Healthcare-Associated Infections: 2012 Annual Report

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Prepared by the North Carolina Department of Health and Human Services, Division of Public Health

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The purpose of this report is to fulfill the legislative requirement, as set forth in SL 2011 – 386, SECTION 2, that the Department of Health and Human Services (DHHS) submit an annual report to the General Assembly on its efforts related to the North Carolina State Plan on Healthcare Associated Infections (HAI) or any other matter it considers relating to Healthcare Associated Infections. In conformance with the statute, this report is being provided to: The Senate Appropriations Committee on Health and Human Services, the House of Representatives Appropriations Subcommittee on Health and Human Services and the Fiscal Research Division of the General Assembly.

2012 HIGHLIGHTS:

Key accomplishments and activities of the HAI Prevention Program in 2012 include the following:

1. Transitioned to a mandatory surveillance program for healthcare associated infections effective January 1, 2012.
2. Became the third state partner in the One & Only Campaign, a public health campaign led by the US Centers for Disease Control (CDC) and the Safe Injection Practices Coalition that aims to eradicate outbreaks resulting from unsafe injection practices by raising awareness among patients and healthcare providers about safe injection practices.
3. Codified permanent rules in 10A North Carolina Administrative Code 41A .0106 to support the mandate for HAI reporting in North Carolina set forward in Session Law 2011-386. These rules were adopted by the Commission for Public Health on September 20, 2012 and became effective October 1, 2012.
4. Released first public report on healthcare-associated infections on October 1, 2012, as required by the NC administrative code.
5. Participated or consulted in responses to more than 75 outbreaks in healthcare settings.

BACKGROUND:

Healthcare-associated infections are infections that patients acquire within a healthcare setting while receiving treatment for other conditions. Although most information about HAIs has come from hospital settings such as intensive care units (ICUs) and special care units, HAIs also occur in long-term care facilities, outpatient surgery centers, dialysis centers, and other settings where patients receive healthcare. The CDC estimates that 1 out of every 20 hospitalized patients will be affected, culminating in approximately 1.7 million infections and 99,000 deaths each year.[1]

These infections also represent a financial burden. A recent analysis estimated the overall direct medical costs to US hospitals could be from $28 billion to $45 billion each year[2]. After adjusting for the range of effectiveness of possible infection control interventions, this same analysis estimated the financial benefits of HAI prevention could range from a low of $5.7 billion to $6.8 billion to a high of $25.0 billion to $31.5 billion annually.[2]

Each year, approximately 33,000 North Carolinians contract an HAI in an acute care facility, resulting in approximately $281million to $779 million in direct costs to those facilities[3]. These figures are likely an underestimate, since only acute care facilities and a limited subset of HAIs were included in the approximations.

As our ability to prevent HAIs grows, these infections have become increasingly unacceptable. For the past several years, many North Carolina healthcare facilities and organizations focusing on healthcare quality have worked to track and prevent HAIs. Because of collaborative approaches aimed at protecting patients from HAIs, North Carolina has received national recognition for its high level of engagement in efforts to improve patient safety, and was rated as one of the most "engaged" states in the Institute for Healthcare Improvement's harm-reduction campaigns.[4] These efforts have led to substantial reductions in many facilities, as demonstrated by the sustained reductions in central line-associated bloodstream infections and catheter-associated urinary tract infections described on pages 8–9 of this report. Despite these successes, HAIs continue to occur in facilities statewide.

Acknowledging the need for a coordinated, statewide response to HAI, the NC General Assembly established the Joint Study Committee on Hospital Infection Control and Disclosure in April 2008. In 2009, the Committee recommended to the General Assembly that North Carolina implement a mandatory, state-operated, statewide HAI surveillance and reporting system operating within the Department of Health and Human Services, Division of Public Health (DPH).[5] In early 2010, with funding from the 2009 American Recovery and Reinvestment Act (ARRA), DPH established the statewide HAI Prevention Program within the Communicable Disease Branch of the Division of Public Health. DPH also convened the North Carolina HAI Advisory Group as a forum to develop the State Plan for Prevention of Healthcare-Associated Infections ("State Plan") and to consult with DPH on other HAI activities.

The mission of the NC HAI Prevention Program is to eliminate preventable infections in health care settings. This mission is accomplished through work on four major objectives:

1. Conduct statewide surveillance for HAIs
2. Provide useful, unbiased information to health care providers and consumers
3. Promote and coordinate prevention efforts
4. Respond to outbreaks in health care settings

The State Plan provides a framework for HAI prevention efforts in the areas of state HAI program infrastructure; HAI surveillance and response; HAI prevention; and evaluation and communication. Work began on the State Plan in March 2010 and was completed February 2011. Copies of the State Plan have been distributed to state partners and are available upon request to the NC HAI Prevention Program.

INFRASTRUCTURE:

Before the 2009 recommendation by the North Carolina Joint Study Committee on Hospital Infection Control Disclosure, no centralized infrastructure for HAI surveillance and reporting existed in North Carolina. With the advent of this recommendation and with funding from the American Recovery and Reinvestment Act, DPH began the process of establishing an infrastructure to directly address healthcare-associated infections at a statewide level. This process included four key stages, namely: establishing the NC HAI Prevention Program; convening the State HAI Advisory Group; designating an infrastructure for reporting of HAIs; and developing a statewide plan to prevent HAIs.

HAI Prevention Program: The HAI Prevention Program is housed within the North Carolina Department of Health and Human services, Division of Public Health, Epidemiology Section, Communicable Disease Branch. The staff of the HAI Prevention Program includes a team leader, a medical director, an HAI program coordinator / nurse consultant, and an HAI epidemiologist. Together, this team is responsible for directing state-level HAI activities and working with local, state and national partners.

Key accomplishments of the HAI Prevention Program since its inception include the following:

1. Initiated statewide voluntary reporting of central line-associated bloodstream infections by acute care hospitals as an interim measure until HAI reporting became mandatory in North Carolina.
2. Collaborated with the North Carolina Center for Hospital Quality and Patient Safety and other statewide partners to promote and expand existing HAI prevention activities (see pages 8–9).
3. Collaborated with the North Carolina Statewide Program for Infection Control and Epidemiology on a comprehensive project to validate HAI data reported by N.C. facilities through the National Healthcare Safety Network.
4. Developed a state HAI website to provide useful HAI-related information to healthcare consumers and providers in North Carolina.
5. Established a statewide HAI Advisory Group to guide state HAI activities with broad representation from government, professional groups, academic institutions and the public.

6. Developed the State Plan for Prevention of Healthcare-Associated Infections, a comprehensive plan to reduce HAIs in North Carolina; distributed the State Plan to the public, policy makers and state partners.
7. Provided support for infection prevention training of staff in all 85 local health departments to enhance local capacity to serve as resources for facilities within their jurisdictions.
8. Enhanced collaboration with the Division of Health Service Regulation regarding outbreaks in licensed facilities, infection control training and enforcement, response to infection control breaches and related issues.
9. Collaborated with the state HAI Advisory Group to draft administrative code rules for reporting of HAIs by hospitals in North Carolina as required by House Bill 809/Session Law 2011-386.[6-8]
10. Released first public report on healthcare-associated infections on October 1, 2012, as required by the NC administrative code.[9]
11. Became the third state partner in the One & Only Campaign, a public health campaign, led by the CDC and the Safe Injection Practices Coalition that aims to eradicate outbreaks resulting from unsafe injection practices by raising awareness among patients and healthcare providers about safe injection practices.

HAI Advisory Group: In 2009 and early 2010, DPH extended invitations to stakeholders from state and local government, infection control and healthcare quality organizations, clinical laboratories, healthcare professional organizations, academic centers, and consumer advocates to form the HAI Advisory Group. (HAI Advisory Group members are listed on pages 10-11 of this report). The primary responsibilities of the HAI Advisory Group are to work with the DPH on the establishment of the State Plan and to advise the Department on HAI activities. The HAI Advisory Group can be subdivided into subgroups or work groups to accomplish specific tasks. During 2011–2012, one subgroup was convened to specifically address surveillance and public disclosure of HAI data. The DPH Epidemiology Section Chief and State Epidemiologist currently chair the HAI Advisory Group with routine management completed by the state HAI Prevention Program. The HAI Advisory Group meets quarterly in person or by phone to address current HAI issues.

The North Carolina Statewide Program for Infection Control and Epidemiology (SPICE): The NC HAI Prevention Program works closely with SPICE, which is located at the School of Medicine at the University of North Carolina at Chapel Hill and funded by the State of North Carolina. SPICE is charged with investigating and controlling healthcare-associated infections in hospitals, long-term care facilities, and other medical facilities in the state. Furthermore, the program provides training, education, and direct consultation to these facilities to prevent and control healthcare-associated infections.

The North Carolina State Plan for Prevention of Healthcare-Associated Infections: Shortly after the formation of the NC HAI Prevention Program and the convening of the NC HAI Advisory Group, work began on developing a statewide plan to reduce healthcare-associated infections. The decision was made to follow the recommended federal guideline for state HAI plan development by focusing on the following four areas: 1) program infrastructure; 2) surveillance and response; 3) prevention; and 4) evaluation and communication. Work began on the plan in March 2010 and was completed February 2011. Copies of the state plan have been distributed to state partners and are available upon request to the NC HAI Prevention Program (nchai@dhhs.nc.gov).

Infrastructure for HAI reporting: The National Healthcare Safety Network (NHSN) has been adopted as the state HAI surveillance reporting platform. NHSN is a CDC-operated surveillance system that has become the gold standard for HAI surveillance and reporting in the United States. Reporting through NHSN is also required for hospitals participating in the Centers for Medicare and Medicaid Services-Inpatient Prospective Payment System. NHSN is easily accessible by healthcare facilities, has no user fees, and is used by most other states that currently require reporting of HAIs. NHSN also provides support and training modules for the infection preventionists and hospital epidemiologists who will use the system.

LEGAL BACKGROUND:

Three bills related to healthcare-associated infections were introduced during 2011 (Senate Bill 347, House Bill 474, & House Bill 809)[6-8] and two were ratified by the legislature and signed into law by Governor Perdue (House Bill 474, Session Law 2011-99 & House Bill 809, Session Law 2011-386). The legislation and recent changes to the North Carolina Administrative Code are summarized below.

Session Law 2011-99: In the fall of 2010, an outbreak of hepatitis B virus infection caused the death of six residents in a North Carolina adult care home. House Bill 474 was introduced in response to this outbreak and the subsequent DPH investigation which identified shared use of diabetes testing equipment as the source. As of May 31, 2011, this law requires more comprehensive infection prevention policies in adult care homes; state inspection and monitoring of infection prevention activities; reporting of suspected outbreaks by adult care home administrators; and increased training and competency evaluation for adult care home supervisors and medication aides. Since enactment of this law, the NC HAI Prevention Program has worked closely with the Division of Health Service Regulation to develop the accompanying policies and training materials.

Session Law 2011-386: SL 2011-386 was signed into law on June 27, 2011, creating the first mandate for HAI reporting in North Carolina. Key provisions of this law include the following:

1. By December 31, 2011 the Department of Health and Human Services shall establish a statewide surveillance system for healthcare-associated infections;
2. The Commission for Public Health shall adopt rules necessary to implement statewide surveillance and reporting and specify uniform standards to include a requirement for electronic reporting of specified health care-associated infections to the Department;
3. Each hospital shall be subject to statewide reporting requirements and shall report selected health care-associated infections using the National Healthcare Safety Network;
4. The Department shall release aggregated reports to the public if it deems the release to be necessary to protect the public's health;
5. The Department shall submit an annual report to the General Assembly summarizing statewide healthcare-associated infection activities.

10A North Carolina Administrative Code 41A .0106[9]: In order to meet the requirements of Session Law 2011-386 within the timeframe established, a temporary rule was approved by the North Carolina Office of Administrative Hearings, Rules Review Commission on November 17, 2011. The permanent version of the rule was adopted by the Commission for Public Health on September 20, 2012 and became effective October 1, 2012. The rule stipulates that hospitals shall:

1. Report specified healthcare-associated infections electronically using the National Healthcare Safety Network (NHSN) and make the data available to NC DHHS;
2. Report these infections within 30 days following the end of the month in which they occurred (or were identified);
3. Report denominator or referent data required by NHSN within 30 days following the end of each month;
4. Comply with all reporting requirements for general participation in NHSN;
5. Report all healthcare-associated infections required by the Centers for Medicare and Medicaid Services-Inpatient Prospective Payment System (CMS-IPPS) rules beginning on the dates specified therein.
    a. The three healthcare-associated infections to be reported by hospitals beginning January 1, 2012 are:
        i. Central line-associated bloodstream infections in adult, pediatric and neonatal intensive care units;
        ii. Catheter-associated urinary tract infections in adult and pediatric intensive care units;
        iii. Surgical site infections following colon surgery or abdominal hysterectomy.

b. The two healthcare-associated infections to be reported by long term care hospitals (also known as long term acute care hospitals) beginning October 1, 2012 are:
    i. Central line-associated bloodstream infections facility-wide;
    ii. Catheter-associated urinary tract infections facility-wide.
c. The one healthcare-associated infection to be reported by inpatient rehabilitation facilities beginning October 1, 2012 is:
    i. Catheter-associated urinary tract infections facility-wide.

The rule also stipulates that the department shall release reports to the public on healthcare-associated infections beginning on October 1, 2012 and quarterly thereafter.

SURVEILLANCE AND PUBLIC DISCLOSURE:

Timely and accurate monitoring (surveillance) is necessary to track progress towards HAI elimination. Public health surveillance is crucial to determine which prevention programs are succeeding and where more work is needed. Reporting of specified HAIs is mandated in North Carolina and is now required for all hospitals nationwide that participate in the Centers for Medicare and Medicaid Services-Inpatient Prospective Payment System. Two important components of surveillance are: 1) ensuring accuracy of the data being reported and 2) reporting the data in a manner that can be easily accessed and understood by the public. Components of healthcare-associated infection surveillance activities are described below:

Voluntary surveillance program: In November 2010, the HAI Prevention Program began working with hospitals statewide to encourage voluntary reporting of specific HAIs, beginning with central line-associated bloodstream infections (CLABSI). By the end of 2011, there were 72 hospitals submitting data on CLABSI to the HAI Prevention Program.

Mandatory surveillance program: The North Carolina HAI Prevention Program transitioned to a mandatory surveillance program on January 1, 2012. As specified in the rule described above, NC hospitals are required to report those healthcare-associated infections listed in the schedule outlined in the Centers for Medicare and Medicaid Services–Inpatient Prospective Payment System Rules, which were adopted by reference in the NC Administrative Code. A list of these conditions and the starting dates for reporting are included in Table 1.

Table 1: Current and Proposed Requirements for Reporting of Healthcare-Associated Infections from Hospitals[10]

HAI Event	Facility Type	Reporting Start Date
Central line-associated bloodstream infections (CLABSI)	Acute Care Hospitals: Adult, Pediatric, and Neonatal ICUs	January 2011
Catheter-associated urinary tract infections (CAUTI)	Acute Care Hospitals: Adult and Pediatric ICUs	January 2012
Surgical site infections (SSI)	Acute Care Hospitals: Colon and abdominal hysterectomy procedures	January 2012
CLABSI	Long Term Care Hospitals*	October 2012
CAUTI	Long Term Care Hospitals*	October 2012
CAUTI	Inpatient Rehabilitation Facilities	October 2012
MRSA bacteremia (laboratory identification)	Acute Care Hospitals	January 2013
***Clostridium difficile* (laboratory identification)**	Acute Care Hospitals	January 2013

*Long Term Care Hospitals are known as Long Term Acute Care Hospitals in the National Healthcare Safety Network

As of October 1, 2012, 98 of 124 licensed hospitals in North Carolina were required to report healthcare associated infections to NC via NSHN; all 98 facilities were reporting as mandated. Only hospitals that have been licensed by the NC DHHS Division of Health Service Regulation are classified as licensed hospitals and include acute care hospitals, long term hospitals (also known as long term acute care hospitals), and inpatient rehabilitation facilities. Beginning January 2013, three state-operated psychiatric hospitals and two specialty hospitals will be required to report HAIs bringing the total number of reporting facilities to 103. Reporting is not required from the 23 small rural facilities designated by CMS as critical access hospitals.

Surveillance validation project: With federal and state support, NC SPICE began a validation project in 2010 to estimate the accuracy of healthcare-associated infection data currently being reported to NHSN. This two year project included 23 hospitals across the state and evaluated approximately 2,500 records for evidence of healthcare-associated infections. Preliminary results from this project indicate that approximately three-quarters of CLABSI and CAUTI events identified by investigators had been reported through NHSN.

Following the work of SPICE, the North Carolina HAI Prevention Program has been working with state and national partners to develop a quality measurement and evaluation (validation) program to assess the accuracy of healthcare-associated infection data reported to the state. This project will follow recognized public health standards in validation methodology, promote sustainability and seek to improve healthcare-associated infection surveillance.

Public disclosure of HAI data: Public disclosure of healthcare-associated infection information is an important part of surveillance activities. The North Carolina HAI Prevention Program recognizes that many parties are interested in healthcare quality and public disclosure of HAI information needs to be relevant to their needs. The Department, in collaboration with the North Carolina HAI Advisory Group, has determined that quarterly reports will best meet the needs of those who will ultimately use the information collected through surveillance activities. In accordance with 10A NCAC 41A .0106, the first public report was issued on October 1, 2012. This public report is a reference document, providing the framework for future reports of healthcare-associated infection information, and may be accessed at http://epi.publichealth.nc.gov/cd/hai/figures/hai_oct2012.pdf.

OUTBREAK RESPONSE

Since its inception, the HAI Prevention Program has worked with others in the Communicable Disease Branch to fulfill the core public health function of outbreak investigation and response, particularly regarding outbreaks in healthcare settings. During the past few years, the HAI Prevention Program has responded to outbreaks in a variety of healthcare settings, including outbreaks of hepatitis B, hepatitis C, invasive group A streptococcus, influenza, rhinovirus, and norovirus. Since January 1, 2012, Communicable Disease Branch staff have responded to or assisted with >75 outbreaks in healthcare settings.

Prompt investigation of such outbreaks is needed to identify the source(s) and prevent further infections. Our recent investigations have identified important breakdowns in infection control practices that have allowed infection to spread, including reuse of multidose medication vials and diabetes testing equipment. These findings help not only the facility experiencing the outbreak, but also other facilities that may receive the information through health alerts or other communication and education efforts. These outbreaks have also led to legislative and policy changes designed to prevent future outbreaks.

HAI Prevention Program staff and the Division of Health Service Regulation have worked together on notification and coordinated response to outbreaks occurring in licensed facilities and infection control breaches identified during facility surveys. Additionally, the HAI Prevention Program is working with local health departments to improve their capacity to identify and respond to infection control issues in their jurisdictions. With support from the American Recovery and Reinvestment Act, the HAI Prevention Program is providing resources for at least one staff member from each local health department to complete a Department-approved course in infection control. This

course was developed and is offered by the NC Statewide Program for Infection Control and Epidemiology.

HAI PREVENTION ACTIVITIES

A *collaborative* is a quality improvement model in which there is an organized effort of joint learning and support involving a network of sites. State and national experts provide learning opportunities, guidelines, materials and coaching. There is significant knowledge sharing between participating organizations. Participants engage in improvement activity during action periods of the collaborative, punctuated by in-person and virtual learning sessions.

CLABSI Prevention Activities: During 2010 and 2011, the HAI Prevention Program worked with the North Carolina Center for Hospital Quality and Patient Safety (NC Quality Center) on a successful prevention collaborative addressing central line-associated blood stream infection (CLABSI). The participating units achieved a 46% reduction in the CLABSI rate among the 27 participating facilities. Approximately 126 CLABSIs were prevented, which translates into approximately 18 lives and $2.5 million dollars saved. [11]

The NC HAI Prevention Program is currently working with the NC Quality Center on Phase II of the CLABSI Collaborative, which began in September 2011. While the first phase focused on appropriate central line insertion practices, Phase II focuses on the technical aspects of prevention such as proper maintenance of the central line (dressing changes, scrubbing the injection ports appropriately, assessing the need for the line) and making the patient and family a part of the team that assures proper procedures are followed (staff hand hygiene, appropriate personal protective equipment worn, scrubbing the injection port prior to access). Continuing with work from Phase I, Phase II also focuses on adaptive aspects of performance improvement using the Comprehensive Unit Safety Program (CUSP) model that stresses learning from defects and teamwork and communication. Phase II involves close collaboration with the Carolinas Center for Medical Excellence (CCME), North Carolina's Medicare Quality Improvement Organization and the NC chapter of the Association for Professionals in Infection Control and Epidemiology (APIC-NC). Representatives from the HAI Prevention Program, CCME, and APIC-NC are on the collaborative Leadership Team. Staffs from the HAI Prevention Program and CCME serve as "coaches" for participating facilities along with staff from the NC Quality Center. As of June 2012, the 14 units participating in Phase II had achieved a 32% reduction in the number of CLABSIs reported.

CAUTI Prevention Activities: During 2010 and 2011, the HAI Prevention Program also worked with the NC Quality Center on a successful prevention collaborative addressing the most frequent device-associated HAI: Catheter-associated urinary tract infection (CAUTI). The CAUTI Collaborative was completed in November of 2011 and has shown a 28% reduction in CAUTI among the 21 participating hospital units over a 12-month period. By the end of the collaborative, five participating units had been CAUTI-free for over 9 months.

Injection Safety Activities: In recent years, the Communicable Disease Branch has identified and responded to several high-profile outbreaks of viral hepatitis associated with unsafe injection practices. These outbreaks have involved many preventable illnesses, including hospitalizations and deaths, and have resulted in large-scale notifications to hundreds of potentially exposed patients. They have also highlighted a disturbing lack of training in safe injection practices and basic infection control principles among staff members who perform or assist with invasive procedures in outpatient healthcare settings.

In 2012, North Carolina became the third state partner in the One & Only Campaign, a public health campaign, led by the CDC and the Safe Injection Practices Coalition. This campaign aims to eradicate outbreaks resulting from unsafe injection practices by raising awareness among patients and healthcare providers about safe injection practices.

Since joining the campaign, HAI Prevention Program staff have convened a multidisciplinary injection safety working group with stakeholders from many partner agencies. Over 500 participants have completed the trainings and webinars of the HAI Program. HAI Prevention Program staff have also distributed approximately 2,500 pieces of injection safety educational materials from the campaign and created a campaign website which has generated more than 2,700 page views. During 2013, staff will launch a train-the-trainer program ("Injection Connection") to spread injection safety education even more widely across the state.

COMMUNICATION

The HAI Prevention Program has developed a website to provide useful HAI-related information to both healthcare consumers and providers in North Carolina. This website is available at http://epi.publichealth.nc.gov/cd/diseases/hai, and includes the following:

- Information on infections that are seen within healthcare facilities, how they are spread, and how they can be prevented
- Information on antibiotic resistance
- Statewide HAI surveillance reports and national data regarding HAIs and their cost to healthcare consumers
- A glossary of HAI terms and abbreviations
- A copy of the HAI State Plan
- Links to statutes and rules that relate to HAI reporting and prevention in North Carolina

CONCLUSION

Over the past three years, the North Carolina HAI Prevention Program has developed a statewide plan to reduce healthcare-associated infections, initiated public disclosure of healthcare-associated data, identified appropriate goals for the reduction of healthcare-associated infection, and made substantial progress towards achieving these goals. During the next year, the program will continue to conduct statewide surveillance for HAIs, provide useful, unbiased information to the public, promote and coordinate prevention efforts, and respond to outbreaks in health care settings in an effort to achieve our mission and to create a safer healthcare environment for all North Carolinians.

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