungerford Hospital, The | 540 Litchfield Street | Torrington | 06790 | 109 | 13 |
| Danbury Hospital, The[b] | Danbury Hospital, The | 24 Hospital Avenue | Danbury | 06810 | 430 | 26 |
| Day Kimball Hospital | Day Kimball Healthcare, Inc. | 320 Pomfret Street | Putnam | 06260 | 104 | 18 |
| Greenwich Hospital | Greenwich Hospital | 5 Perryridge Road | Greenwich | 06830 | 174 | 32 |
| Griffin Hospital | Griffin Hospital, The | 130 Division Street | Derby | 06418 | 160 | 20 |
| Hartford Hospital | Hartford Hospital | 80 Seymour Street and 200 Retreat Avenue | Hartford | 06106 | 819 | 48 |
| Hospital of Central Connecticut, The | Hospital of Central Connecticut at New Britain General and Bradley Memorial, The | 100 Grand Street | New Britain | 06050 | 414 | 32 |
| John Dempsey Hospital | University of Connecticut Health Center | 263 Farmington Avenue | Farmington | 06030 | 224 | 10 |
| Johnson Memorial Hospital | Johnson Memorial Hospital, Inc. | 201 Chestnut Hill Road | Stafford | 06076 | 92 | 9 |
| Lawrence and Memorial Hospital | Lawrence and Memorial Hospital, Inc. | 365 Montauk Avenue | New London | 06320 | 280 | 28 |
| Manchester Memorial Hospital | Manchester Memorial Hospital, The | 71 Haynes Street | Manchester | 06040 | 249 | 34 |
| Middlesex Hospital | Middlesex Hospital | 28 Crescent Street | Middletown | 06457 | 275 | 22 |
| MidState Medical Center | MidState Medical Center | 435 Lewis Avenue | Meriden | 06451 | 144 | 12 |
| Milford Hospital, Inc. | Milford Hospital, Inc., The | 300 Seaside Avenue | Milford | 06460 | 106 | 12 |
| Norwalk Hospital | Norwalk Hospital Association, The | 34 Maple Street | Norwalk | 06856 | 328 | 38 |
| Rockville General Hospital | Rockville General Hospital, Inc., The | 31 Union Street | Vernon | 06066 | 102 | 16 |
| Saint Francis Hospital and Medical Center | Saint Francis Hospital and Medical Center | 114 Woodland Street and 500 Blue Hills Avenue | Hartford | 06105 | 617 | 65 |
| Saint Mary's Hospital, Inc. | Saint Mary's Hospital, Inc. | 56 Franklin Street | Waterbury | 06706 | 347 | 32 |
| Sharon Hospital | Essent Healthcare of Connecticut, Inc. | 50 Hospital Hill Road | Sharon | 06069 | 78 | 16 |
| St. Vincent's Medical Center | St. Vincent's Medical Center | 2800 Main Street | Bridgeport | 06606 | 473 | 47 |
| Stamford Hospital, The | Stamford Hospital, The | 30 Shelburne Road | Stamford | 06904 | 305 | 25 |
| Waterbury Hospital | Waterbury Hospital, The | 64 Robbins Street | Waterbury | 06708 | 357 | 36 |
| **Facility Name[a]** | **Provider Name** | **Facility Address** | **City** | **Zip code** | **Licensed Beds** | **Licensed Bassinets** |
| William W. Backus Hospital, The | William W. Backus Hospital, The | 326 Washington Street | Norwich | 06360 | 213 | 20 |
| Windham Community Memorial Hospital and Hatch Hospital Corporation | Windham Community Memorial Hospital, Inc. | 112 Mansfield Avenue | Windham | 06226 | 130 | 14 |
| Yale-New Haven Hospital, Inc. | Yale-New Haven Hospital, Inc. | 20 York Street | New Haven | 06510 | 1407 | 134 |

***Total of 8,444 Beds and 789 Bassinets, excluding the one Children's Hospital***

***Total of 8,559 Beds and 861 Bassinets, including the one Children's Hospital***

*Source: DPH licensure files and e-licensure database as of October 2014*

the license

[b]New Milford Hospital became a satellite campus of Danbury Hospital effective October 1, 2014 and Danbury Hospital became licensed for 430 beds and 26 bassinets on its single general hospital license.