Healthcare-Associated Infections: 2011 Annual Report

February 3, 2012

The purpose of this report is to fulfill the legislative requirement, as set forth in SL 2011 – 386, SECTION 2, that DHHS make an annual report to the General Assembly on its efforts related to the North Carolina State Plan on Healthcare Associated Infections or any other matter it considers relating to Healthcare Associated Infections. In conformance with the statute, this report is being provided to the General Assembly.

BACKGROUND:

Healthcare-associated infections (HAIs) are infections that patients acquire within a healthcare setting while receiving treatment for other conditions. These infections can be devastating and even deadly. 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 US Centers for Disease Control and Prevention (CDC) estimates that 5 percent of all hospital admissions result in an HAI, culminating in approximately 1.7 million infections and 99,000 deaths each year[1] as well as $28–33 billion in excess costs[2]. Each year, approximately 33,000 North Carolinians contract an HAI in an acute care facility, resulting in approximately $281–779 million dollars 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. These efforts have led to substantial reductions in many facilities. 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)[4]. 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 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 HAI; and developing a statewide plan to prevent healthcare-associated infections.

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 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 becomes mandatory in NC
2. Worked with the North Carolina Center for Hospital Quality and Patient Safety and other statewide partners to promote and expand existing HAI prevention collaboratives
3. Worked with the North Carolina Statewide Program for Infection Control and Epidemiology on a comprehensive project to validate HAI data reported by NC 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 to 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. Worked with the state HAI Advisory Group to propose administrative code rules for reporting of HAIs by hospitals in North Carolina as required by Session Law 2011-386.

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 page 9 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 serve as consultants to DPH during rollout of HAI activities. The HAI Advisory Group can be subdivided into subgroups or work groups to accomplish specific tasks. During 2010–2011, four subgroups were convened in the following areas: surveillance and public disclosure of HAI data; reporting of outbreaks of HAI by North Carolina healthcare facilities; economic impact of HAIs in North Carolina; and laboratory response to HAI. Epidemiology Section Chief and State Epidemiologist currently chairs the HAI Advisory Group with routine management done 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. The program provides training, education, and direct consultation to hospitals, long-term care facilities, and other medical facilities to prevent and control healthcare-associated infections.

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 be using the system.

The North Carolina State Plan for Prevention of Healthcare-Associated Infections: Shortly after the foundation 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.

LEGISLATIVE UPDATES:

Three bills related to healthcare-associated infections were introduced during the past year (Senate Bill 347, House Bill 474, & House Bill 809)[5-7] and two became law (House Bill 474, Session Law 2011-99 & House Bill 809, Session Law 2011-386). These two pieces of legislation and recent changes to the North Carolina Administrative Code are summarized below.

House Bill 474 / 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. Signed into law May 31st, 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 this law was enacted, the NC HAI Prevention Program has worked closely with the Division of Health Service Regulation to develop the accompanying policies and training materials.

House Bill 809 / Session Law 2011-386: House Bill 809 became law 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[8]: In order to meet the requirements of Session Law 2011-386 within the timeframe established, a temporary rule was passed by the Commission for Public Health on October 21, 2011 and approved by the North Carolina Office of Administrative Hearings, Rules Review Commission on November 17, 2011. A proposal for a permanent version of the rule is currently being drafted by the Department. The temporary 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. According to current CMS-IPPS rules, 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.

The temporary 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: Beginning 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). This voluntary process allowed the HAI Prevention Program to track, evaluate and determine a baseline rate for CLABSI in North Carolina and allowed healthcare facilities to become familiar with the process of reporting through NHSN. 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 will transition to a mandatory surveillance program beginning January 1, 2012. As specified in the rule described above, acute care hospitals will be required to report CLABSI in critical care units (adult, pediatric and neonatal), catheter-associated urinary tract infections in critical care units (adult and pediatric), and surgical site infections resulting from colon resections or abdominal hysterectomies. Additional healthcare-associated infections will be added according to 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.

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 4,000 records for evidence of healthcare-associated infections. Results from this project will be available in the first quarter of 2012.

Following the work of SPICE, the North Carolina HAI Prevention Program has been working with national partners to develop a quality measurement and evaluation (validation) program to evaluate the accuracy of healthcare-associated infection data reported to the state before disclosure in public reports. 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 NCAC 41A .0106, the first public report will be issued on October 1, 2012.

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 two 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, and norovirus.

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 have also worked with the Division of Health Service Regulation to improve interagency notification and coordinated response to outbreaks occurring in licensed facilities and infection control breaches identified during facility surveys.

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 and 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.

During 2010 and 2011, the HAI Prevention Program worked with the North Carolina Center for Hospital Quality and Patient Safety (the Quality Center) on two successful prevention collaboratives addressing two of the most important device-associated HAIs: Catheter-associated urinary tract infection (CAUTI) and central line-associated blood stream infection (CLABSI). The CLABSI collaborative has shown a 46% reduction in the CLABSI rate among the 27 participating facilities over a two-year period. Approximately 126 CLABSIs were prevented, which translates into approximately 18 lives and $2.5 million dollars saved [9]. The CAUTI Collaborative was completed in November of 2011and 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 [9].

The NC HAI Prevention Program is currently working with the Quality Center on Phase II of the CLABSI Collaborative, which began in September 2011. This phase will focus on maintaining and spreading the success achieved during the first phase. While the first phase focused on appropriate central line insertion practices, phase II will also focus on 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). Phase II also involves close collaboration with the Carolina Center for Medical Excellence (CCME), North Carolina's Medicare Quality Improvement Organization.

Staff from both the HAI Prevention Program and CCME are on the collaborative Leadership Team and serve as "coaches" for participating facilities.

In addition to these prevention collaboratives, 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 developed and offered by the NC Statewide Program for Infection Control and Epidemiology.

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 will be made available to the public in early 2012 as part of a broader Communicable Disease website revision, and will include the following:

- Information on infections that are seen within healthcare facilities, how they are spread, how they can be prevented
- Information on antibiotic resistance
- Statewide HAI surveillance reports (beginning in October 2012) and national data regarding HAIs and their cost to healthcare consumers
- A glossary of HAI terms and abbreviations
- A copy of HAI State Plan
- Links to trusted partners in HAI prevention at the state and national level, including the CDC; the Association for Professionals in Infection Control and Epidemiology (APIC) and its North Carolina chapter (APIC-NC); the Statewide Program for Infection Control and Epidemiology (SPICE), Duke Infection Control Outreach Network (DICON), and the Society for Healthcare Epidemiology of America (SHEA)
- Links to statutes and rules that relate to HAI reporting and prevention in North Carolina

Educational sessions (oral and poster) have also been provided during the past two years to a variety of audiences at conferences and training sessions statewide. Emphasis has been placed on the HAI State Plan, the HAI Advisory Group, and forthcoming changes in HAI reporting.

CONCLUSION

Over the past two years, the North Carolina HAI Prevention Program has developed a statewide plan to reduce healthcare-associated infections, identified appropriate goals for the reduction of healthcare-associated infection, and made substantial progress towards achieving these goals. Over 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.

REFERENCES

1. Klevens RM, Edwards J, Richards C, Horan T, Gaynes R, Pollock D, Cardo D. (2007) Estimating Health Care-Associated Infections and Deaths in U.S. Hospitals, 2002. *Public Health Reports*. Vol. 122:160-166.

2. Scott RD. The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention (2009). Internal Report. Division of Healthcare Quality Promotion, National Center for Preparedness, Detection, and Control of Infectious Diseases, Coordinating Center for Infectious Diseases, Centers for Disease Control and Prevention, February 2009.

3. Estimates for Cost of Healthcare-Associated Infections (HAIs) in North Carolina Acute Care Hospitals: Report from the Economic Impact Subgroup of the North Carolina Department of Public Health HAI Advisory Group. (2011) Unpublished Internal Report, NC-DHHS.

4. Joint Study Committee on Hospital Infection Control and Disclosure Report, January 2009. Available through the North Carolina Legislative Library at www.ncleg.net/LegLibrary/

5. North Carolina Senate Bill 347, An act to require the department of health and human services to establish a statewide surveillance and reporting system for health care-associated infections and to subject hospitals to the requirements of the statewide surveillance and reporting system. General Assembly of North Carolina Session 2011

6. North Carolina House Bill 474, An act to protect adult care home residents by increasing minimum continuing education training and competency evaluation requirements for adult care home medication aides, and requiring the department of health and human services, division of health service regulation, to annually inspect adult care homes for compliance with safe infection control standards. North Carolina General Assembly Session 2011.

7. North Carolina House Bill 809, An act to require the department of health and human services to establish a statewide surveillance and reporting system for health care-associated infections and to subject hospitals to the requirements of the statewide surveillance and reporting system. General Assembly of North Carolina Session 2011

8. North Carolina Administrative Code 41A. 106. Reporting of Health-Care-Associated Infections. Temporary rule approved November 17, 2011.

9. Official communication. North Carolina Center for Hospital Quality and Patient Safety. November 15, 2011.

North Carolina HAI Advisory Group

Megan Davies, MD, Chair
State Epidemiologist & Chief, Epidemiology Section
NC Division of Public Health

Representative Martha B. Alexander
NC House of Representatives

Deverick Anderson, MD, MPH
Duke Infection Control Network

Margaret A. Comin, RN, BSN, MPA
Division of Medical Assistance

Evelyn Cook, RN, CIC
APIC - NC - Governmental Affairs Chair

Kathy Dail, RN, BSN, MEd
NC Division of Public Health

Chris DeRienzo, MD, MPP
NC Med. Society Residents & Fellows Section

Evelyn Foust, CPM, MPH
Head, Communicable Disease Branch, NCDPH

Millie R. Harding, CPA
Senior Vice President, North Carolina Hospital Association

G. Mark Holmes, PhD
Program on Health Care Economics and Finance, UNC

Jeff Horton, Chief Operating Officer
NC Division of Health Service Regulation

Representative Verla Insko
NC House of Representatives

Constance (Connie) D. Jones, RN, CIC
NC Division of Public Health

Carol Koeble, MD
Director, NC Center for Hospital Quality and Patient Safety

Genie Komives, MD
VP, Sr. Medical Director, Healthcare Quality, BCBS of NC

James Lederer, MD
Society of Healthcare Epidemiology of America

Jean-Marie Maillard, MD
Head, Medical Consultation Unit (PI), NC DPH

MJ McCaffrey, MD, CAPT USN (Ret)
Director, Perinatal Quality Collaborative of North Carolina

John Morrow, MD
NC Association of Local Health Directors

Catherine Moore, RN, MSN
North Carolina Nursing Association

Zack Moore, MD, MPH
NC Division of Public Health

Levi M Njord, MSc
NC Division of Public Health

Sylvia I Pegg, RN, BSN, CIC
President, APIC-NC

Senator William R. Purcell, MD
NC Senate

Charles Riddick, MAEd
CEO, The Carolinas Center for Medical Excellence

William A. Rutala, PhD, MPH
Director, NC SPICE

Robert L. Sautter, PhD, HCLD (ABB)
NC Laboratory Response Forum

Daniel J. Sexton, MD
Director, Duke Infection Control Network

Michael E. Toedt, MD, FAAFP
Exec. Dir. Clinical Services, Cherokee Indian Hospital

Judy Flower Ward
Consumer Representative

Christopher W. Woods, MD, MPH
Chief, Infectious Diseases Section, Durham VAMC