Annual Report April 2016

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# Healthcare-Associated Infections in North Carolina

## 2015 Annual Report

Product of:
N.C. Surveillance for Healthcare-Associated and Resistant Pathogens
Patient Safety (SHARPPS) Program
N.C. Communicable Disease Branch
N.C. Division of Public Health
N.C. Department of Health and Human Services

N.C. SHARPPS Program

Public Health
HEALTH AND HUMAN SERVICES

## Overview of Healthcare-Associated Infections in North Carolina

The U.S. Centers for Disease Control and Prevention estimates that 4 percent of all hospital admissions result in a healthcare-associated infection (HAI), culminating in approximately 721,800 infections[1] and 99,000 deaths each year[2] as well as $28–$33 billion in excess costs.[3] In North Carolina, HAIs result in approximate direct costs to facilities ranging from $124 million to $348 million annually.[4] These numbers likely underestimate the true burden of HAIs because they include only a subset of healthcare-associated infections occurring in acute care hospitals. This report is intended to provide an understanding of the burden of healthcare-associated infections in North Carolina.

HAIs are infections caused by a variety of organisms, including bacteria and fungi, while receiving medical care. Hospitals report specific types of HAIs to the North Carolina Division of Public Health (N.C. DPH). This report focuses on five important types of HAIs that occurred while patients were hospitalized during January 1, 2015 – December 31, 2015. These infections include:

1. Central line-associated bloodstream infections (CLABSI)
2. Catheter-associated urinary tract infections (CAUTI)
3. Surgical site infections (SSI) occurring after inpatient abdominal hysterectomies or colon surgeries
4. Laboratory-identified bloodstream infections caused by methicillin-resistant *Staphylococcus aureus* (MRSA)
5. Laboratory-identified infections caused by *Clostridium difficile* (CDI)

The prevention of healthcare-associated infections is a public health priority in North Carolina and is a collaborative effort among the healthcare and public health communities. This report was a product of this collaboration prepared by the Surveillance for Healthcare-Associated and Resistant Pathogens Patient Safety (SHARPPS) Program located in the Communicable Disease Branch of the Epidemiology Section of N.C. DPH. The N.C. SHARPPS Program works to eliminate preventable infections in health care settings by:

1. Conducting statewide surveillance for selected HAIs;
2. Providing useful, unbiased information to health care providers and consumers through public reports;
3. Promoting and coordinating prevention efforts;
4. Providing guidance, education and training; and
5. Investigating and responding to outbreaks in healthcare settings.

Report definitions are provided in Appendix A. Prevention tips on HAIs are also provided in Appendix C.

We welcome your feedback to improve the usefulness of future reports (nchai@dhhs.nc.gov). For more information on healthcare-associated infections and the N.C. SHARPPS Program, please visit http://epi.publichealth.nc.gov/cd/diseases/hai.html.

**For more information:**

- To learn more about each individual HAI, please visit the N.C. SHARPPS Program website at **http://epi.publichealth.nc.gov/cd/diseases/hai.html.**
- To review background information on HAI surveillance in N.C. and detailed information on common statistics used, visit **http://epi.publichealth.nc.gov/cd/hai/figures/hai_oct2012.pdf.**


## Acknowledgements

The North Carolina Surveillance for Healthcare-Associated and Resistant Pathogens Patient Safety Program would like to acknowledge and thank hospital infection preventionists across the state who work tirelessly to protect patients from infection. They provided the data used to create this report and worked with their hospital colleagues to identify and reconcile any potential


[1] Magil, SS, Edwards, JR, Bamberg W, et al. Multistate point-prevalence survey of healthcare-associated infections. *N Engl J Med.* 2014;370:1198-1208. Available at http://www.cdc.gov/HAI/surveillance/index.html.

[2] Klevens RM, Edwards JR, Richards CL, Jr., et al. Estimating health care-associated infections and deaths in U.S. hospitals, 2002. *Public Health Rep.* Mar-Apr 2007;122(2):160-166. Available at http://www.cdc.gov/HAI/surveillance/index.html.

[3] Scott R. *The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention. 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. Available at http://www.cdc.gov/HAI/surveillance/index.html.

[4] Anderson DJ, Pyatt DG, Weber DJ, Rutala WA; North Carolina Department of Public Health HAI Advisory Group. Statewide costs of health care-associated infections: Estimates for acute care hospitals in North Carolina. *Am J Infect Control.* 2013;41:764-8. doi: 10.1016/j.ajic.2012.11.022.

problems with the data. The recent successes in fighting healthcare-associated infections would not have been possible without their continuing efforts, dedication and collaboration.

The Surveillance for Healthcare-Associated and Resistant Pathogens Patient Safety Program would also like to recognize the contributions of the Healthcare-Associated Infections Advisory Group members listed in Appendix D. In particular, the Program is grateful for their ongoing guidance and feedback on the presentation and content of N.C. DPH HAI reports.

Finally, the Program would like to acknowledge our partners who have been important leaders and strong supporters of surveillance and prevention programs for healthcare-associated infections in North Carolina. These include the North Carolina Hospital Association, the North Carolina Statewide Program for Infection Control and Epidemiology, the North Carolina Chapter of the Association for Professionals in Infection Control and Epidemiology, and the Adult Care Licensure and Nursing Home Licensure and Certification sections of the North Carolina Division of Health Service Regulation.

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# I. Highlights of Healthcare-Associated Infections Activities in 2015

## A. N.C. Surveillance for Healthcare Associated and Resistant Pathogens Patient Safety Program

Formerly known as the HAI Program, the Surveillance for Healthcare-Associated and Resistant Pathogens Patient Safety (SHARPPS) Program is the new name chosen to better reflect the broader scope of work conducted on a daily basis. The SHARPPS Program conducts surveillance, provides guidance, education, and training, and assists with outbreak investigations in all types of healthcare settings. Key accomplishments and activities of the North Carolina SHARPPS Program in 2015 include the following:

- ***Carbapenem-Resistant Enterobacteriaceae (CRE) Surveillance:*** Enterobacteriaceae are a family of germs normally found in the human gut. CRE are Enterobacteriaceae that have developed high levels of resistance to antibiotics and are therefore difficult or impossible to treat. In March 2015, NC DPH successfully implemented a sentinel surveillance system to: 1) describe the burden of CRE among patients admitted to major medical centers; 2) assess for presence and prevalence of specific mechanisms of resistance; 3) describe common healthcare exposures associated with CRE infection; and 4) describe the geographic distribution of patients with CRE. These data will be used to guide future antimicrobial resistance activities.
- ***Data Validation:*** In 2015, the SHARPPS program conducted an external validation of 2014 central line-associated bloodstream infection (CLABSI) and laboratory-identified *Clostridium difficile* infection (CDI) data reported through the National Healthcare Safety Network (NHSN) to assess performance characteristics and identify common reasons for misreporting. Data validation is critical to ensure completeness and accuracy of reporting, and identifies opportunities for improvement in classification and reporting of HAIs. Results of the validation will be shared publicly in the coming months.
- ***One and Only Safe Injection Practices Campaign****:* NC DPH worked to improve safe injection practices through the One & Only injection safety campaign. In 2015, 14 injection safety educational sessions were held, with over 1490 healthcare professionals trained. There were over 3000 campaign materials disseminated. In addition, the One & Only campaign brought education to 55 licensed healthcare professionals to support them with providingto provide safe injection educational sessions within their organizations and local communities
- ***Drug Diversion:*** New this year, the SHARPPS Program began working with medical, law enforcement, and other partners to increase awareness about healthcare worker drug diversion and assist health care facilities prevent, detect, and respond to drug diversion. Additionally, we are working to assure that a complete assessment of infection risk occurs (in coordination with partners) whenever diversion of injectable medications is identified***.***
- ***Investigation and Outbreak Response:*** In 2015, the Medical Consultation Unit (of which the SHARPPS Program is a part) consulted in 185 outbreaks, with over 125 of these occurring in healthcare settings.
- ***Get Smart: Know When Antibiotics Work:*** The NC Quality Center, in conjunction with the NC Department of Public Health, is leading a statewide antimicrobial stewardship campaign. This campaign supports public and provider awareness about the dangers of unnecessary use of antibiotics. A Gubernatorial proclamation was issued in recognition of Get Smart – Know When Antibiotics Work Week, November 14–20, 2016. Through this campaign, we have provided resources for the general public and health care providers, disseminating more than 850 Get Smart campaign materials. We facilitated the delivery of CDC-developed educational materials to federally qualified health centers (FQHCs) and local health departments (LHDs) across the state, conducted a survey of pharmacy and professional schools in North Carolina to assess the inclusion of antibiotic stewardship in their curricula, and provided two presentations regarding antimicrobial stewardship and appropriate use to professional groups.

## B. 2015 Annual Report

Key points for the 2015 North Carolina Annual Report:

- Central line-associated bloodstream infections (CLABSI) in adult/pediatric medical, surgical and medical/surgical wards & intensive care units (ICUs)
    - North Carolina hospitals reported 626 infections, compared to the predicted 1,104 infections. This was better than the 2006-2008 national experience.
    - Methicillin-resistant *Staphylococcus aureus* (MRSA) was the most commonly identified antibiotic-resistant pathogen identified.
- CLABSI in neonatal ICUs
    - North Carolina hospitals reported 59 infections in neonatal ICUs, compared to the 118 infections that were predicted. This was better than the 2006-2008 national experience.
- Catheter-associated urinary tract infections (CAUTI)
    - North Carolina hospitals reported 672 infections, compared to the 1211 infections that were predicted. This was better than the 2009 national experience.
    - For the first time in 2015, North Carolina met the U.S. Department of Health and Human Services goal to reduce CAUTIs nationally by 25% from the 2009 baseline.
- Surgical site infection (SSI) post abdominal hysterectomy
    - North Carolina hospitals reported 73 infections following inpatient abdominal hysterectomies performed on adults ≥ 18 years, compared to the 102 infections that were predicted. This was better than the 2006-2008 national experience.
    - In 2015, 40% of *Staphylococcus aureus* identified among abdominal hysterectomy SSIs were methicillin resistant.
- SSI post colon surgery
    - North Carolina hospitals reported 259 infections following inpatient colon surgeries performed on adults ≥ 18 years, compared to the 314 infections that were predicted. This was better than the 2006-2008 national experience.
    - MRSA was the most commonly identified antibiotic-resistant pathogen among colon surgery SSI patients.
- Methicillin-resistant *Staphylococcus aureus* (MRSA) laboratory-identified (LabID) events
    - North Carolina hospitals reported 308 MRSA LabID events, compared to the 328 MRSA LabID events that were predicted. This was the same as the 2010-2011 national experience.
    - The U.S. Department of Health and Human Services set a goal to reduce MRSA nationally by 25% from the baseline experience in 2010-2011; North Carolina has not yet met this goal.
- *Clostridium difficile* infection (CDI) LabID events
    - North Carolina hospitals reported 3,046 CDI LabID events, compared to the 3,577 CDI LabID events which were predicted. This was better than the 2010-2011 national experience
    - The U.S. Department of Health and Human Services set a goal to reduce CDI nationally by 30% from the baseline experience in 2010-2011; North Carolina has not yet met this goal.

## C. Healthcare-Associated Infections Partner Updates

**North Carolina Statewide Program for Infection Control and Epidemiology (N.C. SPICE)**

The North Carolina Statewide Program for Infection Control and Epidemiology (N.C. SPICE) promotes prevention and control of healthcare-associated infections in North Carolina and beyond by providing evidence-based education and consultation across the healthcare spectrum. In 2015, SPICE held four classroom courses targeting new infection preventionists (IPs) in acute and long-term care settings, training a total of 350 healthcare professionals. Two additional modules of the Enhanced Education of Infection Prevention in Nursing Homes series were produced. In these two modules, prevention and treatment UTIs and *Clostridium difficile* in nursing homes were addressed. Two DVD volumes containing all 6 modules were mailed to all 413 licensed nursing homes in NC and to 67 others requesting the DVD format. NC Curriculum for Infection Control with sections for Outpatient, Dental and Home Health/Hospice Settings, continued to be taught via classroom, webinar and on-line formats. As a result of these courses, 794 healthcare personnel were trained. Finally, SPICE provided 571 infection control consultations by phone or email in 2015.

**North Carolina Division of Health Service Regulation (DHSR)**

*Adult Care Licensure Section (ACL)*

Healthcare-associated infections can occur in any healthcare setting, including adult care homes such as assisted living facilities. TheNorth Carolina Division of Health Service Regulation's (DHSR) Adult Care Licensure (ACL) Section is an important partner in ensuring infection prevention strategies are implemented in these types of healthcare settings.

General statute §131D-4.4 and 4.5 specifies provisions specific for adult care homes including written infection prevention guidelines in facility policies and procedures, infection prevention training requirements for adult care home staff, and the establishment of guidelines for reporting communicable disease outbreaks to the North Carolina Division of Public Health (DPH). As a result of this statute, ACL developed a state infection prevention course for adult care homes and in April 2012, provided statewide training for care providers and county and state staff with regulatory responsibilities for adult care homes. Trainings were held at 7 different sites, with over 750 attendees.

Collaboration among ACL, DPH and the local health departments has continued to grow during 2015. During inspections of licensed adult care homes, the facility's compliance with infection prevention policies and procedures is reviewed. Noncompliance or breaches in infection prevention practices by facility staff when monitoring resident blood glucose levels are reported to the N.C. HAI Program, which shares information with the local health department. Guidelines for reporting and enhanced communication between DHSR and DPH have led to increased education of adult care providers, safe infection prevention practices, and appropriate testing of residents when potential exposures occur.

*Nursing Home Licensure and Certification Section (NHLC)*

The Nursing Home Licensure and Certification Section (NHLC) regulates more than 430 nursing homes. In 2015, training and education of NHLC staff was a priority to provide basic knowledge in infection prevention practices and appropriate corrective action if infection prevention practices were inadequately implemented.

The following infection prevention educational sessions were provided:

1. Annual training to all nursing home and acute care surveyors in conjunction with N.C. SPICE;
2. Dissemination of N.C. SPICE newsletter and routine updates to surveyors and nursing home administrators;
3. Centers for Medicaid and Medicare Services webinar was made available to all surveyors;
4. CMS had a series of three Infection Control Related webinars that were mandatory for all NH home surveyors. These were related to Contact Precautions, MDRO's, environmental hazards and related Infection Control issues.
4. N.C. HAI Program summary updates were provided to surveyors and nursing home administrators as received from the program.
5. CDC updates and other alerts from NHLC Regional Office disseminated to surveyors and nursing home administrators.

**North Carolina Quality Center (NCQC)**

The NC Quality Center (NCQC) is committed to partnering with healthcare providers and communities to provide safe, quality healthcare and to prevent HAIs. Towards this mission, the NCQC has engaged in the following HAI prevention activities:

*Partnership with Alliant Quality, the Quality Innovation Network – Quality Improvement Organization for Georgia and North Carolina in "Reducing Healthcare Associated Infections"*

Alliant Quality is aligned with the Healthcare Associated Infection goals as outlined in the Health and Human Services National Action Plan to Prevent Healthcare-Associated Infections: Roadmap to Elimination and with other public and private programmatic initiatives. The NCQC, along with the Georgia Hospital Association, is partnering with Alliant Quality to facilitate the Reducing Healthcare-Associated Infections in Hospitals Quality Improvement project as part of the five-year (2014-2019) Centers for Medicare & Medicaid Services (CMS) Quality Innovation Network Quality Improvement Organization (QIN-QIO) project through a Learning & Action Network to address HAI reduction and prevention focused on CAUTI, CLABSI and CDI.

*NCHA Board of Trustees Goal – CAUTI Reduction*

The NCHA Board of Trustees adopted a 2015 Patient Safety Goal that 100% of NCHA member hospitals commit to reduce Catheter Associated Urinary Tract Infections (CAUTI) by putting a nurse driven protocol for Foley catheter removal in place hospital wide, and submit a copy of the protocol to the NCQC. In addition, the Board committed to reduce the state CAUTI Standardized Infection Ratio to less than 0.5. To date, 77 hospitals have submitted protocols and NCQC is providing assistance to the remaining hospitals to develop their protocols. The statewide CAUTI rate is 0.64 as of 4th quarter 2015.

*NC Get Smart: Antimicrobial Stewardship Campaign*

The NC Quality Center, in conjunction with the NC Department of Public Health and other key stakeholders focused on continued awareness of antibiotic stewardship programs as a strategy for reducing HAI.

The baseline result of the CDC checklist that was distributed to hospitals statewide during 2014 was shared during virtual meetings and an on-line journal published by the professional association of NC pharmacists. From this assessment it was determined that there were multiple opportunities for health care organizations to adopt better antimicrobial stewardship practices, which reduce the resulting dangers of unnecessary antibiotics use. Special areas of interest included developing and strengthening protocols for the treatment of urinary tract infections, skin and soft tissue infection, empiric treatment of MRSA, Non-C.Diff antibiotics in new cases of CDI and culture proven invasive infections. Informational webinars on standard guidelines for treatment in these areas were delivered during the year.

Additionally, faculty of the NCQC HAI team engaged front line providers of primary care and urgent care centers affiliated with two major health systems in trainings that informed of the importance of antibiotic stewardship in the treatment of upper respiratory infections and bronchitis. Resources were also shared with these groups on how to have the difficult conversations with patients requesting unnecessary antibiotics.

The partnership with Capitol Broadcasting Company Inc. continued through early 2015 with the airing of public service announcements about antibiotic misuse. The NC Get Smart website with resources for the general public and health care providers was maintained and continues to house talking points that can be used for media and health professional communications about antibiotic resistance during peak flu and cold seasons.

**North Carolina Chapter of the Association for Professionals in Infection Control (APIC-NC)**

The North Carolina Chapter of the Association for Professionals in Infection Control and Epidemiology (APIC-NC) is the leading professional association for infection preventionists (IP). Its mission is to create a safer world through the prevention of infections.

APIC-NC boasts more than 220 members consisting of nurses, physicians, public health professionals, epidemiologists, microbiologists or medical technologists. Many infection preventionists are employed within healthcare institutions and also serve as educators, researchers, consultants and clinical scientists.

APIC-NC serves two primary roles in regard to its membership. First, educational programs support the infection prevention activities of the many patient safety stakeholders. Second, APIC-NC collaborates with other professional associations, consumer groups, thought leaders, and regulatory and accrediting agencies to maximize the synergy of shared interests and resources with the goal of improving patient outcomes.

In 2015, APIC-NC offered two educational sessions that consisted of the latest infection prevention information. The first session, "Tackling the Dragons of the OR", focused on:

- Patient Safety "Behind the Red Line" including: discussion on surgical site infections, classes of surgery, best practices with Neurosurgery case example
- Best practices with reprocessing of surgical instruments
- Peri-Operative Environment-Environmental Cleaning in the OR
- Construction in the OR
- Endoscopic retrograde cholangiopancreatography (ERCP) and CRE with facility actions related to FDA guidelines

The second session, "Juggling the Everyday Challenges of Infection Control", concentrated on achieving success with new unique challenges in healthcare while staying current with changes in everyday aspects of infection prevention, including relevant topics:

- New Challenges:
    - Outbreaks: Hepatitis C and Ebola: hospital specific response, state response and healthcare worker's personal experience in Africa,
    - Fecal Microbial Transplant,
    - Bed Bugs
- Everyday Challenges:
    - Cleaning, Disinfection, Sterilization,
    - Food Safety,
    - Device-Associated Infections,
    - Surgical Site Infections,
    - Resurgence of communicable disease,
    - Safe Injection Practices

## II. Explanation of Statewide Healthcare-Associated Infections Data

The HAI Annual Report for 2015 includes data that have been combined from all reporting acute care hospitals in North Carolina. Other types of facilities also report HAI data to North Carolina, including long term acute care facilities, inpatient rehabilitation facilities, critical access hospitals and specialty hospitals such as psychiatric facilities. Data for these additional facility types are provided in Quarterly Reports, available here: http://epi.publichealth.nc.gov/cd/hai/figures.html.

This section describes information presented below in Section III.

### A. WHAT IS THE PURPOSE OF THIS REPORT?

This report is meant to help patients who need inpatient medical treatment get information about healthcare-associated infections (HAIs) at the hospital they choose. The reports also help hospitals monitor their progress towards eliminating HAIS and compare themselves to other similarly-sized hospitals in the state.

HAIs are infections patients can get while receiving medical treatment in a healthcare facility. Patients should know that these infections are unintended. Ideally, HAIs should never happen, but sometimes they do. Hospitals track and report HAIs for many reasons. In some cases they are required to do so—either by state public health authorities or by federal health agencies. In most cases, hospitals report numbers (data) about certain HAIs because they want to know how well they are doing in preventing them, and how they compare with other hospitals of similar size and with similar kinds of patients.

This report looks at five HAIs:

1. Central line-associated bloodstream infections (CLABSI)
2. Catheter-associated urinary tract infections (CAUTI)
3. Surgical site infections (SSI) following abdominal hysterectomies and colon surgeries
4. Positive laboratory results with methicillin-resistant *Staphylococcus aureus* (MRSA) bacteria found in the bloodstream
5. Positive laboratory results with *Clostridium difficile* (*C. difficile,* CDI) bacteria found in a stool (fecal) sample

**Click here for "Fast Facts" about central lines, urinary catheters, and the HAIs discussed in this report.**

Hospitals are required by law to report these five HAIs to the North Carolina Division of Public Health. More information about North Carolina's mandatory reporting can be found here: http://epi.publichealth.nc.gov/cd/hai/prevention/laws.html.

These measures do not represent all possible infections, but were selected because they give a good overview of how a hospital or state is doing in preventing healthcare-associated infections. These infections are largely preventable when healthcare providers use infection prevention steps recommended by the Centers for Disease Control and Prevention (CDC).

### B. WHERE DO THE NUMBERS COME FROM?

Hospitals self-report their HAI data to the CDC and the North Carolina Division of Public Health using a free, web-based software system called the National Healthcare Safety Network (NHSN). CDC and the North Carolina SHARPPS Program provide training to hospital staff on the appropriate use of this system and provide guidance on how to track infections in a standard way.

More information about NHSN can be found here: http://www.cdc.gov/nhsn/.

## C. HOW DO I READ THE REPORT?

This report looks at how hospitals in this state performed in terms of infection prevention by displaying how many HAIs they reported during January 1, 2015 – December 31, 2015. There is one key measure used to determine HAI progress in North Carolina as well as nationally; this is referred to as the standardized infection ratios (SIR).

**The number that is used to represent how a hospital did compared to the national average is called a standardized infection ratio (SIR).** When presenting SIRs, the report data tables and figures show whether a hospital had more ("worse") HAIs, fewer ("better") HAIs, or about the same ("same") number of HAIs compared to the national average (i.e., national experience) based on previous years of reported data. This comparison takes into account differences between hospitals such as types of patients and procedures, as well as other factors such as the hospital's size and whether it is affiliated with a medical school. The predicted value of the national experience for each HAI is also called the "NHSN baseline". Each HAI may use data from a different year or years to come up with this predicted baseline value: CLABSIs and SSIs use data from 2006-2008; CAUTIs use data from 2009; MRSA and CDI LabID events use data from 2010-2011. The SIR is considered a "best guess" or estimate of observed infections compared those predicted based on the NHSN baseline experience.

SIRs are presented for the state overall and for each hospital size group; SIR is also presented by location type (e.g., adult/pediatric units vs. neonatal locations). The hospital groups were categorized by total hospital bed counts: Less than 100 beds, 100-199 beds, 200-399 beds, and 400+ beds. Hospitals that served as the primary location for medical schools were included in a separate category (primary medical school affiliation). A list of the reporting hospitals in each size category can be found in Appendix E.

**Click here for a "Reading Guide" that explains each element of the data tables and figures.**

## D. WHAT DO THE NUMBERS MEAN?

It's important to understand that numbers alone won't show how well a hospital or North Carolina is doing in preventing HAIs. This report shows how the state performed during a single year (2015), and compares each year's performance to the national average or baseline experience. Among all hospitals that report HAIs, larger hospitals that see more patients or patients with more complicated medial problems or do more surgeries may have more infections compared to smaller hospitals.

In addition to presenting numbers, there are some more complicated calculations performed on the data. These calculations help ensure that any data guesses or estimates (i.e., for the SIR) are as accurate as possible. A larger number of data records will provide more accurate estimates than a smaller number. One of these calculations gives a lower and higher range of values that we use when comparing the number of observed infections to the number of predicted infections; this range tells us whether the difference between the observed and predicted infections is statistically significant or not.

**Click here for a "Numbers Guide" that explains any calculations for numbers in the data tables and figures.**

## E. ORGANISMS IDENTIFIED FROM HAIs

In NHSN, hospitals may report up to three organisms identified from one HAI. These organisms were categorized into one of ten groups, *Candida* & other yeasts/fungi, *Enterobacter*, *Enterococcus*, *Escherichia coli* (*E. coli*), *Klebsiella*, *Pseudomonas*, *Staphylococcus aureus*, *Coagulase negative Staphylococci*, and two "other" categories – Other Gram-Positive Bacteria and Other Gram-Negative Bacteria. The first eight categories or organisms listed represent the leading organisms associated with HAIs. Many of these organisms are part of the normal flora contained within the human body, found on the skin, or in the gastrointestinal and/or urinary tract. Introduction of these organisms into other areas of the body can lead to infection.

## F. THINGS TO CONSIDER WHEN LOOKING AT THE REPORT

A total of 108 North Carolina hospitals reported HAIs in 2015, including 89 short-term acute-care hospitals, eight long-term acute-care hospitals, six inpatient rehabilitation facilities, and five specialty hospitals.

These reports cover data from infections that occurred during January 1, 2015 - December 31, 2015. Data were downloaded from the National Healthcare Safety Network (NHSN) on March 11, 2016; any changes made to the data after this date are not reflected in this report. Before reviewing this report, a few clarifications about the data need to be made:

1. **Changes in surveillance definitions impact the number of observed and predicted events:** In 2015, there were a number of notable changes to surveillance definitions and reporting requirements that should be considered when looking at this report. First, in acute care hospitals, CLABSI and CAUTI reporting was expanded to include the reporting of observed CLABSI and CAUTI infections in adult and pediatric medical, surgical, and medical/surgical wards locations in addition to ongoing ICU reporting. Secondly, the CAUTI surveillance definition was restricted to include only urine cultures with a colony count of at least 100,000 colony forming units per milliliter (CFU/ml) for at least one bacteria and to exclude pathogen results with only yeast, mold, dimorphic fungi or parasites.

2. **The data within this report are preliminary.** Although efforts were made by hospitals and the North Carolina SHARPPS Program to ensure that the data were accurate and complete, the data are self-reported and have not been formally "double-checked," or validated. Until data validation is completed, numbers should be interpreted with caution.

3. **There may be differences in reporting practices among hospitals.** Hospitals with more infection control personnel and resources may be able to identify and report more infections compared to a hospital with fewer infection control resources.

4. **There may be differences between results published by the North Carolina SHARPPS Program and results published elsewhere** (e.g., CMS - Centers for Medicare and Medicaid Services Hospital Compare website). Results may differ due to using data from different time periods, different facility types, different patient populations, and/or different methods of analysis.

5. **The North Carolina SHARPPS Program has chosen not to present some rates** for individual hospital units, procedures or hospitals that did not meet a threshold (minimum value) for the reporting period. The minimum threshold numbers are based on CDC recommendations for reporting healthcare-associated infection data.

6. **The North Carolina SHARPPS Program does not calculate an SIR when the number of predicted infections is less than 1**. In these situations, the "How Does the State Compare to the National Experience" text says "No conclusion." This does not mean that hospitals failed to report data, or that hospitals did not report all necessary data; it only means that the number of patients, devices (central lines or urinary catheters), and/or procedures that were seen during this time period did not meet the established threshold (minimum value) for calculating an SIR. This minimum threshold is based on CDC recommendations. In other words, there is not enough information to make a reliable conclusion about the hospital's or the state's performance on this measure.

7. **Laboratory-Identified Events (LabID Events):** *Clostridium difficile* infections (CDI) and methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia (blood infection) LabID events rely on laboratory data. Patients did not have to be ill to have a positive result. This allows for a much less labor-intensive means to track CDI and MRSA infections. Only those LabID events that are acquired in the hospital are displayed in this report. The sensitivity of various testing types may vary, particularly for CDI, so hospitals that use more sensitive tests might report more LabID events than hospitals that use less sensitive tests. NHSN makes risk adjustments to account for these differences when calculating SIRs for LabID CDI events.

III. Statewide Healthcare-Associated Infections

## A. Central Line-Associated Bloodstream Infections (CLABSI)

### 1. CLABSI in Adult/Pediatric ICUs

**North Carolina 2015 CLABSI Highlights in Adult/Pediatric Medical, Surgical and Medical/Surgical Wards & ICUs**

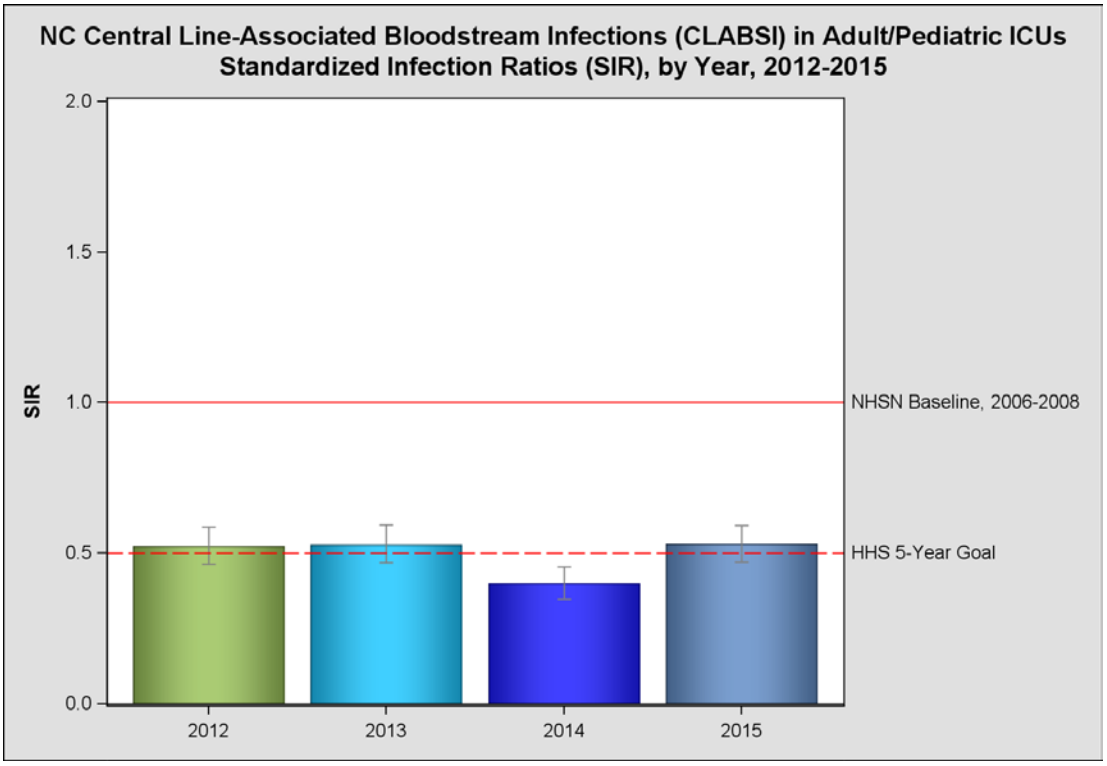
- North Carolina hospitals reported 626 infections, compared to the predicted 1104 infections.
  - This was better than the 2006-2008 national experience.
  - This number is larger than the number of CLABSIs reported in previous years.
- CLABSI surveillance was expanded to include medical, surgical and medical/surgical wards. In previous years, surveillance was limited only to adult and pediatric ICUs.
- In 2015, North Carolina did not meet the U.S. Department of Health and Human Services goal to reduce CLABSIs by 50% from the 2006-2008 baseline experience.
- The most commonly identified organisms from adult and pediatric CLABSI patients were *Candida* and other yeasts/fungi.

**Table 1. N.C. Central Line Associated Bloodstream Infections (CLABSI) in Adult/Pediatric Medical, Surgical and Medical/Surgical Wards & ICUs, by Year, 2012-2015**

| Year | # Observed Infections | # Predicted Infections | How Does North Carolina Compare to the National Experience? |
|---|---|---|---|
| 2012 | 310 | 637 | ★Better: Fewer infections than were predicted (better than the national experience) |
| 2013 | 315 | 613 | ★Better: Fewer infections than were predicted (better than the national experience) |
| 2014 | 248 | 644 | ★Better: Fewer infections than were predicted (better than the national experience) |
| 2015* | 626 | 1104 | ★Better: Fewer infections than were predicted (better than the national experience) |

*In 2015, CLABSI surveillance was expanded to include medical, surgical and medical/surgical wards.

**Figure 1.**

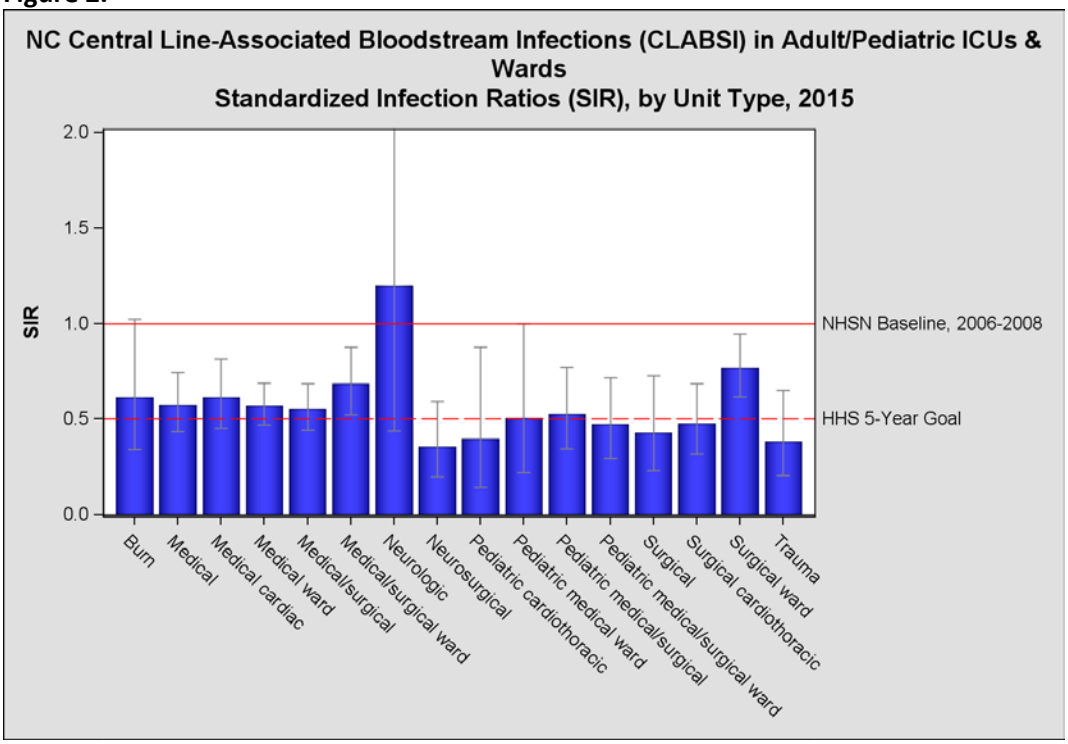



**How to Understand Figure 1:**

- Overall (2012-2015), the number of observed CLABSI infections reported in ICUs in North Carolina has been BETTER than predicted based on the national experience
- The number of observed CLABSI infections in ICUs increased slightly in 2015 compared to the previous year

* This figure excludes infections in ward/non-ICU locations, which became reportable in 2015.

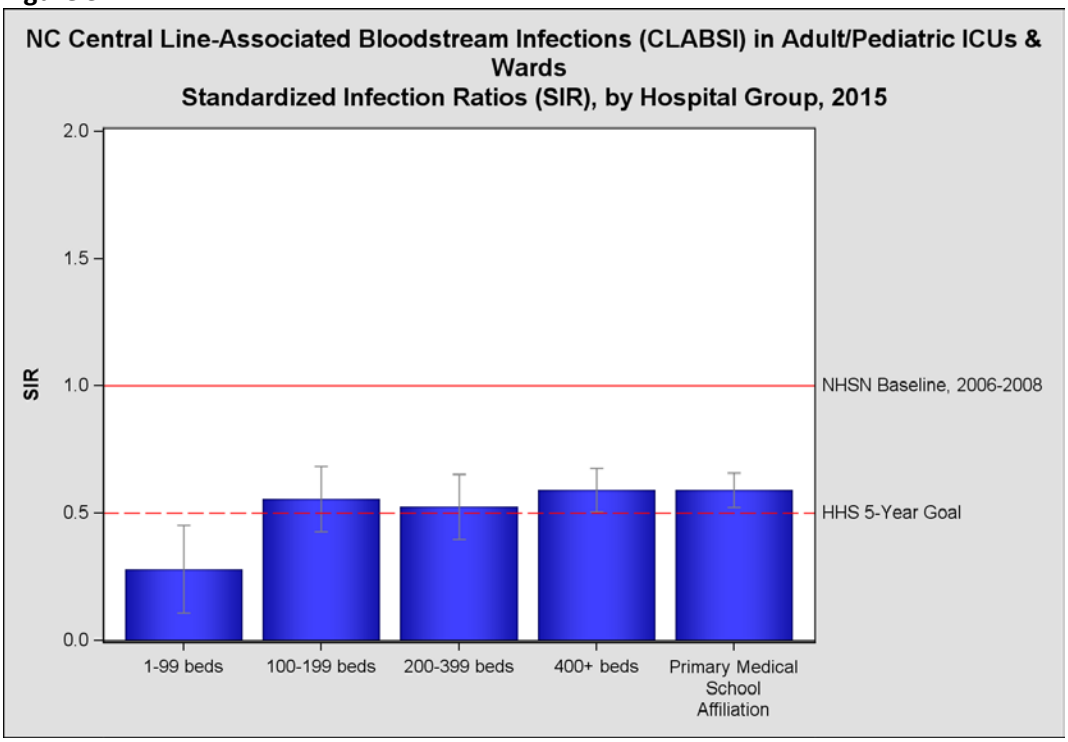
**Figure 2.**




**How to Understand Figure 2:**

- In 2015, neurologic ICUs had the highest number of observed infections, performing WORSE than predicted by the national experience
- In 2015, all adult/pediatric reporting locations except neurologic ICUs and burn ICUs did BETTER when compared to the national experience
- The number of observed infections in nine of the 16 unit types was higher than the HHS 5-year goal

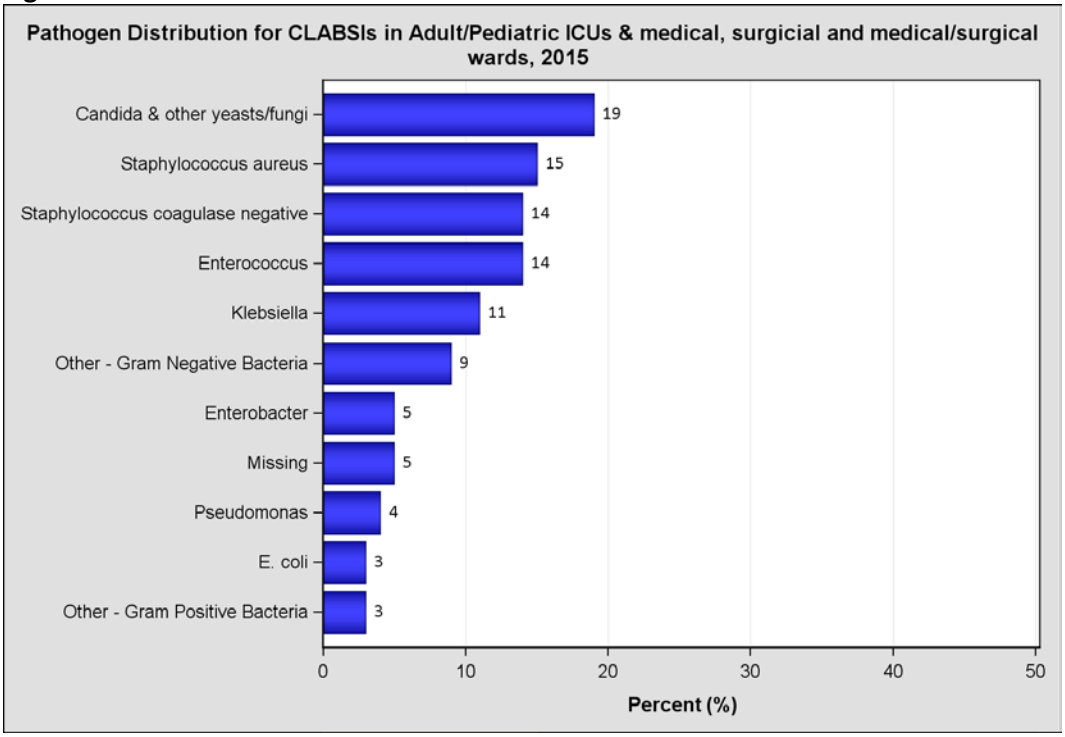
**Figure 3.**




**How to Understand Figure 3:**

- In 2015 all hospital groups had fewer observed infections than predicted and did BETTER compared to the national experience
- Hospitals with less than 100 beds were the only hospital size group that met the targeted HHS 5-year goal

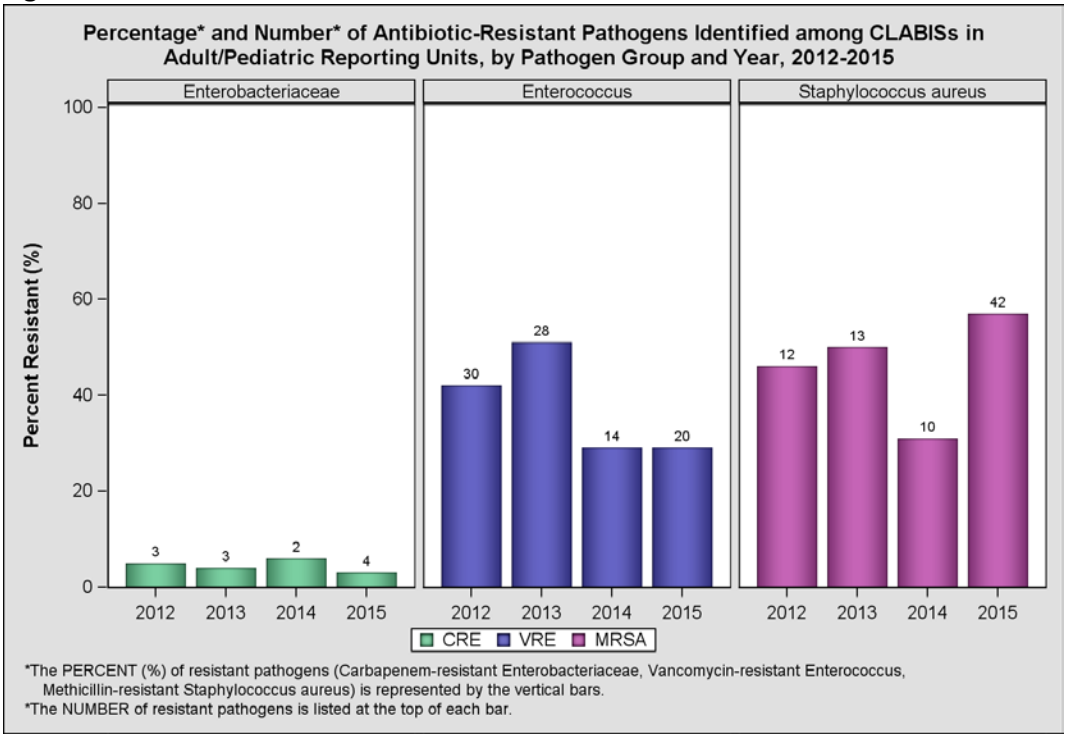
**Figure 4.**




**How to Understand Figure 4:**

- In 2015, *Candida* and other yeasts/fungi (19%) and *Staphylococcus aureus* (15%) were the most common pathogens identified from observed CLABSI infections
- *Coagulase negative Staphylococci* (14%) and *Enterococcus* (14%) organisms were the next most commonly reported pathogens from CLABSI infections

**Figure 5.**



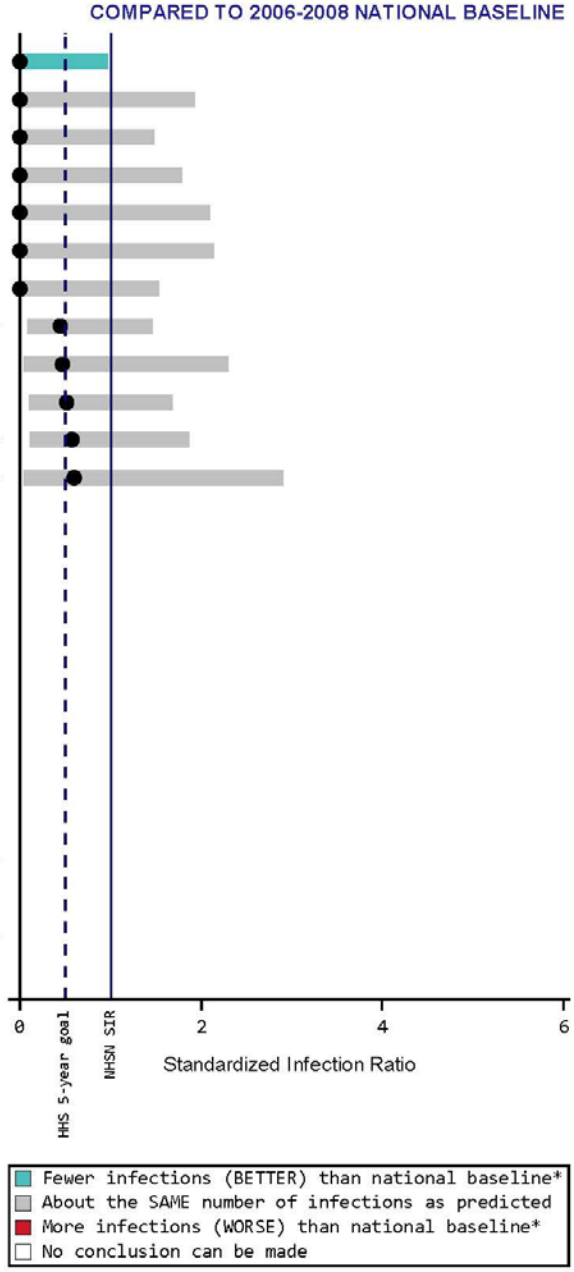

**How to Understand Figure 5:**

- In 2015, 57% of *Staphylococcus aureus* and were resistant to methicillin. This is an increase from previous years
- In 2015, 29% of *Enterococcus* were resistant to vancomycin
- The percentage of *Enterobacteriaceae* resistant to carbapenems and *Enterococcus* resistant to vancomycin among reported CLABSIs were similar to previous years

**The following SIR plots summarize CLABSI infection data among Adult/Pediatric locations for North Carolina hospitals by hospital groups (Appendix E).**

**CLABSI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs**
**Standardized Infection Ratios: January 1 – December 31, 2015**
**Hospital Group: Hospitals with less than 100 Beds**

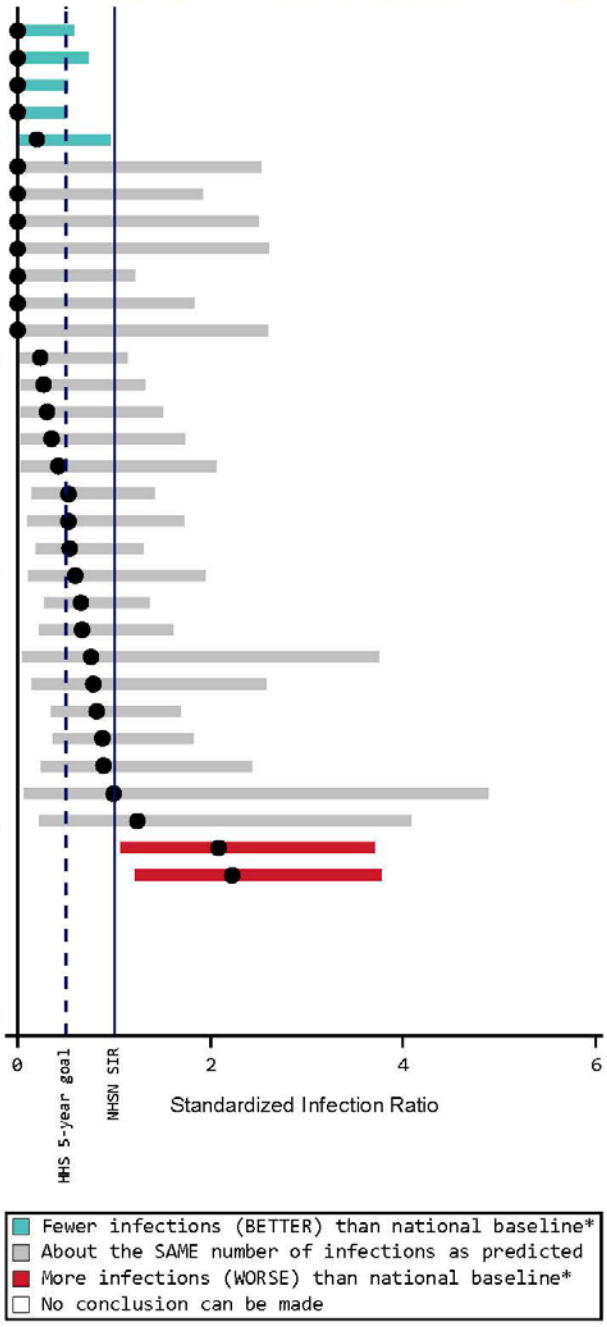
| HOSPITAL | OBS | PRED | CLD | SIR |
|---|---|---|---|---|
| Dlp - Harris Regional Hospital | 0 | 3.1 | 2142 | 0.0 |
| Vidant Roanoke Chowan Hospital | 0 | 1.6 | 1060 | 0.0 |
| Randolph Hospital | 0 | 2.0 | 1486 | 0.0 |
| Vidant Beaufort Hospital | 0 | 1.7 | 1145 | 0.0 |
| Granville Medical Center | 0 | 1.4 | 1090 | 0.0 |
| Novant Health Brunswick Medical Center | 0 | 1.4 | 1101 | 0.0 |
| Hugh Chatham Memorial Hospital | 0 | 2.0 | 1551 | 0.0 |
| Caldwell Memorial Hospital | 2 | 4.5 | 3214 | 0.4 |
| Sentara Albemarle Medical Center | 1 | 2.1 | 1628 | 0.5 |
| Columbus Regional Healthcare System | 2 | 3.9 | 2743 | 0.5 |
| Novant Health Huntersville | 2 | 3.5 | 2801 | 0.6 |
| Annie Penn Hospital | 1 | 1.7 | 1296 | 0.6 |
| McDowell Hospital | 1 | 0.8 | 578 | NC |
| Murphy Medical Center | 0 | 0.9 | 710 | NC |
| Sandhills Regional Medical Center | 0 | 0.8 | 534 | NC |
| Martin General Hospital | 0 | 0.1 | 97 | NC |
| Vidant Duplin Hospital | 0 | 0.6 | 379 | NC |
| Kings Mountain Hospital | 0 | 0.7 | 511 | NC |
| Person Memorial Hospital | 1 | 0.6 | 340 | NC |
| Wake Forest Baptist Health-Lexington | 0 | 0.8 | 627 | NC |
| Novant Health Medical Park Hospital | 0 | 0.6 | 409 | NC |
| Carolinas Healthcare System Anson | NA | NA | N | NA |
| Johnston Health Clayton | 0 | 0.2 | 130 | NC |
| Firsthealth Moore Regional-Hoke | NA | NA | N | NA |
| Firsthealth Moore Regional-Richmond | 0 | 0.7 | 499 | NC |




Data reported from adult/pediatric units as of March 14, 2016 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
CLD = # central line days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## CLABSI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 100 to 199 Beds

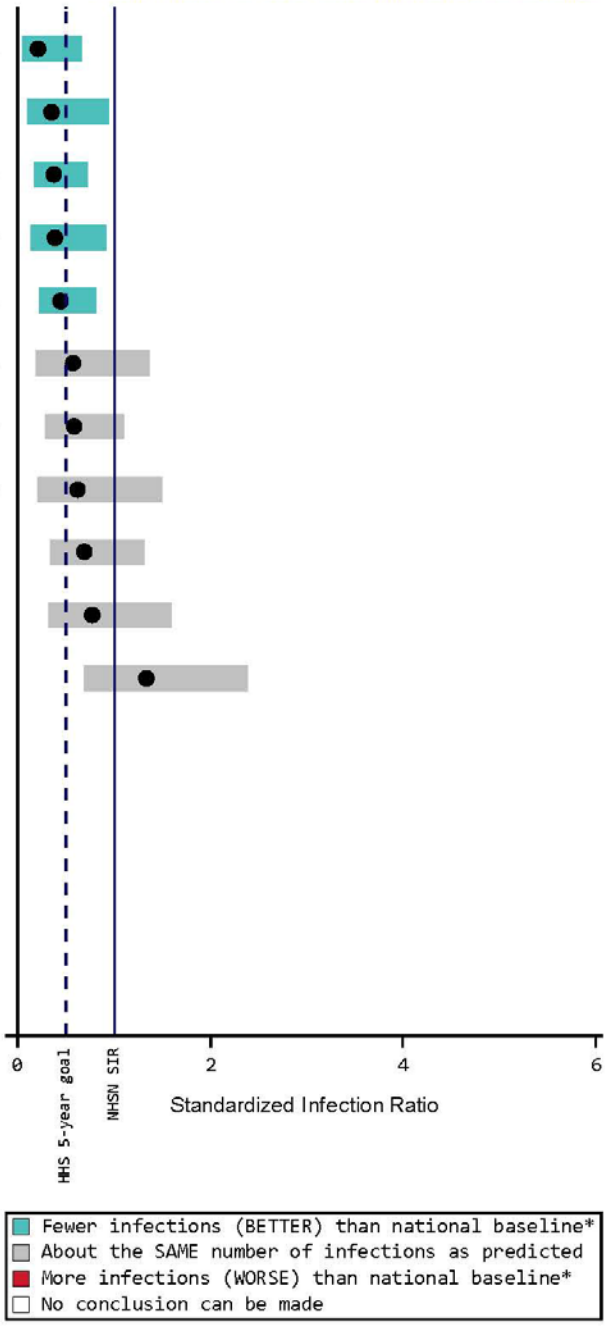
| HOSPITAL | OBS | PRED | CLD | SIR |
|---|---|---|---|---|
| Iredell Memorial Hospital | 0 | 5.2 | 3754 | 0.0 |
| Maria Parham Medical Center | 0 | 4.1 | 2797 | 0.0 |
| Catawba Valley Medical Center | 0 | 5.8 | 3926 | 0.0 |
| Wesley Long Hospital | 0 | 6.1 | 4175 | 0.0 |
| Vidant Edgecombe Hospital | 1 | 5.2 | 3020 | 0.2 |
| Haywood Regional Medical Center | 0 | 1.2 | 829 | 0.0 |
| ARHS-Watauga Medical Center | 0 | 1.6 | 1191 | 0.0 |
| Davis Regional Medical Center | 0 | 1.2 | 718 | 0.0 |
| Northern Hospital Of Surry County | 0 | 1.2 | 848 | 0.0 |
| Stanly Regional Medical Center | 0 | 2.5 | 1644 | 0.0 |
| Halifax Regional Medical Center | 0 | 1.6 | 1296 | 0.0 |
| Morehead Memorial Hospital | 0 | 1.2 | 770 | 0.0 |
| Carteret General Hospital | 1 | 4.4 | 2956 | 0.2 |
| Carolinas Medical Center-Lincoln | 1 | 3.7 | 2654 | 0.3 |
| Onslow Memorial Hospital | 1 | 3.3 | 2398 | 0.3 |
| Central Carolina Hospital | 1 | 2.8 | 1924 | 0.4 |
| Betsy Johnson Regional | 1 | 2.4 | 1851 | 0.4 |
| WakeMed Cary Hospital | 3 | 5.8 | 4284 | 0.5 |
| Carolinas Healthcare System Blue Ridge | 2 | 3.8 | 2488 | 0.5 |
| Duke Raleigh Hospital | 4 | 7.4 | 5037 | 0.5 |
| Carolinas Medical Center-Union | 2 | 3.4 | 2463 | 0.6 |
| Wilson Medical Center | 6 | 9.1 | 6229 | 0.7 |
| Carolinas Medical Center-Mercy | 4 | 6.0 | 3930 | 0.7 |
| Park Ridge Health | 1 | 1.3 | 901 | 0.8 |
| Carolinas Medical Center-University | 2 | 2.6 | 1829 | 0.8 |
| Johnston Health | 6 | 7.4 | 4552 | 0.8 |
| Frye Regional Medical Center | 6 | 6.9 | 4408 | 0.9 |
| Lake Norman Regional Medical Center | 3 | 3.4 | 2083 | 0.9 |
| Pardee Hospital | 1 | 1.0 | 785 | 1.0 |
| Rutherford Regional Medical Center | 2 | 1.6 | 1252 | 1.2 |
| Novant Health Matthews Medical Center | 10 | 4.8 | 3700 | 2.1 |
| Lenoir Memorial Hospital | 12 | 5.4 | 3910 | 2.2 |
| Novant Health Thomasville Medical Center | 0 | 0.8 | 621 | NC |
| Sampson Regional Medical Center | 1 | 0.8 | 618 | NC |
| Scotland Memorial Hospital | 1 | 0.4 | 352 | NC |
| Wilkes Regional Medical Center | 0 | 0.3 | 223 | NC |
| Women's Hospital | NA | NA | N | NA |




Data reported from adult/pediatric units as of March 14, 2016 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
CLD = # central line days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## CLABSI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 200 to 399 Beds

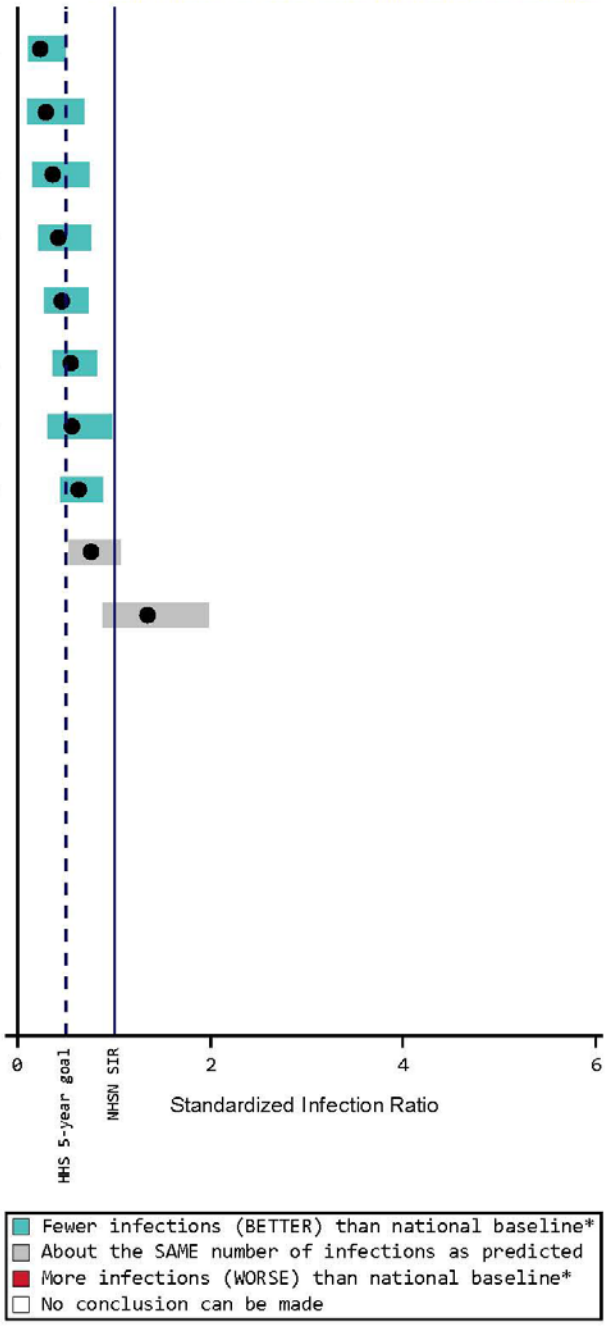
| HOSPITAL | OBS | PRED | CLD | SIR |
|---|---|---|---|---|
| CarolinaEast Medical Center | 2 | 10.0 | 7526 | 0.2 |
| High Point Regional Health System | 3 | 8.7 | 5709 | 0.3 |
| Wayne Memorial Hospital | 7 | 19.1 | 12811 | 0.4 |
| Nash Health Care Systems | 4 | 10.6 | 7194 | 0.4 |
| FirstHealth Moore Regional Hospital | 9 | 20.5 | 13979 | 0.4 |
| Novant Health Rowan Medical Center | 4 | 7.1 | 4795 | 0.6 |
| Duke Regional Hospital | 8 | 13.8 | 8110 | 0.6 |
| Carolinas Healthcare System Cleveland | 4 | 6.5 | 4340 | 0.6 |
| Carolinas Medical Center-Pineville | 8 | 11.6 | 7217 | 0.7 |
| Southeastern Regional Medical Center | 6 | 7.8 | 5442 | 0.8 |
| Alamance Regional Medical Center | 10 | 7.5 | 5230 | 1.3 |




Data reported from adult/pediatric units as of March 14, 2016 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
CLD = # central line days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## CLABSI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 400 or More Beds

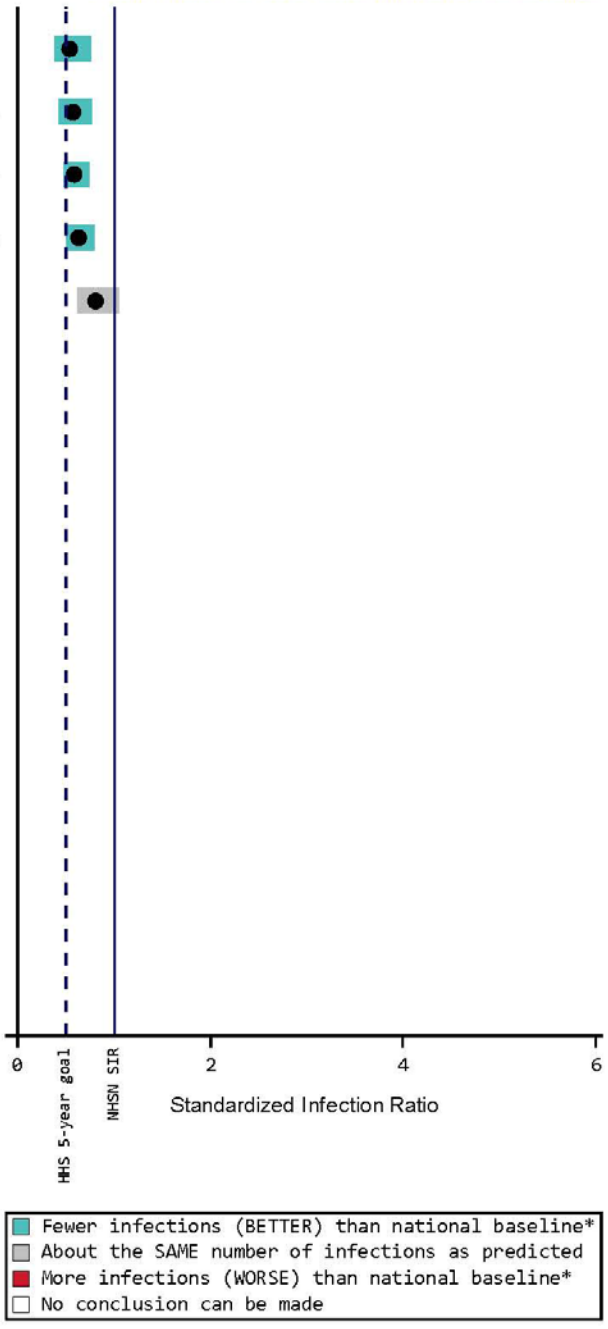
| HOSPITAL | OBS | PRED | CLD | SIR |
|---|---|---|---|---|
| Moses Cone Hospital | 6 | 25.6 | 15499 | 0.2 |
| Gaston Memorial Hospital | 4 | 14.0 | 8353 | 0.3 |
| Cape Fear Valley Health System | 6 | 17.0 | 11358 | 0.4 |
| Rex Healthcare | 9 | 21.8 | 14728 | 0.4 |
| New Hanover Regional Medical Center | 15 | 33.3 | 18382 | 0.5 |
| Mission Hospital | 22 | 39.9 | 24599 | 0.6 |
| Carolinas Medical Center-Northeast | 11 | 19.5 | 13325 | 0.6 |
| WakeMed | 30 | 47.9 | 24871 | 0.6 |
| Novant Health Forsyth Medical Center | 30 | 39.6 | 24512 | 0.8 |
| Novant Health Presbyterian Medical | 23 | 17.1 | 9483 | 1.3 |




Data reported from adult/pediatric units as of March 14, 2016 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
CLD = # central line days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## CLABSI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with Primary Medical School Affiliation

| HOSPITAL | OBS | PRED | CLD | SIR |
|---|---|---|---|---|
| Vidant Medical Center | 30 | 55.7 | 30091 | 0.5 |
| Carolinas Medical Center | 41 | 71.9 | 31279 | 0.6 |
| UNC Health Care | 73 | 124 | 54255 | 0.6 |
| Duke University Hospital | 67 | 107 | 58052 | 0.6 |
| Wake Forest University Baptist Medical | 52 | 64.7 | 31657 | 0.8 |




Data reported from adult/pediatric units as of March 14, 2016 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
CLD = # central line days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## 2. CLABSI in Neonatal Intensive Care Units

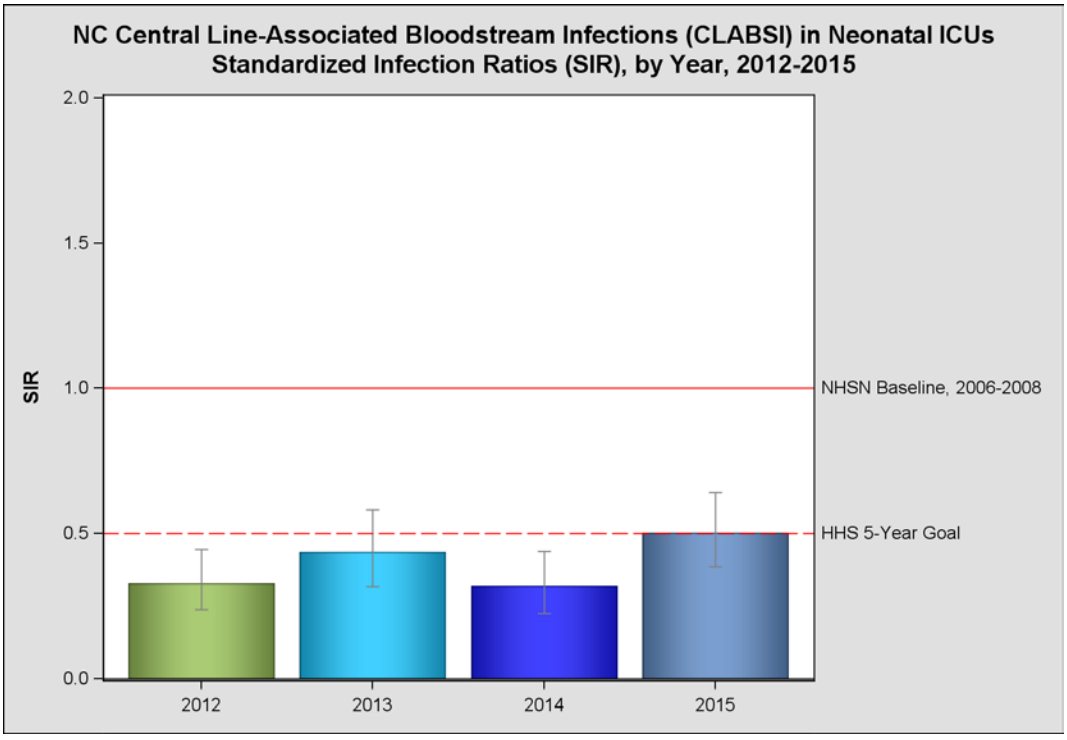
**North Carolina 2015 CLABSI Highlights in NICUs**

- In 2015, North Carolina hospitals reported 59 infections in neonatal ICUS, compared to the 118 infections that were predicted. This was better than the 2006-2008 national experience.
- The most commonly identified organisms from NICU CLABSI patients were *Staphylococcus aureus* and *Klebsiella*.
- In 2015, 19% of Staphylococcus aureus identified among observed CLABSI infections in all neonatal ICUs were methicillin-resistant. This is less than the percent resistance reported in previous years

**Table 2. N.C. Central Line Associated Bloodstream Infections (CLABSI) in neonatal ICUs, by year, 2012-2015**

| Year | # Observed Infections | # Predicted Infections | How Does North Carolina Compare to the National Experience? |
|---|---|---|---|
| **2012** | **39** | **119** | **★Better: Fewer infections than were predicted (better than the national experience)** |
| **2013** | **42** | **96** | **★Better: Fewer infections than were predicted (better than the national experience)** |
| **2014** | **34** | **107** | **★Better: Fewer infections than were predicted (better than the national experience)** |
| **2015** | **59** | **118** | **★Better: Fewer infections than were predicted (better than the national experience)** |

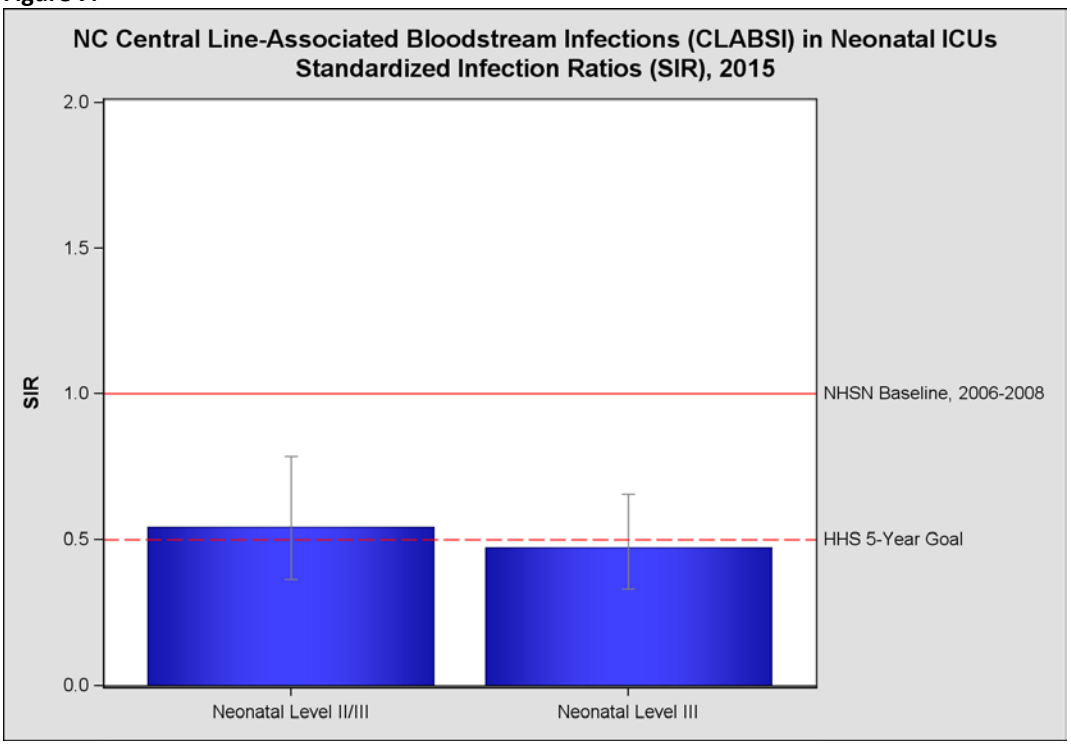
**Figure 6.**




**How to Understand Figure 5:**

- Since 2012, the number of observed CLABSI infections reported in NICUs in North Carolina has been BETTER than predicted based on the national experience
- The HHS 5-year goal to reduce CLABSIs by 50% from the national experience was achieved in NC in 2012 and 2014.

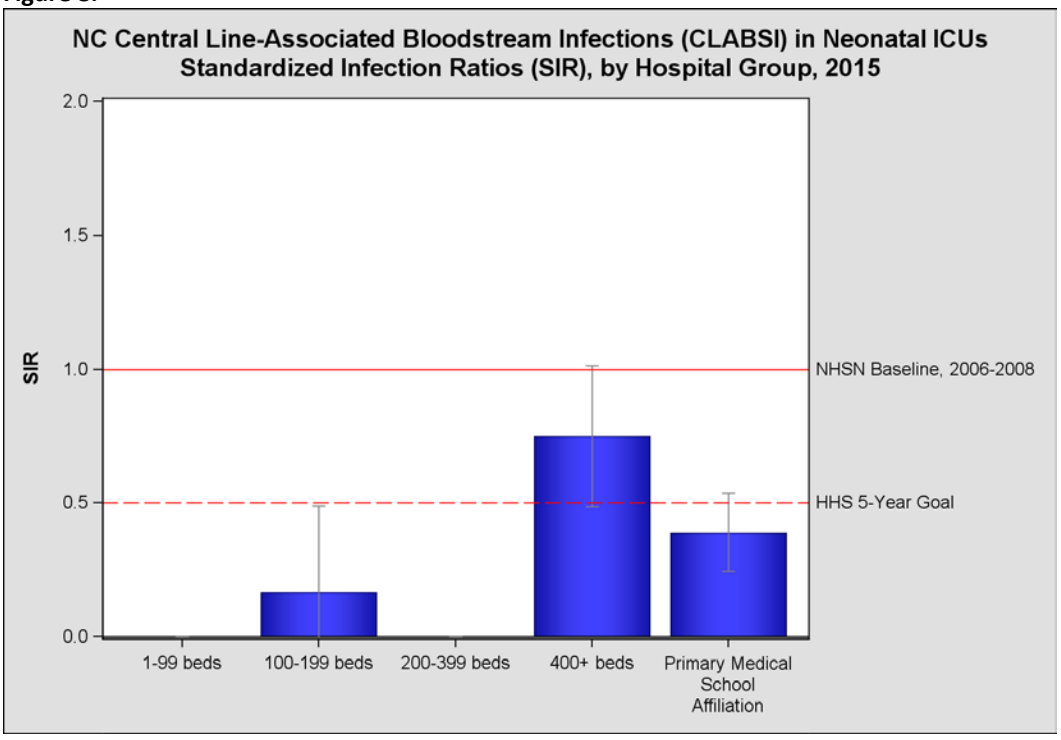
**Figure 7.**




**How to Understand Figure 6:**

- In 2015, both level II/III and level III Neonatal ICUs reported fewer infections than expected, performing BETTER than the national experience.
- In 2015, the number of observed CLABSI infections in Neonatal level II/III and level III locations did not differ from the HHS 5-year goal
- Observed CLABSI infections in neonatal level III ICUs were slightly lower than observed CLABSI infections in neonatal level II/III ICUs.

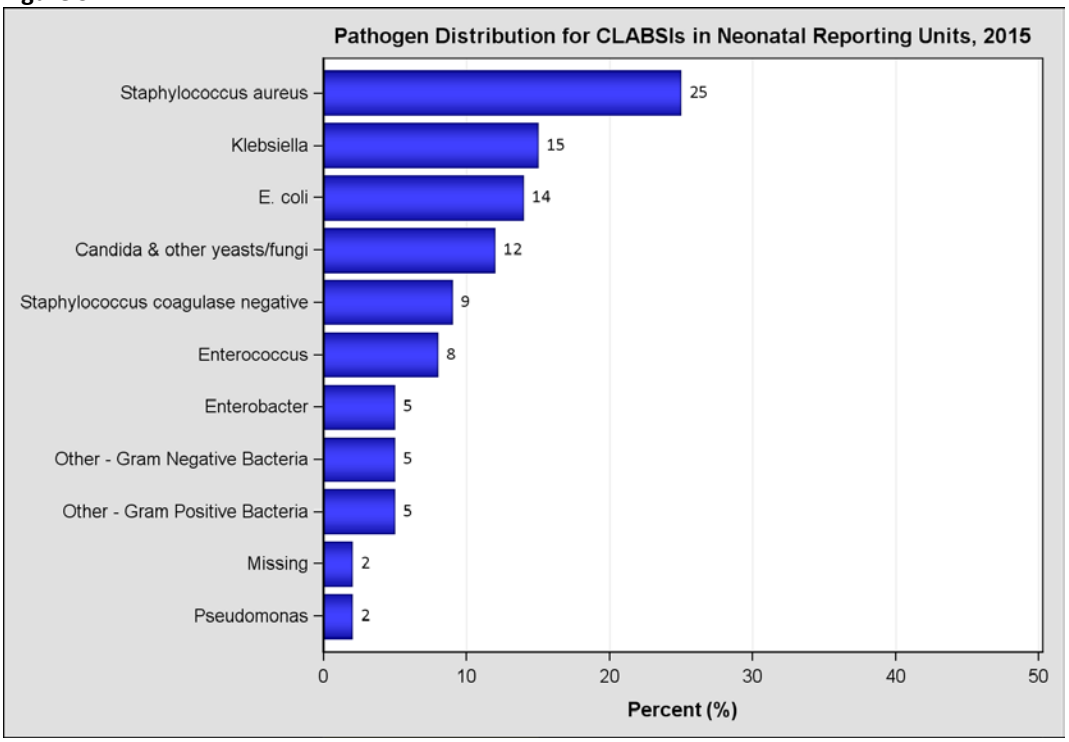
**Figure 8.**




**How to Understand Figure 7:**

- Not all hospital size groups have facilities with NICU locations
- The number of observed CLABSI infections reported in all hospital size group is BETTER than predicted based on the national experience
- The largest two hospital size groups did not meet the HHS 5-year goal for a 50% decrease in CLABSIs from baseline

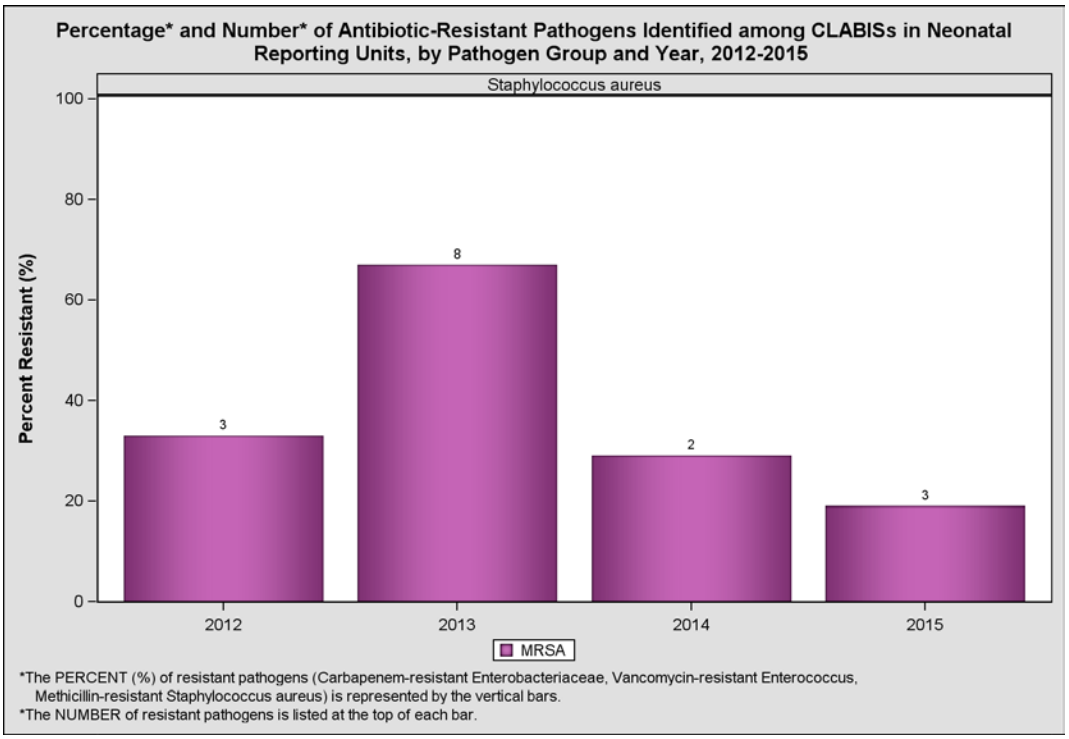
**Figure 9.**




**How to Understand Figure 8:**

- In 2015, *Staphylococcus aureus* (25%) and *Klebsiella* (15%) were the most common pathogens identified from CLABSIs in NICU locations

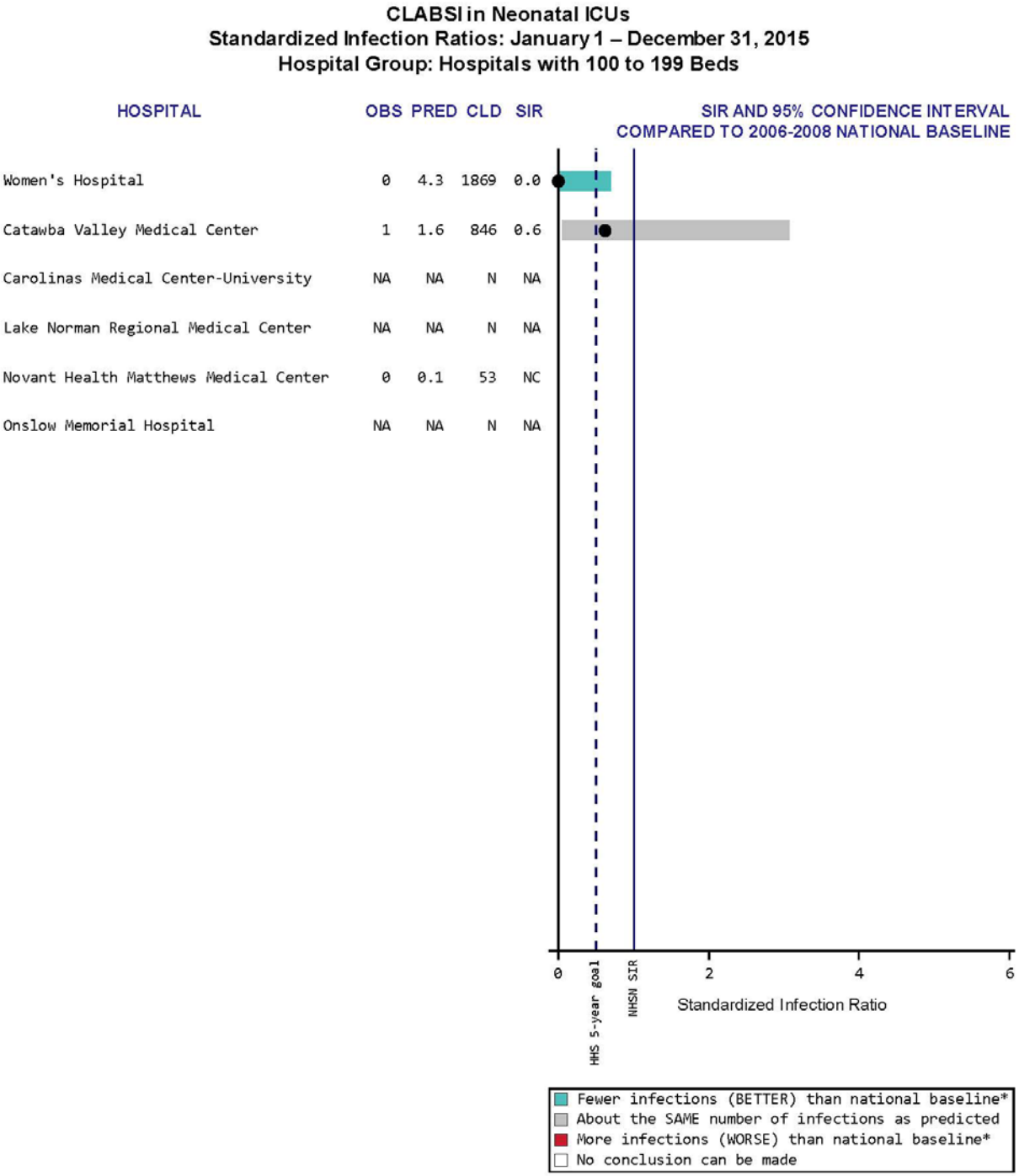
**Figure 10.**




**How to Understand Figure 9:**

- In 2015, 19% of *Staphylococcus aureus* identified among observed CLABSI infections in all neonatal ICUs were resistant to methicillin. This is less than previous years

**The following SIR plots summarize CLABSI infection data among NICUs in North Carolina hospitals by hospital groups (Appendix E).**




Data reported from adult/pediatric units as of March 14, 2016 .
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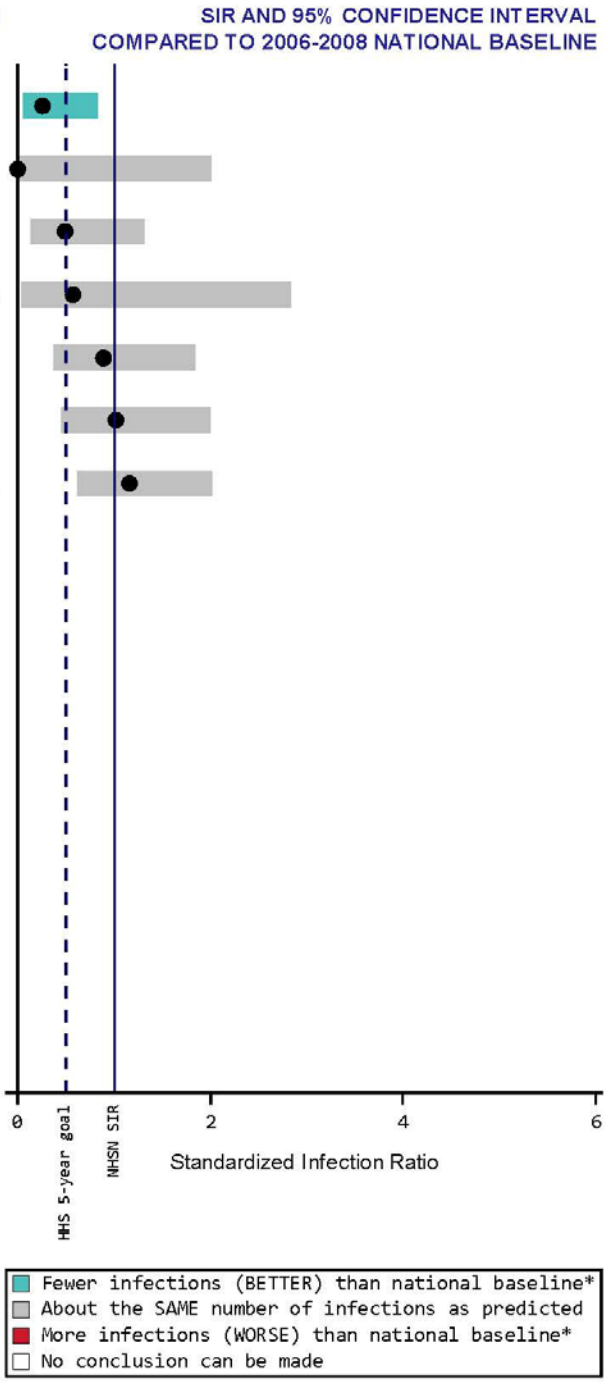
PRED = # infections statistically 'predicted' by national baseline
CLD = # central line days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## CLABSI in Neonatal ICUs
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 400 or More Beds

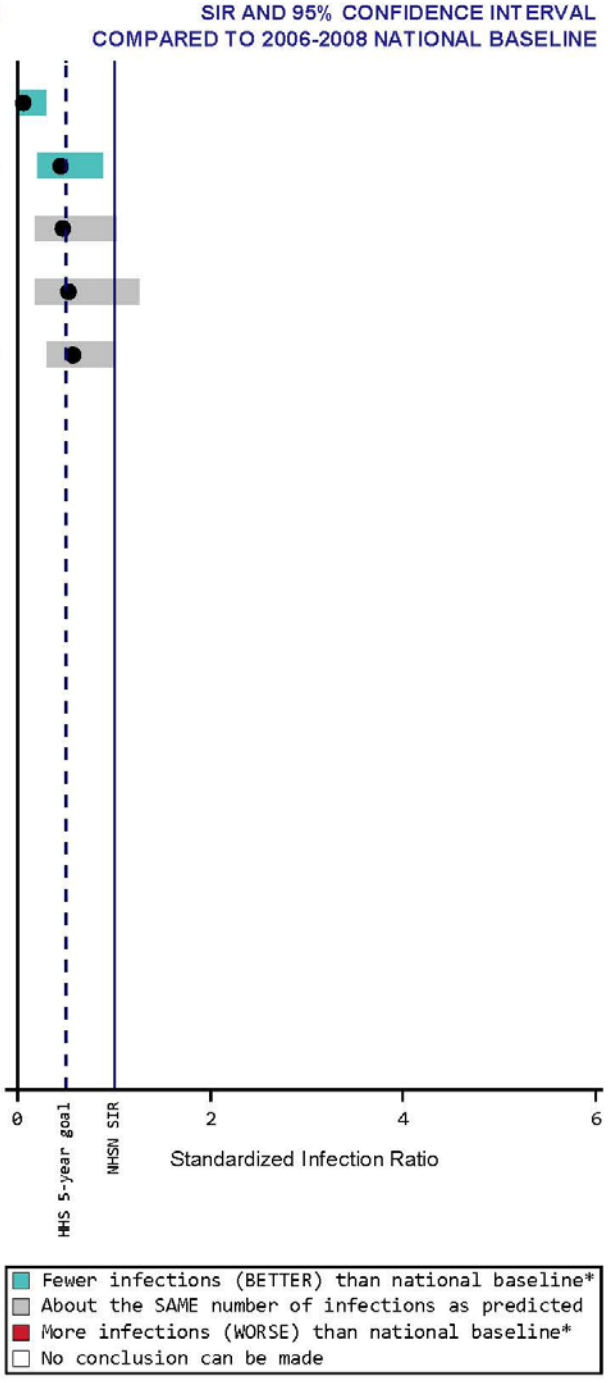
| HOSPITAL | OBS | PRED | CLD | SIR |
|---|---|---|---|---|
| New Hanover Regional Medical Center | 2 | 8.0 | 2830 | 0.3 |
| Carolinas Medical Center-Northeast | 0 | 1.5 | 607 | 0.0 |
| Mission Hospital | 3 | 6.2 | 2306 | 0.5 |
| Cape Fear Valley Health System | 1 | 1.7 | 532 | 0.6 |
| WakeMed | 6 | 6.8 | 2925 | 0.9 |
| Novant Health Forsyth Medical Center | 7 | 6.9 | 2247 | 1.0 |
| Novant Health Presbyterian Medical | 11 | 9.5 | 3518 | 1.2 |
| Gaston Memorial Hospital | 1 | 0.7 | 499 | NC |




Data reported from adult/pediatric units as of March 14, 2016 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
CLD = # central line days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## CLABSI in Neonatal ICUs
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with Primary Medical School Affiliation

| HOSPITAL | OBS | PRED | CLD | SIR |
|---|---|---|---|---|
| Duke University Hospital | 1 | 17.1 | 6722 | 0.1 |
| UNC Health Care | 7 | 15.8 | 6288 | 0.4 |
| Wake Forest University Baptist Medical | 5 | 10.8 | 4322 | 0.5 |
| Vidant Medical Center | 4 | 7.7 | 3092 | 0.5 |
| Carolinas Medical Center | 10 | 17.7 | 7888 | 0.6 |




Data reported from adult/pediatric units as of March 14, 2016 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
CLD = # central line days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## B. Catheter-Associated Urinary Tract Infections (CAUTI)

**North Carolina 2015 CAUTI Highlights**

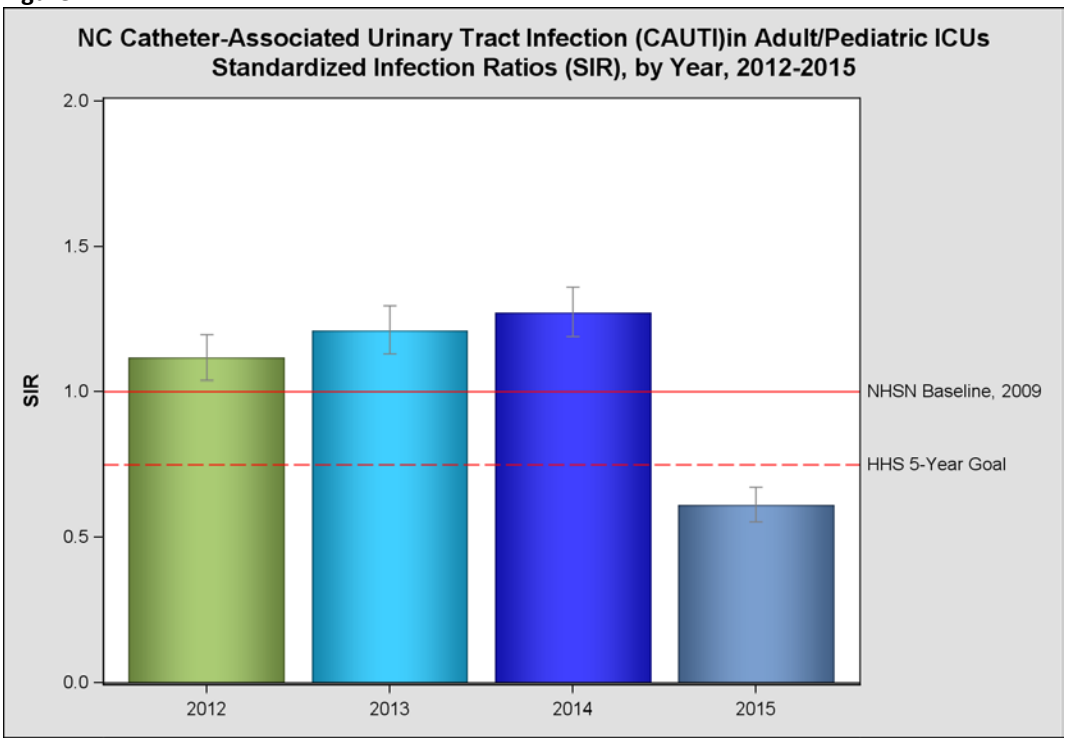
- In 2015, North Carolina hospitals reported 672 infections, compared to the 1,211 infections that were predicted
  - This was better than the 2009 national experience.
  - This was the lowest number of CAUTIs observed since NC hospitals began reporting in 2012.
- Changes for 2015:
  - CAUTI surveillance excluded infections with only yeast, mold, dimorphic fungi or parasites.
  - CAUTI surveillance was expanded to include Medical, Surgical and Medical/Surgical wards in previous years surveillance was limited only to Adult/Pediatric ICUs.
- North Carolina met the U.S. Department of Health and Human Services goal to reduce CAUTIs nationally by 25% from the 2009 baseline for the first time in 2015.
- The most commonly identified organisms were *E. coli* and *Enterococcus*

**Table 3. N.C. Catheter-Associated Urinary Tract Infections (CAUTI) in ICUs and wards, by year, 2012-2015**

| Year | # Observed Infections | # Predicted Infections | How Does North Carolina Compare to the National Experience? |
|---|---|---|---|
| **2012** | **789** | **706** | **✖ Worse: More infections than were predicted (worse than the national experience)** |
| **2013** | **832** | **686** | **✖ Worse: More infections than were predicted (worse than the national experience)** |
| **2014** | **861** | **677** | **✖ Worse: More infections than were predicted (worse than the national experience)** |
| **2015*** | **672** | **1211** | **★Better: Fewer infections than were predicted (better than the national experience)** |

*In 2015, CAUTI surveillance was expanded to include Medical, Surgical and Medical/Surgical wards; infections with only yeast, mold, dimorphic fungi or parasites were also excluded beginning in 2015

**Figure 11.**

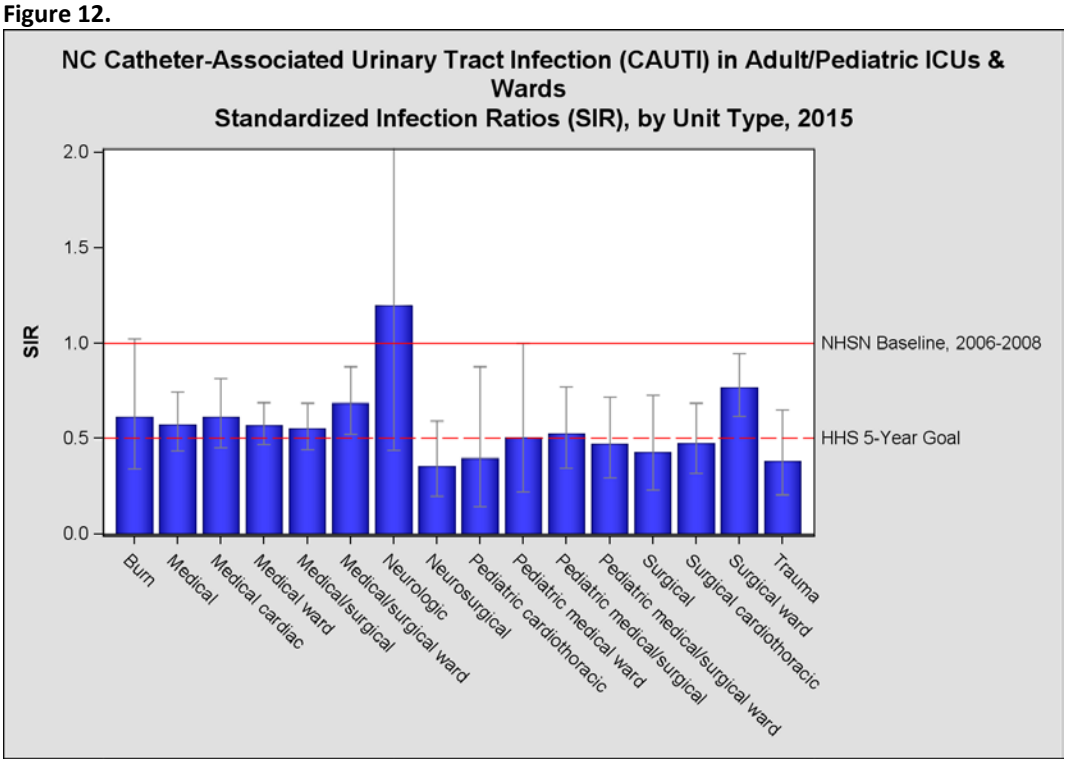



**How to Understand Figure 10:**

- In 2015, North Carolina observed fewer infections than predicted, performing BETTER than the national experience
- In 2015, North Carolina met the HHS 5-year goal to decrease CAUTIs by 25%

* This figure excludes ward locations, which became reportable in 2015.

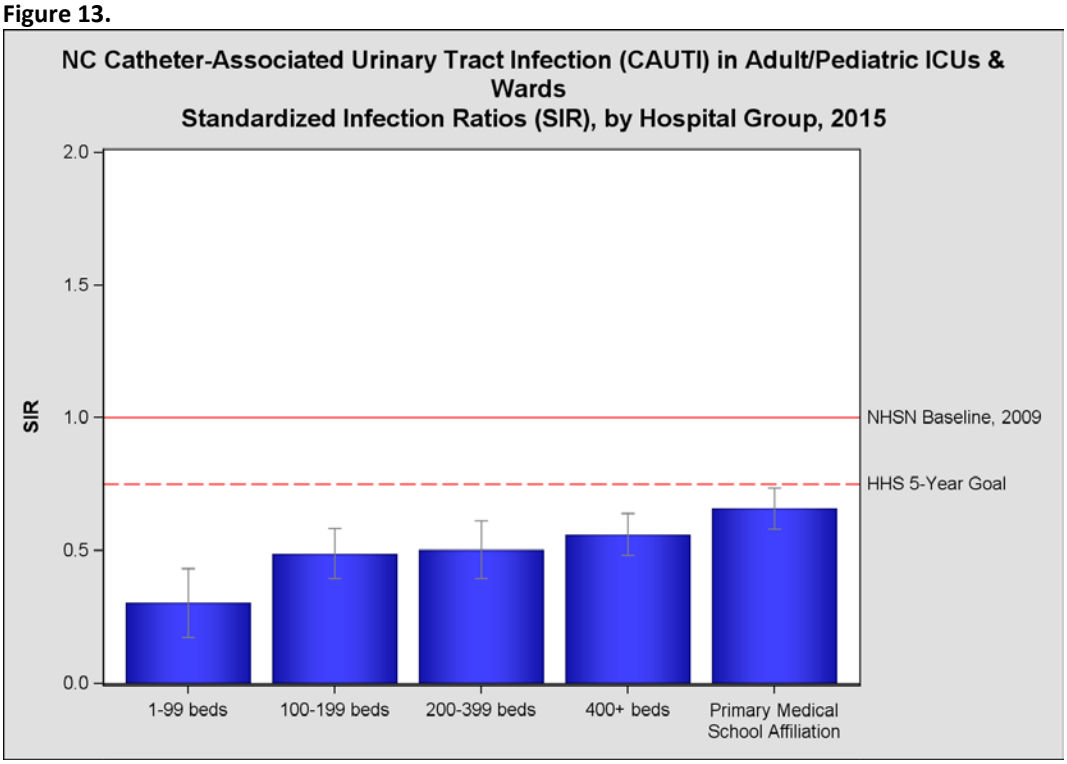
**Figure 12.**




**How to Understand Figure 11:**

- In 2015, neurologic ICU locations reported the most number of infections when compared to other ICU and ward locations, performing WORSE than the national experience.
- Burn ICU locations performed the SAME as the national experience.
- All other locations reported fewer infections than predicted, performing BETTER than the national experience

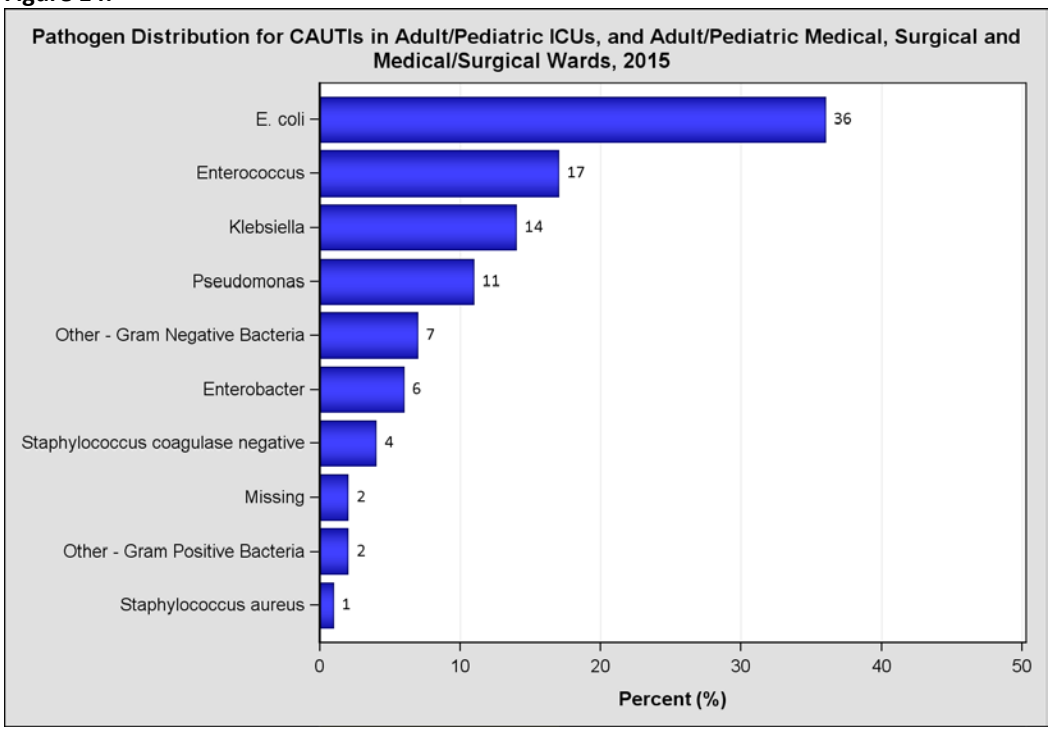
**Figure 13.**




**How to Understand Figure 12:**

- In 2015, all hospital groups reported fewer infections than predicted, performing BETTER than the national experience
- There is a trend of increasing observed CAUTI infections with increasing hospital size
- This year, all hospital groups met the HHS 5-year goal of a 25% reduction in CAUTIs.

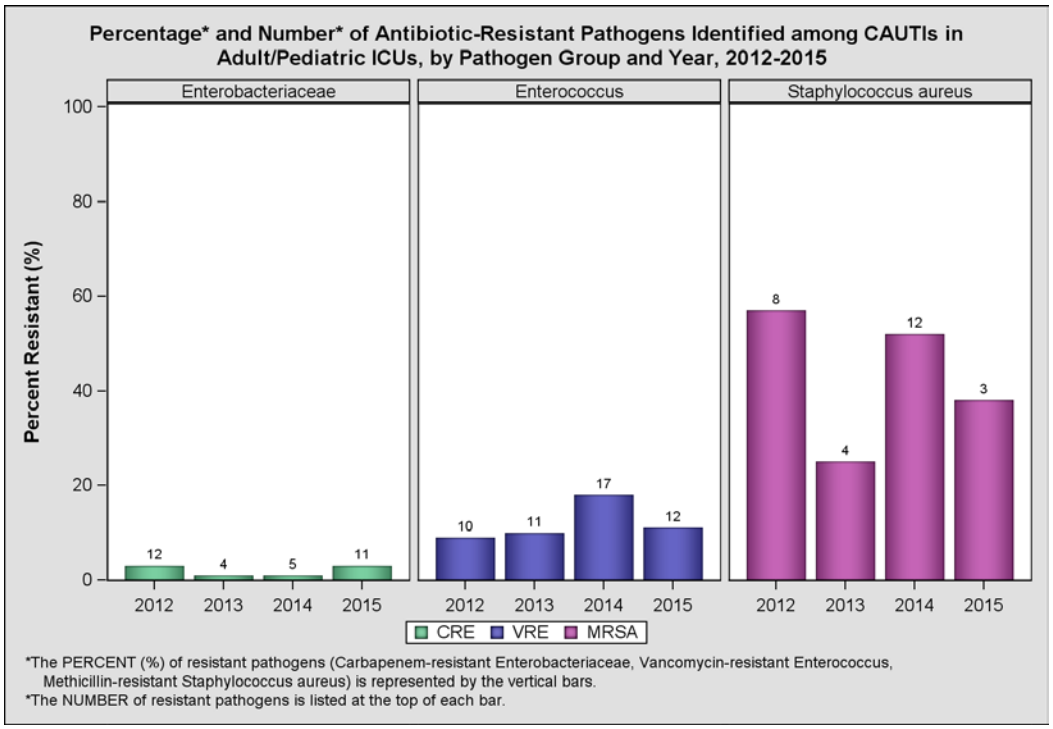
**Figure 14.**




**How to Understand Figure 13:**

- *E. coli* (36%) and *Enterococcus* (17%) were the most commonly identified pathogens among reported CAUTI infections in 2015

**Figure 15.**



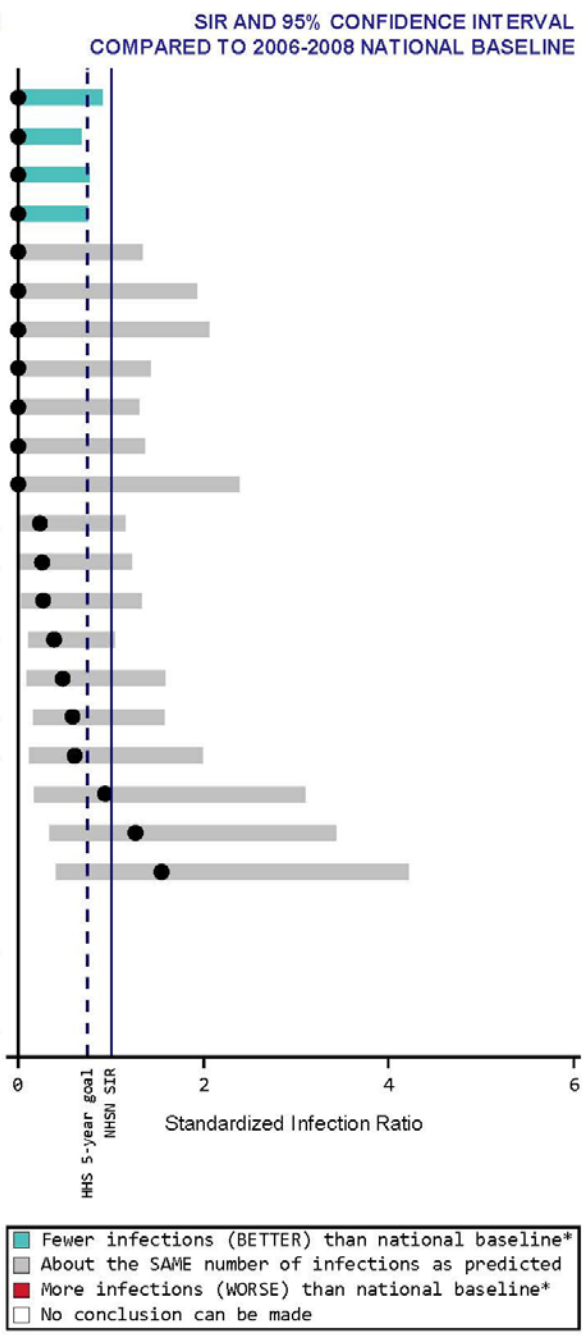

**How to Understand Figure 14:**

- In 2015, 28% of *Staphylococcus aureus* were resistant to methicillin; 11% of *Enterococci* were resistant to vancomycin; and 3% of *Enterobacteriaceae* were resistant to carbapenems among reported CAUTI infections.
- The percentage of antibiotic resistant *Staphylococcus aureus* and *Enterobacteriaceae* identified among reported CAUTIs were lower than in 2014.

**The following SIR plots summarize CAUTI infection data for North Carolina hospitals by hospital groups (Appendix E).**

**CAUTI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs**
**Standardized Infection Ratios: January 1 – December 31, 2015**
**Hospital Group: Hospitals with less than 100 Beds**

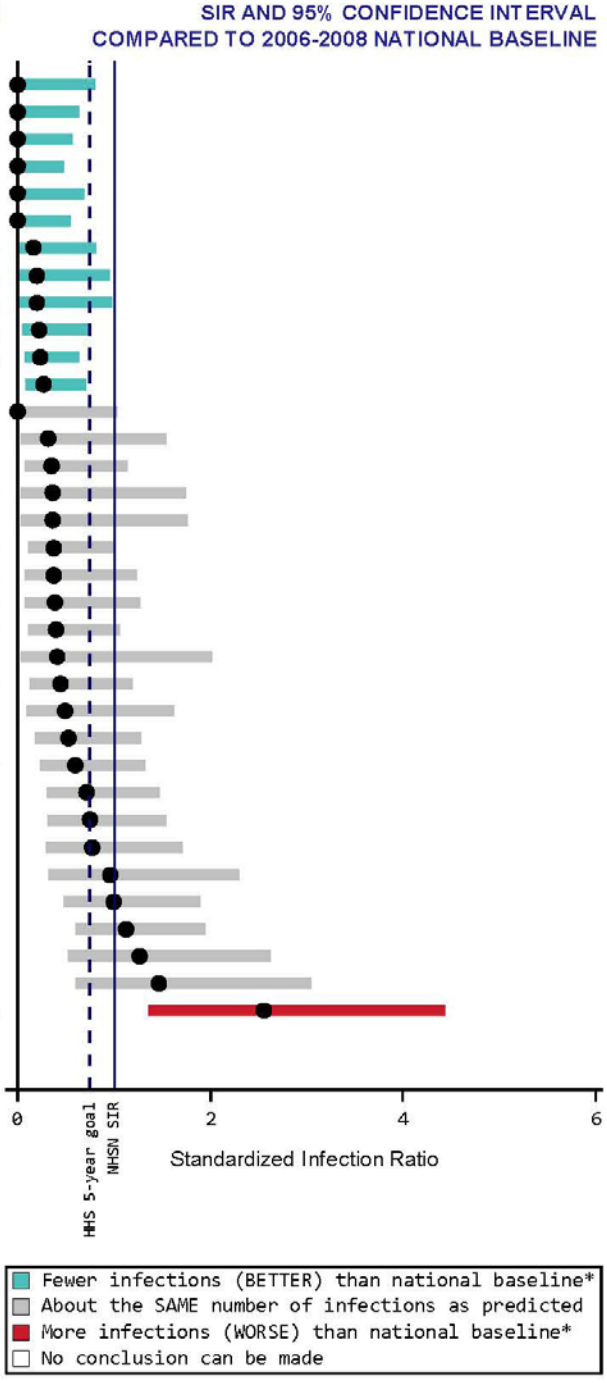
| HOSPITAL | OBS | PRED | UCD | SIR |
|---|---|---|---|---|
| Randolph Hospital | 0 | 3.3 | 2295 | 0.0 |
| Novant Health Huntersville | 0 | 4.4 | 2777 | 0.0 |
| Novant Health Brunswick Medical Center | 0 | 3.9 | 2576 | 0.0 |
| Hugh Chatham Memorial Hospital | 0 | 4.0 | 2667 | 0.0 |
| McDowell Hospital | 0 | 2.2 | 1550 | 0.0 |
| Sandhills Regional Medical Center | 0 | 1.6 | 875 | 0.0 |
| Martin General Hospital | 0 | 1.5 | 974 | 0.0 |
| Vidant Beaufort Hospital | 0 | 2.1 | 1280 | 0.0 |
| Kings Mountain Hospital | 0 | 2.3 | 1271 | 0.0 |
| Wake Forest Baptist Health-Lexington | 0 | 2.2 | 1565 | 0.0 |
| Firsthealth Moore Regional-Richmond | 0 | 1.3 | 849 | 0.0 |
| Novant Health Medical Park Hospital | 1 | 4.3 | 2370 | 0.2 |
| Columbus Regional Healthcare System | 1 | 4.0 | 2570 | 0.2 |
| Annie Penn Hospital | 1 | 3.7 | 2498 | 0.3 |
| Caldwell Memorial Hospital | 3 | 7.9 | 5094 | 0.4 |
| Sentara Albemarle Medical Center | 2 | 4.2 | 2814 | 0.5 |
| Dlp - Harris Regional Hospital | 3 | 5.2 | 3208 | 0.6 |
| Granville Medical Center | 2 | 3.3 | 2227 | 0.6 |
| Murphy Medical Center | 2 | 2.1 | 1422 | 0.9 |
| Vidant Roanoke Chowan Hospital | 3 | 2.4 | 1453 | 1.3 |
| Person Memorial Hospital | 3 | 1.9 | 1004 | 1.5 |
| Vidant Duplin Hospital | 0 | 0.8 | 635 | NC |
| Carolinas Healthcare System Anson | NA | NA | N | NA |
| Johnston Health Clayton | 0 | 0.7 | 346 | NC |
| Firsthealth Moore Regional-Hoke | NA | NA | N | NA |




Data reported from adult/pediatric units as of March 14, 2016 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
UCD = # urinary catheter days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## CAUTI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 100 to 199 Beds

| HOSPITAL | OBS | PRED | UCD | SIR |
|---|---|---|---|---|
| ARHS-Watauga Medical Center | 0 | 3.8 | 2560 | 0.0 |
| Onslow Memorial Hospital | 0 | 4.7 | 3367 | 0.0 |
| Central Carolina Hospital | 0 | 5.3 | 3214 | 0.0 |
| Stanly Regional Medical Center | 0 | 6.3 | 3637 | 0.0 |
| Halifax Regional Medical Center | 0 | 4.4 | 2831 | 0.0 |
| Morehead Memorial Hospital | 0 | 5.5 | 3151 | 0.0 |
| Lake Norman Regional Medical Center | 1 | 6.1 | 3209 | 0.2 |
| Park Ridge Health | 1 | 5.2 | 3042 | 0.2 |
| Carolinas Medical Center-Lincoln | 1 | 5.1 | 3329 | 0.2 |
| Catawba Valley Medical Center | 2 | 9.1 | 6070 | 0.2 |
| Frye Regional Medical Center | 3 | 12.9 | 6027 | 0.2 |
| Johnston Health | 3 | 11.6 | 6042 | 0.3 |
| Haywood Regional Medical Center | 0 | 2.9 | 1871 | 0.0 |
| Novant Health Thomasville Medical Center | 1 | 3.2 | 2215 | 0.3 |
| Vidant Edgecombe Hospital | 2 | 5.8 | 2874 | 0.3 |
| Carolinas Medical Center-University | 1 | 2.8 | 1910 | 0.4 |
| Davis Regional Medical Center | 1 | 2.8 | 1439 | 0.4 |
| Duke Raleigh Hospital | 3 | 8.1 | 5073 | 0.4 |
| Maria Parham Medical Center | 2 | 5.4 | 3424 | 0.4 |
| Wesley Long Hospital | 2 | 5.2 | 3759 | 0.4 |
| Betsy Johnson Regional | 3 | 7.7 | 4964 | 0.4 |
| Northern Hospital Of Surry County | 1 | 2.5 | 1671 | 0.4 |
| Wilkes Regional Medical Center | 3 | 6.9 | 4112 | 0.4 |
| Sampson Regional Medical Center | 2 | 4.1 | 2709 | 0.5 |
| Iredell Memorial Hospital | 4 | 7.6 | 5140 | 0.5 |
| Novant Health Matthews Medical Center | 5 | 8.4 | 5537 | 0.6 |
| Wilson Medical Center | 6 | 8.5 | 5159 | 0.7 |
| Lenoir Memorial Hospital | 6 | 8.1 | 5046 | 0.7 |
| Carolinas Healthcare System Blue Ridge | 5 | 6.5 | 3537 | 0.8 |
| Carteret General Hospital | 4 | 4.2 | 2607 | 1.0 |
| Carolinas Medical Center-Mercy | 8 | 8.0 | 4324 | 1.0 |
| WakeMed Cary Hospital | 11 | 9.8 | 6277 | 1.1 |
| Carolinas Medical Center-Union | 6 | 4.8 | 3379 | 1.3 |
| Pardee Hospital | 6 | 4.1 | 2837 | 1.5 |
| Rutherford Regional Medical Center | 11 | 4.3 | 2786 | 2.6 |
| Scotland Memorial Hospital | 0 | 0.8 | 493 | NC |
| Women's Hospital | 0 | 0.3 | 231 | NC |




Data reported from adult/pediatric units as of March 14, 2016 .
OBS = # infections observed
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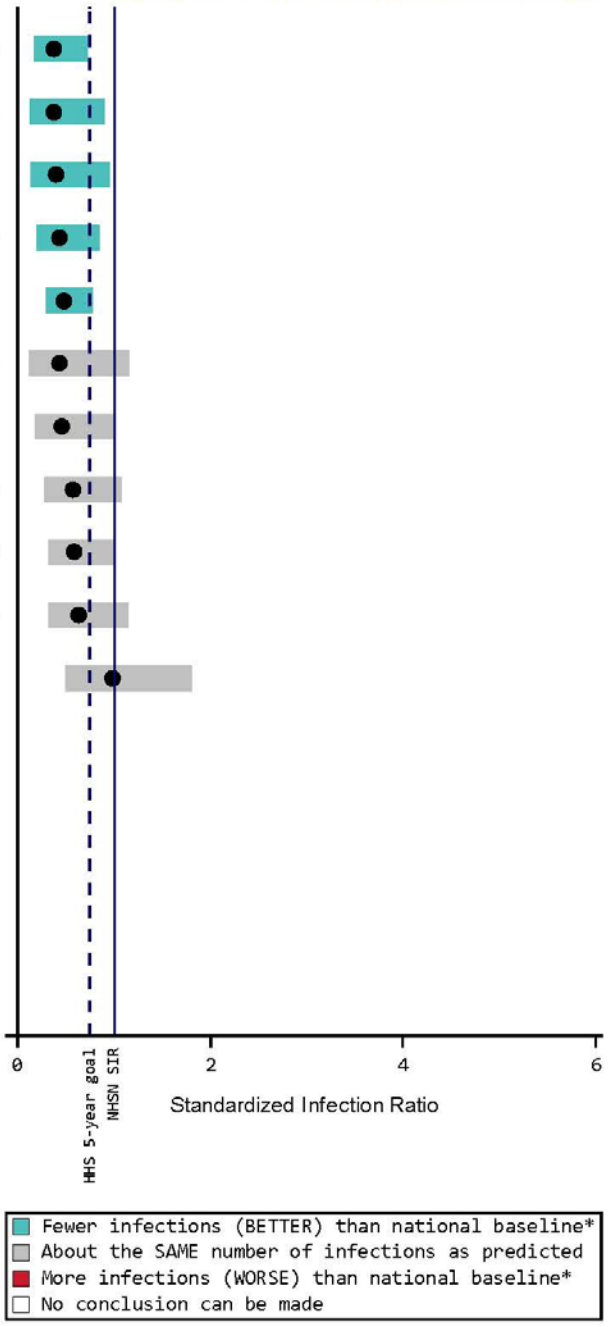
## CAUTI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 200 to 399 Beds

| HOSPITAL | OBS | PRED | UCD | SIR |
|---|---|---|---|---|
| Carolinas Medical Center-Pineville | 7 | 19.2 | 10581 | 0.4 |
| CarolinaEast Medical Center | 4 | 10.7 | 7227 | 0.4 |
| Carolinas Healthcare System Cleveland | 4 | 10.2 | 6675 | 0.4 |
| Duke Regional Hospital | 7 | 16.5 | 7971 | 0.4 |
| FirstHealth Moore Regional Hospital | 15 | 31.3 | 18707 | 0.5 |
| Alamance Regional Medical Center | 3 | 7.1 | 4942 | 0.4 |
| Nash Health Care Systems | 5 | 11.1 | 6974 | 0.5 |
| Southeastern Regional Medical Center | 8 | 14.2 | 8893 | 0.6 |
| Wayne Memorial Hospital | 11 | 19.0 | 11547 | 0.6 |
| High Point Regional Health System | 9 | 14.4 | 8343 | 0.6 |
| Novant Health Rowan Medical Center | 9 | 9.2 | 5751 | 1.0 |

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PRED = # infections statistically 'predicted' by national baseline
UCD = # urinary catheter days
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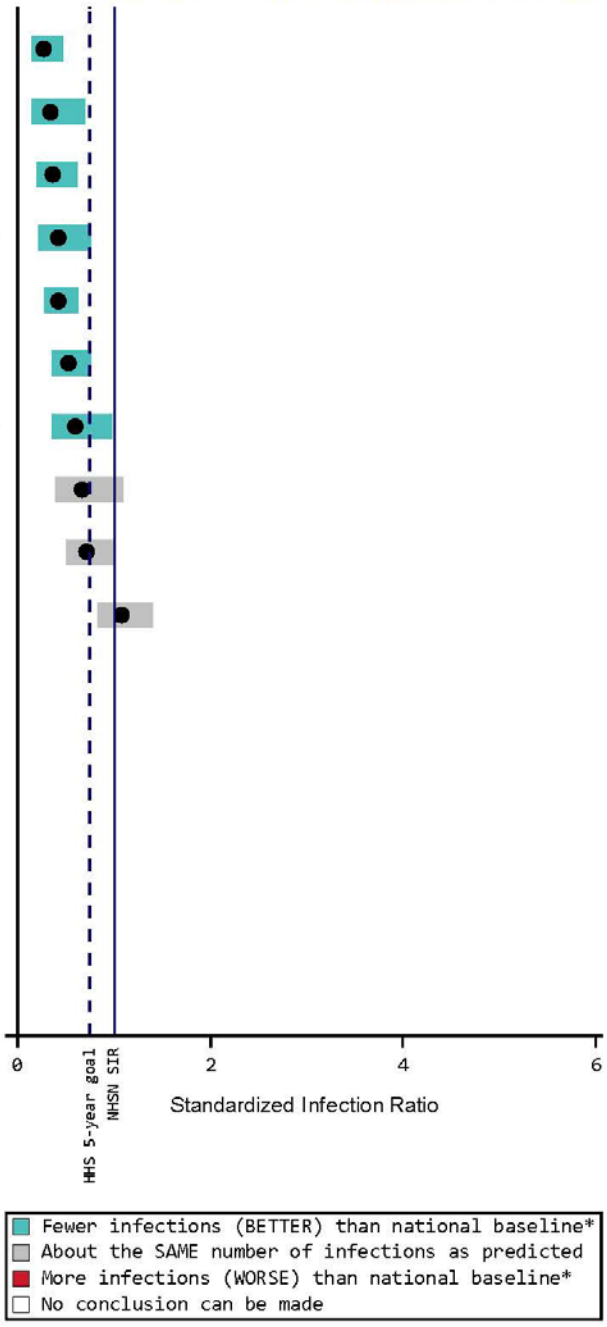
## CAUTI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 400 or More Beds

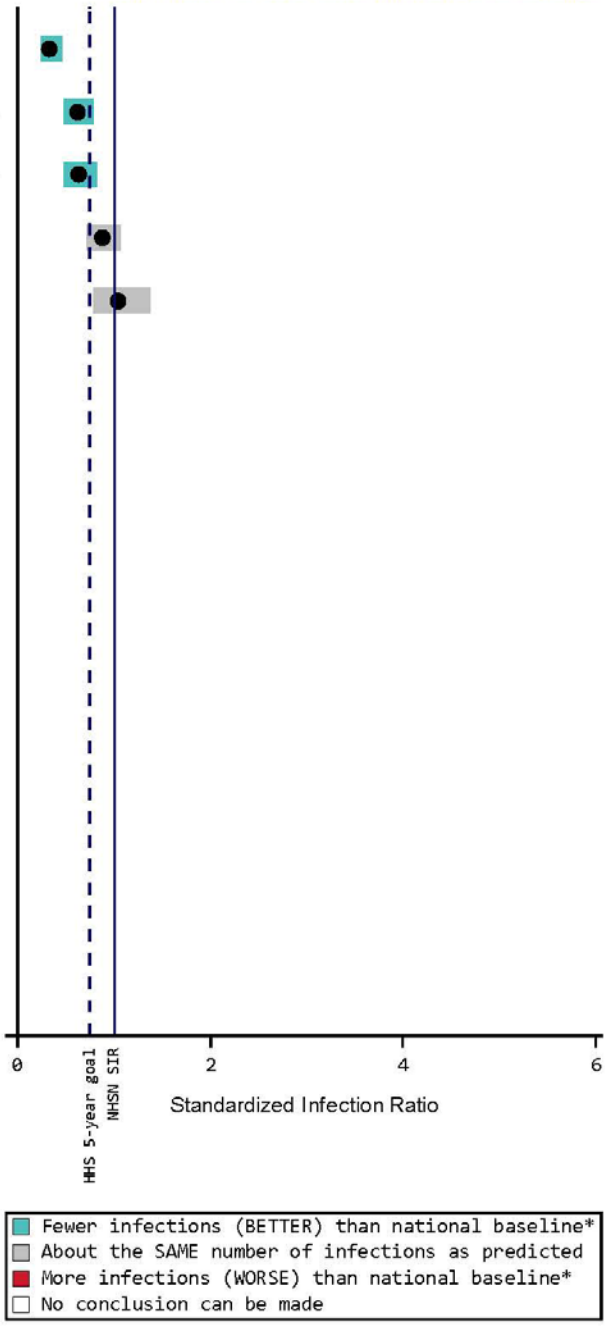
| HOSPITAL | OBS | PRED | UCD | SIR |
|---|---|---|---|---|
| Rex Healthcare | 10 | 38.2 | 22508 | 0.3 |
| Gaston Memorial Hospital | 6 | 18.0 | 9191 | 0.3 |
| Moses Cone Hospital | 11 | 31.0 | 14817 | 0.4 |
| Novant Health Presbyterian Medical | 9 | 21.8 | 11338 | 0.4 |
| Mission Hospital | 21 | 50.6 | 24880 | 0.4 |
| Novant Health Forsyth Medical Center | 24 | 46.4 | 24852 | 0.5 |
| Carolinas Medical Center-Northeast | 14 | 23.4 | 15050 | 0.6 |
| Cape Fear Valley Health System | 14 | 21.1 | 13610 | 0.7 |
| New Hanover Regional Medical Center | 30 | 42.2 | 20349 | 0.7 |
| WakeMed | 53 | 49.3 | 22862 | 1.1 |




Data reported from adult/pediatric units as of March 14, 2016 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
UCD = # urinary catheter days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## CAUTI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with Primary Medical School Affiliation

| HOSPITAL | OBS | PRED | UCD | SIR |
|---|---|---|---|---|
| Wake Forest University Baptist Medical | 31 | 95.5 | 39077 | 0.3 |
| Duke University Hospital | 58 | 95.0 | 43516 | 0.6 |
| Carolinas Medical Center | 49 | 78.5 | 30133 | 0.6 |
| UNC Health Care | 88 | 101 | 40735 | 0.9 |
| Vidant Medical Center | 47 | 45.1 | 21141 | 1.0 |

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PRED = # infections statistically 'predicted' by national baseline
UCD = # urinary catheter days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## C. Surgical Site Infections (SSI)

### 1. Abdominal Hysterectomies

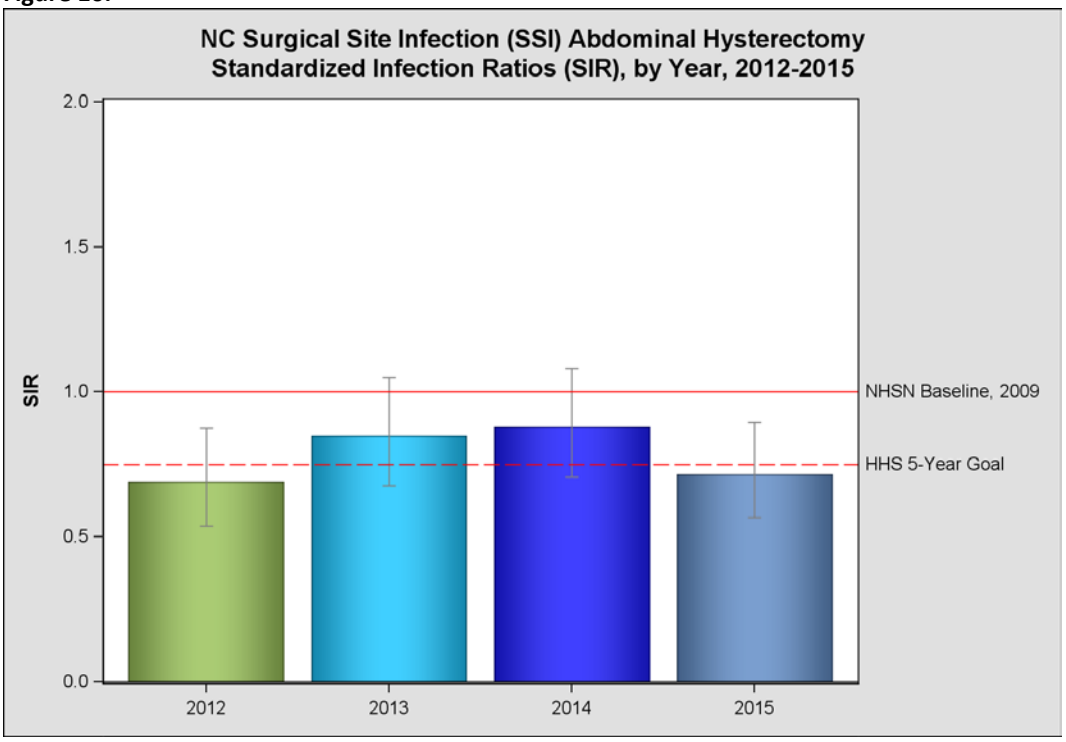
**North Carolina 2015 SSI Highlights Post Abdominal Hysterectomy**

- North Carolina reported 73 infections, compared to the 102 infections which were predicted among inpatient abdominal hysterectomies performed on adults ≥ 18 years in North Carolina acute care hospitals. This was better than the 2006-2008 national experience.
- The U.S. Department of Health and Human Services set a goal to reduce SSIs nationally by 25% from the baseline experience in 2006-2008; N.C. met this goal in 2015.
- The most commonly identified organisms from adult and pediatric patients with SSI were *Enterococci* and Gram positive bacteria other than *Staphylococci* and *Enterococci*.
- In 2015, 40% of *Staphylococcus aureus* identified among abdominal hysterectomy SSIs were methicillin-resistant.

**Table 4.**

| Year | # Observed Infections | # Predicted Infections | How Does North Carolina Compare to the National Experience? |
|---|---|---|---|
| **2012** | **65** | **94** | **★Better: Fewer infections than were predicted (better than the national experience)** |
| **2013** | **80** | **95** | **= Same: about the same number of infections as were predicted (same as the national experience)** |
| **2014** | **85** | **98** | **= Same: about the same number of infections as were predicted (same as the national experience)** |
| **2015** | **73** | **102** | **★Better: Fewer infections than were predicted (better than the national experience)** |

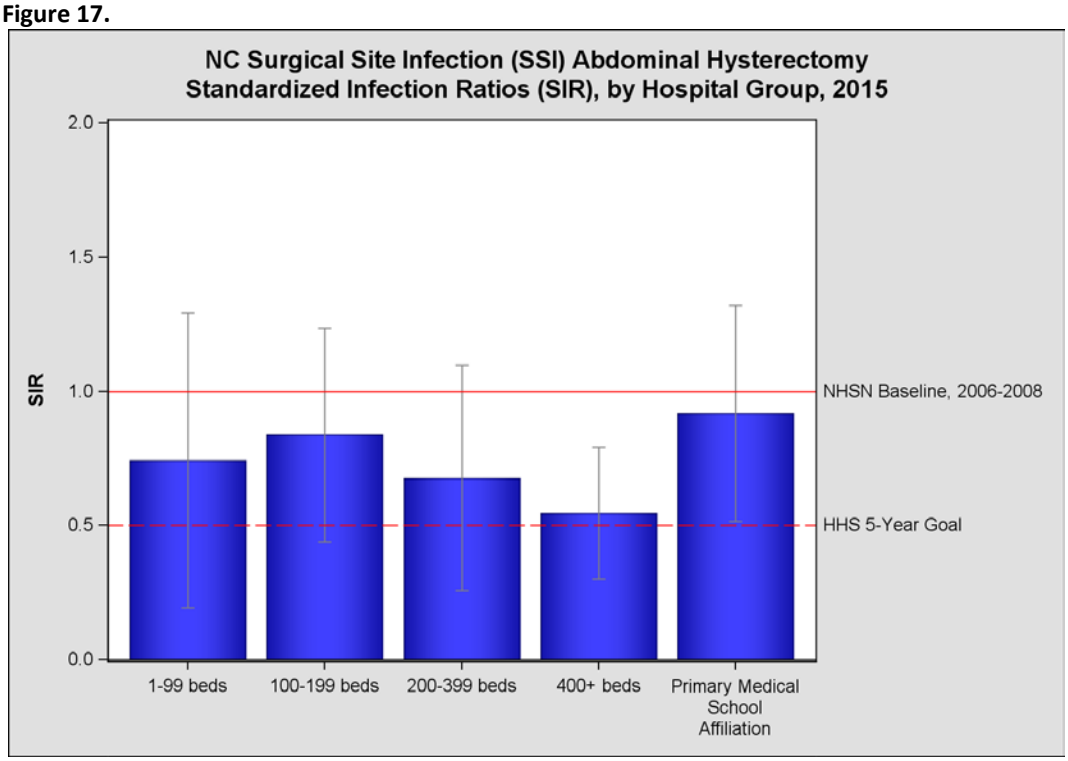
**Figure 16.**




**How to Understand Figure 15:**

- In 2015, the number of observed SSIs following abdominal hysterectomies was the lower than in the previous two years and BETTER compared to the national experience.
- In 2015, the number of observed SSIs following abdominal hysterectomies did not differ from the HHS 5-year goal

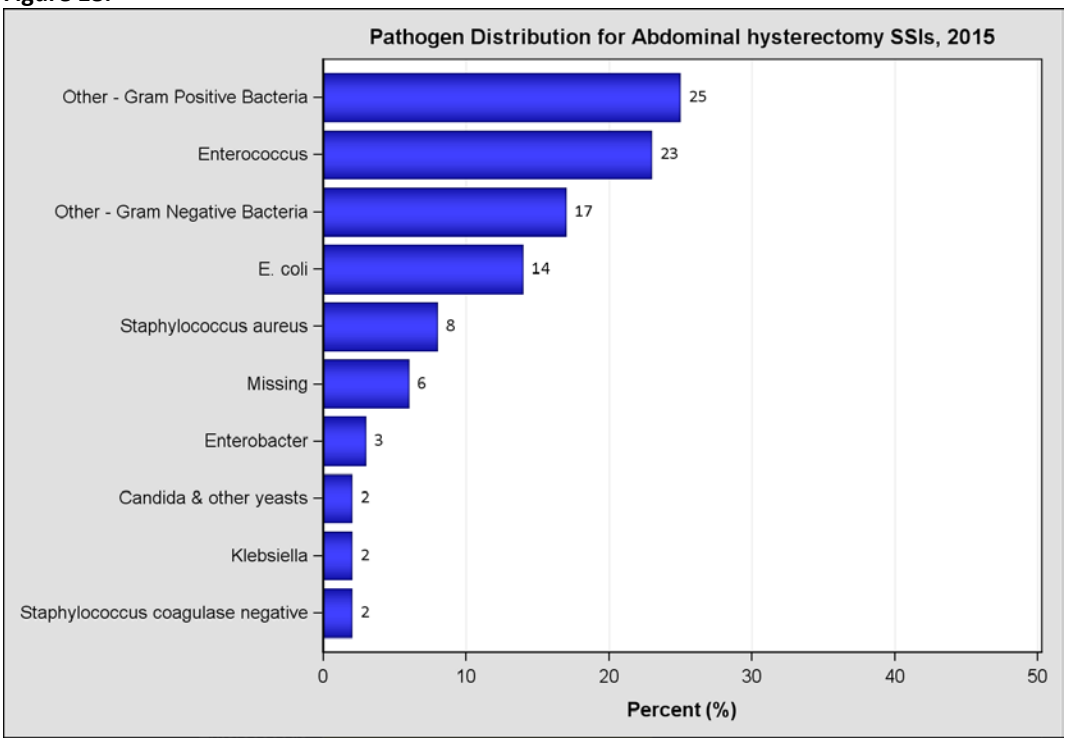
**Figure 17.**




**How to Understand Figure 16:**

- Hospitals with 400+ beds reported fewer SSIs following abdominal hysterectomies than expected and performed BETTER than the national experience
- All other groups reported about the SAME number of infections as predicted by the national experience
- None of the hospital size groups met the HHS 5-year goal

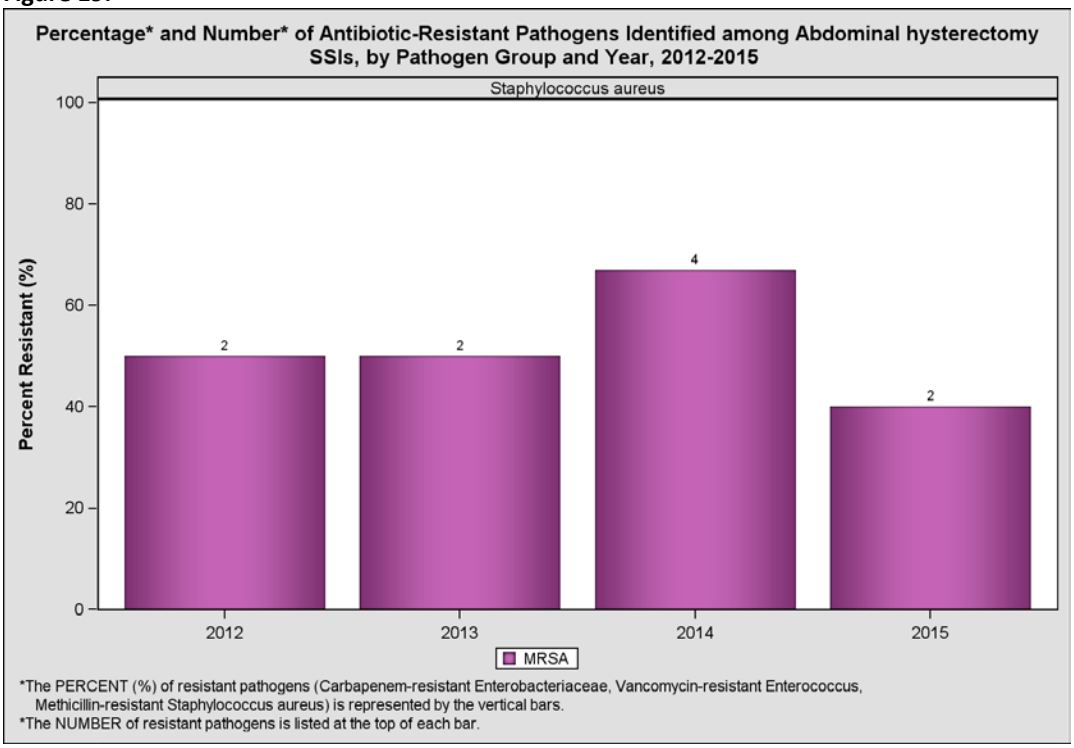
**Figure 18.**




**How to Understand Figure 17:**

- Gram positive bacteria other than *Staphylococci* and *Enterococci* (25%) were the most commonly reported pathogens among SSIs following abdominal hysterectomies
- *Enterococci* were the 2nd most common, accounting for 23% of infections

**Figure 19.**



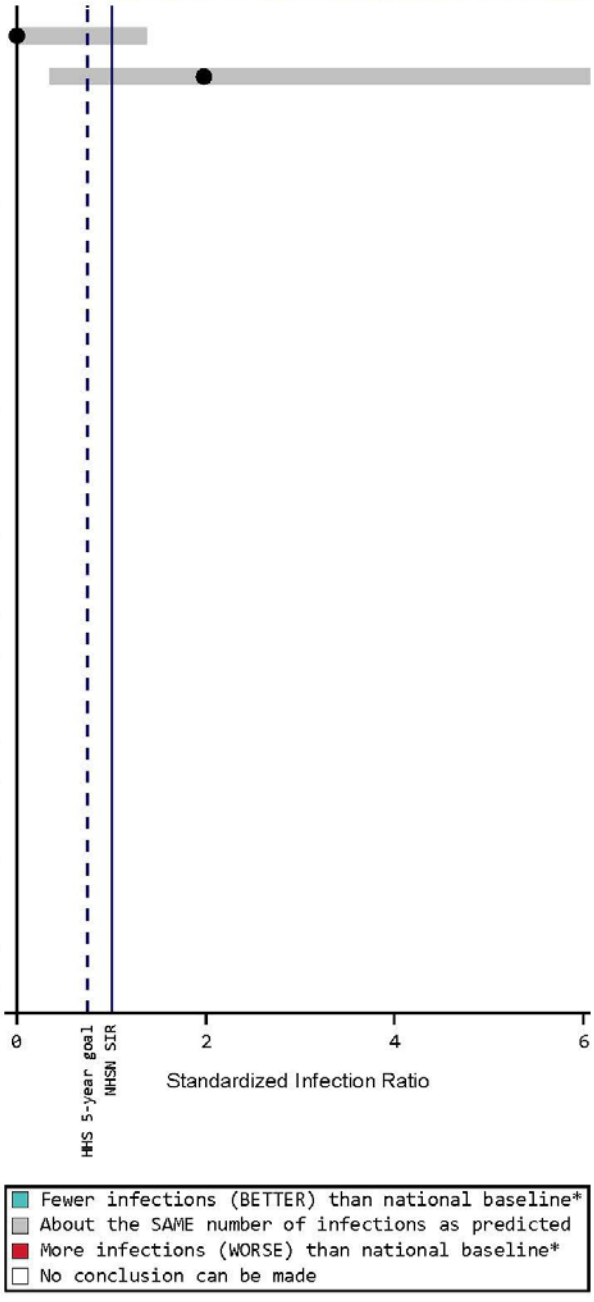

**How to Understand Figure 18:**

- In 2015, 40% of *Staphylococcus aureus* identified among abdominal hysterectomy SSIs were methicillin-resistant. This is less than in previous years
- In NC, fewer than ten *Staphylococcus aureus* organisms identified among abdominal hysterectomy SSIs are tested for resistance each year

**The following SIR plots summarize SSI HYST infection data for North Carolina hospitals by hospital groups (Appendix E).**

## SSI HYST Surgeries in Short-Term Acute Care Hospitals
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with less than 100 Beds

| HOSPITAL | OBS | PRED | PROC | SIR |
|---|---|---|---|---|
| Novant Health Medical Park Hospital | 0 | 2.2 | 230 | 0.0 |
| Novant Health Huntersville | 2 | 1.0 | 113 | 2.0 |
| McDowell Hospital | 0 | 0.3 | 34 | NC |
| Murphy Medical Center | 0 | 0.2 | 20 | NC |
| Dlp - Harris Regional Hospital | NA | NA | N | NA |
| Sentara Albemarle Medical Center | 0 | 0.4 | 35 | NC |
| Sandhills Regional Medical Center | 1 | 0.6 | 68 | NC |
| Vidant Roanoke Chowan Hospital | 2 | 0.2 | 23 | NC |
| Columbus Regional Healthcare System | 0 | 0.8 | 69 | NC |
| Martin General Hospital | NA | NA | N | NA |
| Randolph Hospital | 1 | 0.8 | 78 | NC |
| Vidant Beaufort Hospital | 0 | 0.3 | 22 | NC |
| Granville Medical Center | NA | NA | N | NA |
| Novant Health Brunswick Medical Center | 0 | 0.7 | 67 | NC |
| Vidant Duplin Hospital | NA | NA | N | NA |
| Kings Mountain Hospital | NA | NA | N | NA |
| Caldwell Memorial Hospital | 0 | 0.2 | 27 | NC |
| Person Memorial Hospital | NA | NA | N | NA |
| Wake Forest Baptist Health-Lexington | NA | NA | N | NA |
| Hugh Chatham Memorial Hospital | 0 | 0.6 | 57 | NC |
| Carolinas Healthcare System Anson | NA | NA | N | NA |
| Annie Penn Hospital | 0 | 0.2 | 24 | NC |
| Johnston Health Clayton | NA | NA | N | NA |
| Firsthealth Moore Regional-Richmond | NA | NA | N | NA |

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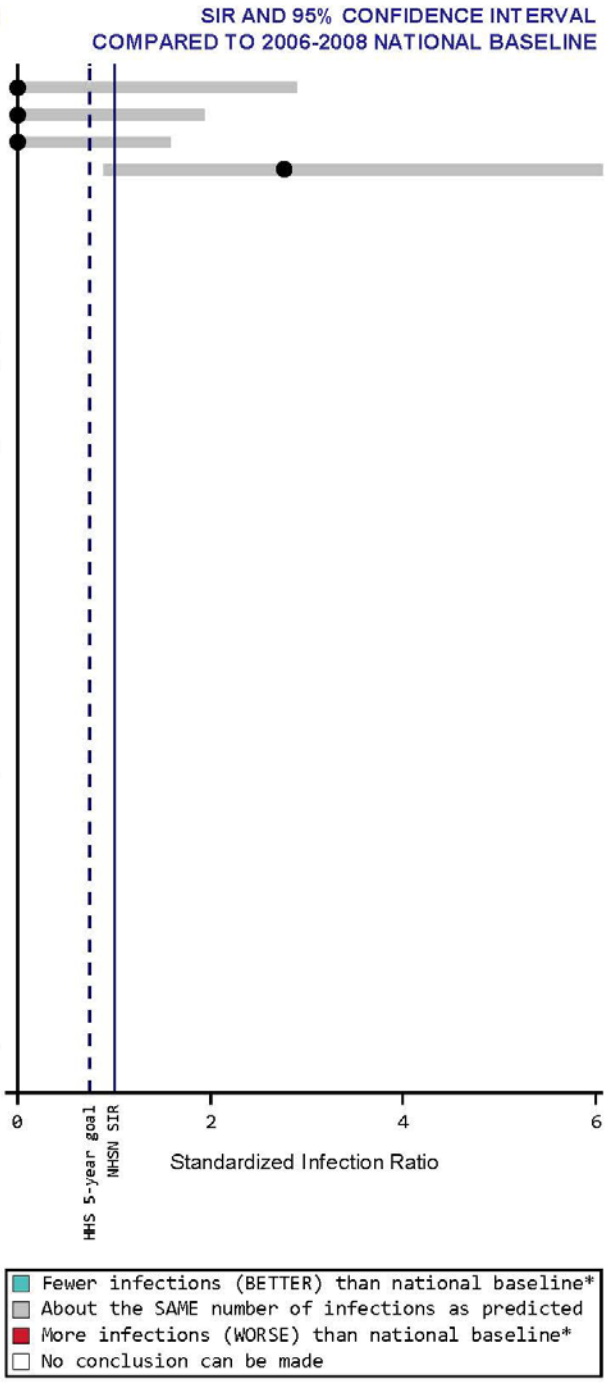
PRED = # infections statistically 'predicted' by national baseline
PROC = # procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## SSI HYST Surgeries in Short-Term Acute Care Hospitals
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 100 to 199 Beds

| HOSPITAL | OBS | PRED | PROC | SIR |
|---|---|---|---|---|
| Carolinas Medical Center-Mercy | 0 | 1.0 | 109 | 0.0 |
| Carolinas Medical Center-University | 0 | 1.6 | 168 | 0.0 |
| Women's Hospital | 0 | 1.9 | 182 | 0.0 |
| Novant Health Matthews Medical Center | 4 | 1.4 | 155 | 2.8 |
| WakeMed Cary Hospital | 0 | 0.9 | 95 | NC |
| Pardee Hospital | 0 | 0.5 | 48 | NC |
| Rutherford Regional Medical Center | 0 | 0.5 | 44 | NC |
| Park Ridge Health | 0 | 0.6 | 65 | NC |
| Haywood Regional Medical Center | 0 | 0.2 | 22 | NC |
| ARHS-Watauga Medical Center | NA | NA | N | NA |
| Davis Regional Medical Center | NA | NA | N | NA |
| Vidant Edgecombe Hospital | 0 | 0.4 | 38 | NC |
| Novant Health Thomasville Medical Center | 1 | 0.2 | 21 | NC |
| Sampson Regional Medical Center | NA | NA | N | NA |
| Lenoir Memorial Hospital | 1 | 0.6 | 43 | NC |
| Iredell Memorial Hospital | 1 | 0.7 | 64 | NC |
| Maria Parham Medical Center | 0 | 0.5 | 51 | NC |
| Northern Hospital Of Surry County | 2 | 0.5 | 51 | NC |
| Lake Norman Regional Medical Center | 0 | 0.8 | 89 | NC |
| Frye Regional Medical Center | 0 | 0.8 | 92 | NC |
| Johnston Health | 1 | 0.7 | 101 | NC |
| Scotland Memorial Hospital | 1 | 0.5 | 43 | NC |
| Carteret General Hospital | 2 | 0.2 | 23 | NC |
| Carolinas Medical Center-Lincoln | 0 | 0.4 | 36 | NC |
| Wilson Medical Center | 0 | 0.8 | 94 | NC |
| Onslow Memorial Hospital | NA | NA | N | NA |
| Catawba Valley Medical Center | 0 | 0.6 | 67 | NC |
| Carolinas Healthcare System Blue Ridge | 0 | 0.2 | 20 | NC |
| Central Carolina Hospital | 1 | 0.3 | 33 | NC |
| Carolinas Medical Center-Union | 0 | 0.8 | 79 | NC |
| Duke Raleigh Hospital | 0 | 0.6 | 69 | NC |
| Stanly Regional Medical Center | 0 | 0.2 | 22 | NC |
| Halifax Regional Medical Center | 1 | 0.5 | 45 | NC |
| Betsy Johnson Regional | 1 | 0.5 | 46 | NC |
| Morehead Memorial Hospital | 0 | 0.4 | 31 | NC |
| Wilkes Regional Medical Center | NA | NA | N | NA |
| Wesley Long Hospital | 0 | 0.5 | 46 | NC |

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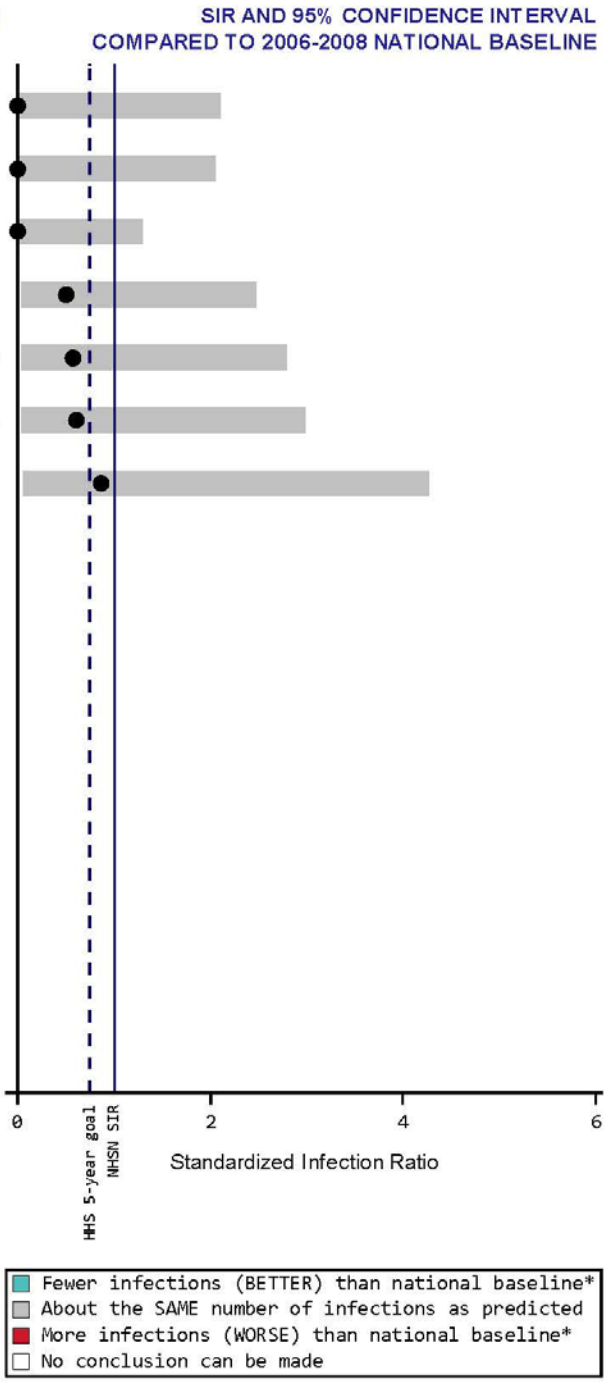
## SSI HYST Surgeries in Short-Term Acute Care Hospitals
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 200 to 399 Beds

| HOSPITAL | OBS | PRED | PROC | SIR |
|---|---|---|---|---|
| CarolinaEast Medical Center | 0 | 1.4 | 164 | 0.0 |
| Wayne Memorial Hospital | 0 | 1.5 | 145 | 0.0 |
| Duke Regional Hospital | 0 | 2.3 | 286 | 0.0 |
| Carolinas Medical Center-Pineville | 1 | 2.0 | 221 | 0.5 |
| Carolinas Healthcare System Cleveland | 1 | 1.8 | 148 | 0.6 |
| High Point Regional Health System | 1 | 1.7 | 171 | 0.6 |
| Southeastern Regional Medical Center | 1 | 1.2 | 99 | 0.9 |
| Novant Health Rowan Medical Center | 0 | 0.4 | 39 | NC |
| Nash Health Care Systems | 2 | 0.9 | 79 | NC |
| FirstHealth Moore Regional Hospital | 1 | 0.8 | 93 | NC |
| Alamance Regional Medical Center | 3 | 0.8 | 94 | NC |

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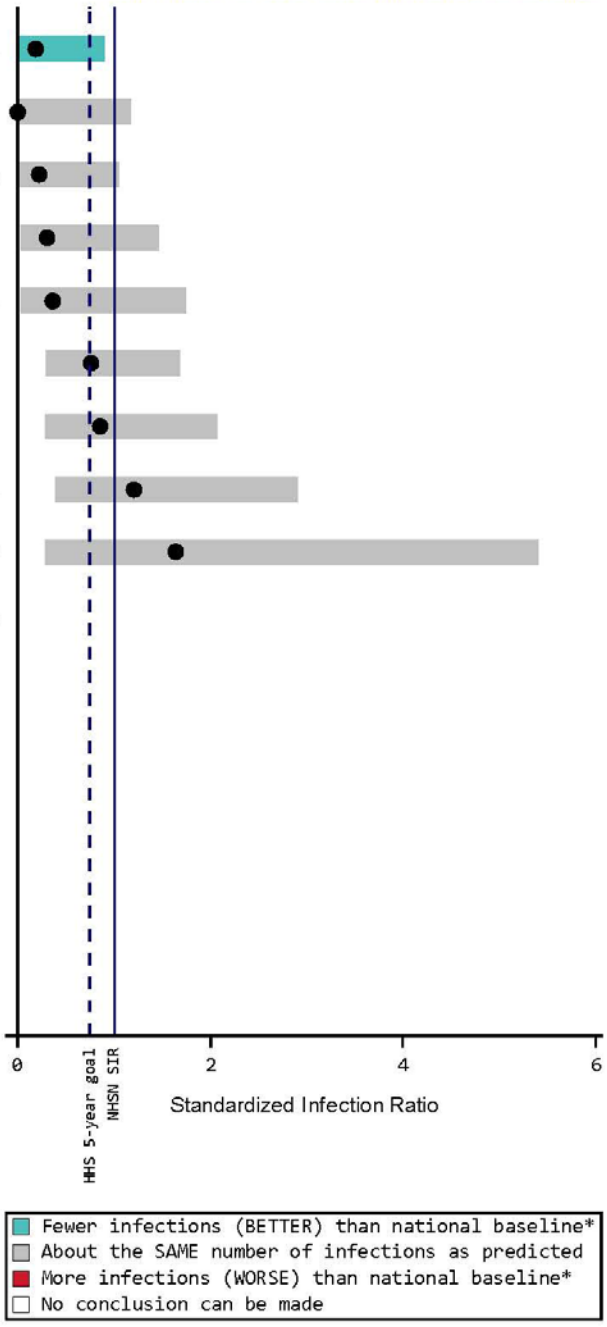
## SSI HYST Surgeries in Short-Term Acute Care Hospitals
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 400 or More Beds

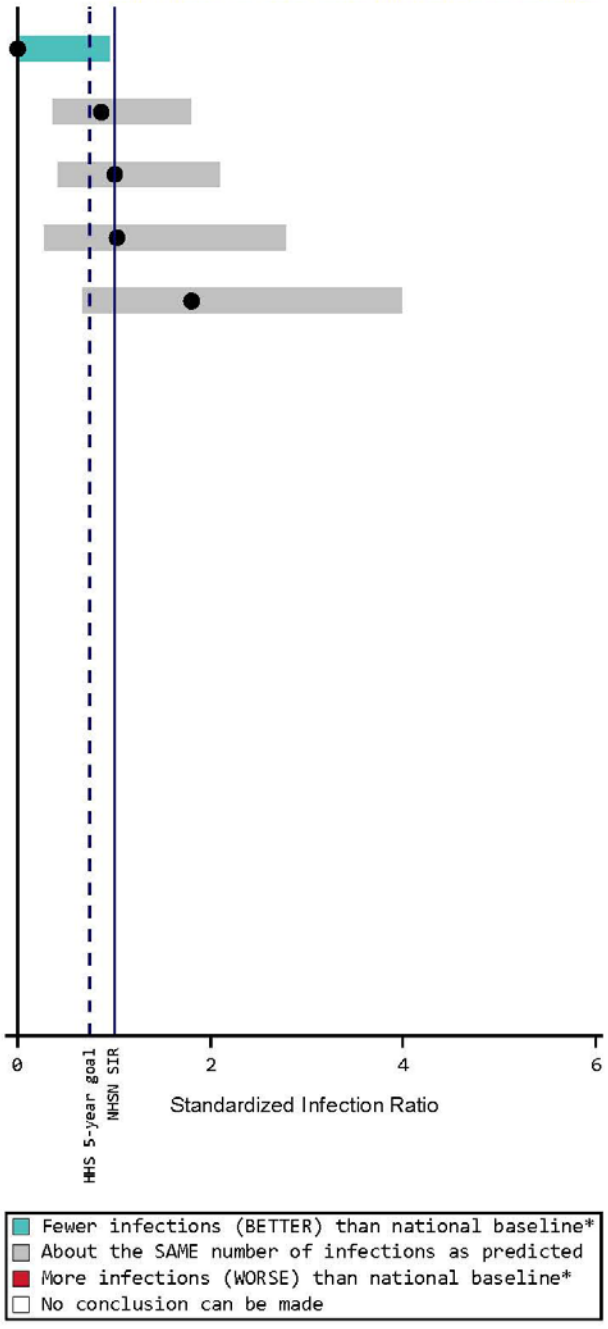
| HOSPITAL | OBS | PRED | PROC | SIR |
|---|---|---|---|---|
| New Hanover Regional Medical Center | 1 | 5.5 | 539 | 0.2 |
| WakeMed | 0 | 2.6 | 253 | 0.0 |
| Mission Hospital | 1 | 4.7 | 480 | 0.2 |
| Carolinas Medical Center-Northeast | 1 | 3.4 | 324 | 0.3 |
| Cape Fear Valley Health System | 1 | 2.8 | 246 | 0.4 |
| Novant Health Presbyterian Medical | 5 | 6.6 | 694 | 0.8 |
| Rex Healthcare | 4 | 4.7 | 472 | 0.9 |
| Novant Health Forsyth Medical Center | 4 | 3.3 | 351 | 1.2 |
| Gaston Memorial Hospital | 2 | 1.2 | 129 | 1.6 |
| Moses Cone Hospital | NA | NA | N | NA |




Data reported from adult/pediatric units as of March 14, 2016 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PROC = # procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## SSI HYST Surgeries in Short-Term Acute Care Hospitals
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with Primary Medical School Affiliation

| HOSPITAL | OBS | PRED | PROC | SIR |
|---|---|---|---|---|
| Duke University Hospital | 0 | 3.2 | 308 | 0.0 |
| UNC Health Care | 6 | 7.0 | 614 | 0.9 |
| Carolinas Medical Center | 6 | 6.0 | 597 | 1.0 |
| Wake Forest University Baptist Medical | 3 | 2.9 | 245 | 1.0 |
| Vidant Medical Center | 5 | 2.8 | 275 | 1.8 |

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OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PROC = # procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## 2. Colon Surgeries

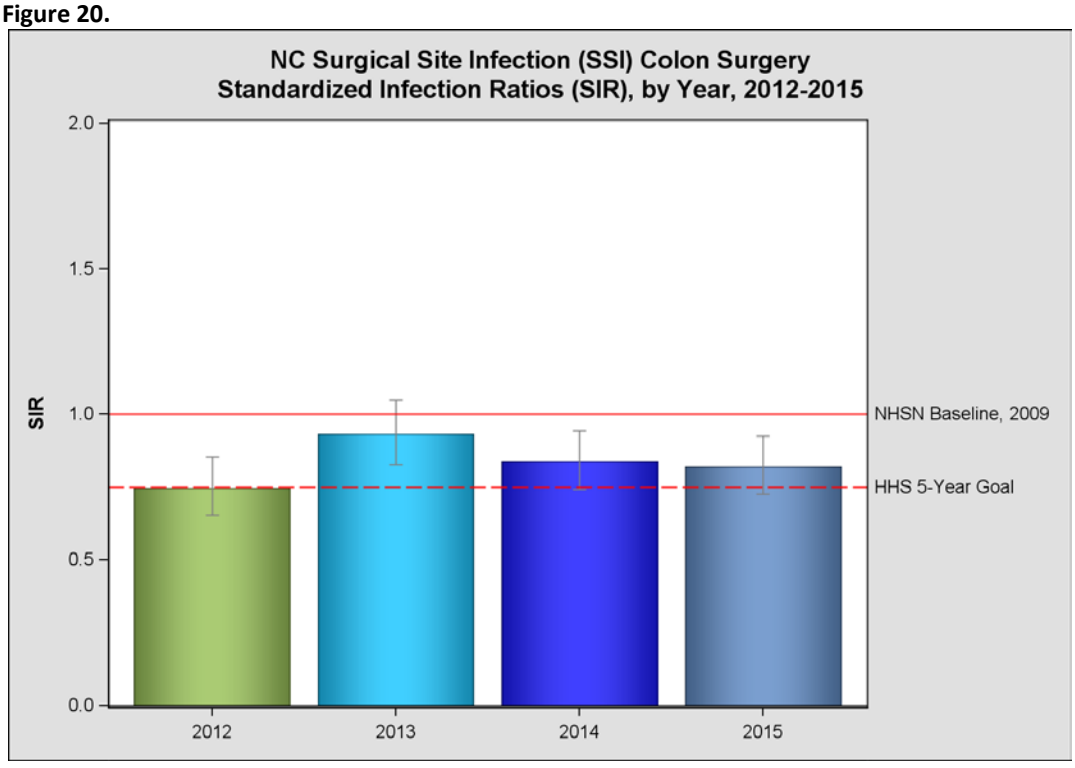
**North Carolina 2015 SSI Highlights Post Colon Surgery**

- Among inpatient colon surgeries performed on adults ≥ 18 years, North Carolina hospitals reported 259 infections, compared to the 314 infections which were predicted. This was better than the 2006-2008 national experience.
- The U.S. Department of Health and Human Services set a goal to reduce SSIs nationally by 25% from the baseline experience in 2006-2008; North Carolina did not meet this goal in 2015.
- The most commonly identified organisms isolated from colon surgery SSI patients were *E. coli* and *Enterococcus*.
- In 2015, MRSA was the most commonly identified antibiotic-resistant pathogen among colon surgery SSI patients.

**Table 5.**

| Year | # Observed Infections | # Predicted Infections | How Does North Carolina Compare to the National Experience? |
|---|---|---|---|
| **2012** | **213** | **285** | **★Better: Fewer infections than were predicted (better than the national experience)** |
| **2013** | **277** | **297** | **= Same: about the same number of infections as were predicted (same as the national experience)** |
| **2014** | **264** | **315** | **★Better: Fewer infections than were predicted (better than the national experience)** |
| **2015** | **259** | **314** | **★Better: Fewer infections than were predicted (better than the national experience)** |

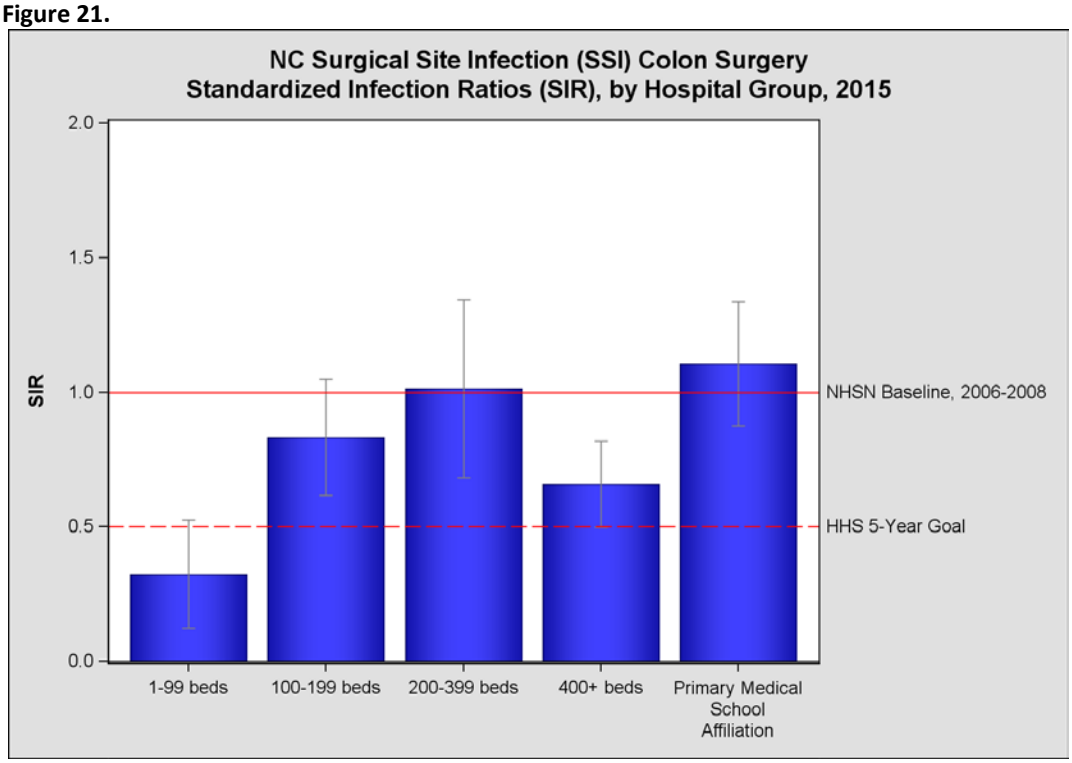
**Figure 20.**




**How to Understand Figure 17:**

- The number of observed SSIs following colon surgeries in NC has been BETTER than the national experience every year since reporting began, except for 2013
- In 2013, the number of observed SSIs following colon surgeries was about the SAME as the national experience
- North Carolina did not meet the HHS 5-year goal to decrease SSIs following colon surgeries by 25% in 2015

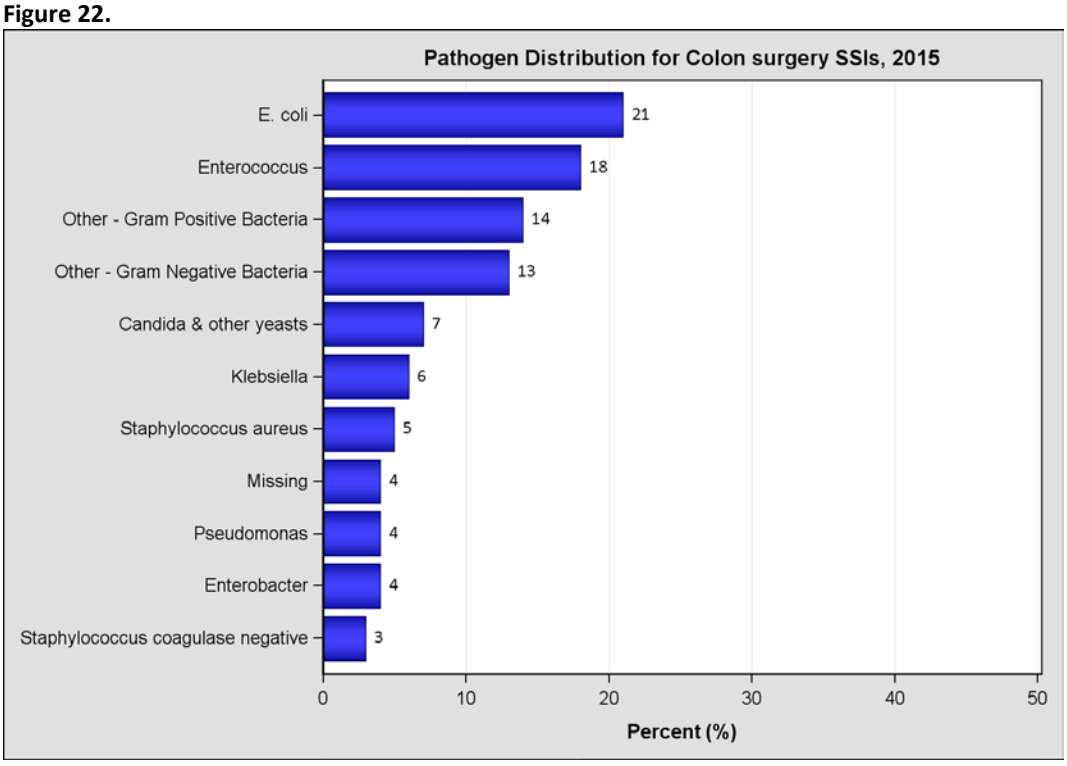
**Figure 21.**




**How to Understand Figure 18:**

- Hospitals with > 100 beds and hospitals with 400+ beds performed BETTER than the national experience for SSIs following colon surgeries
- Hospitals with a primary medical school affiliation, hospitals with 200-399 beds and those with 100-199 beds reported about the SAME number of infections as predicted by the national experience
- The number of observed SSIs following colon surgeries did not differ in hospitals with <100 beds from the HHS 5-year goal

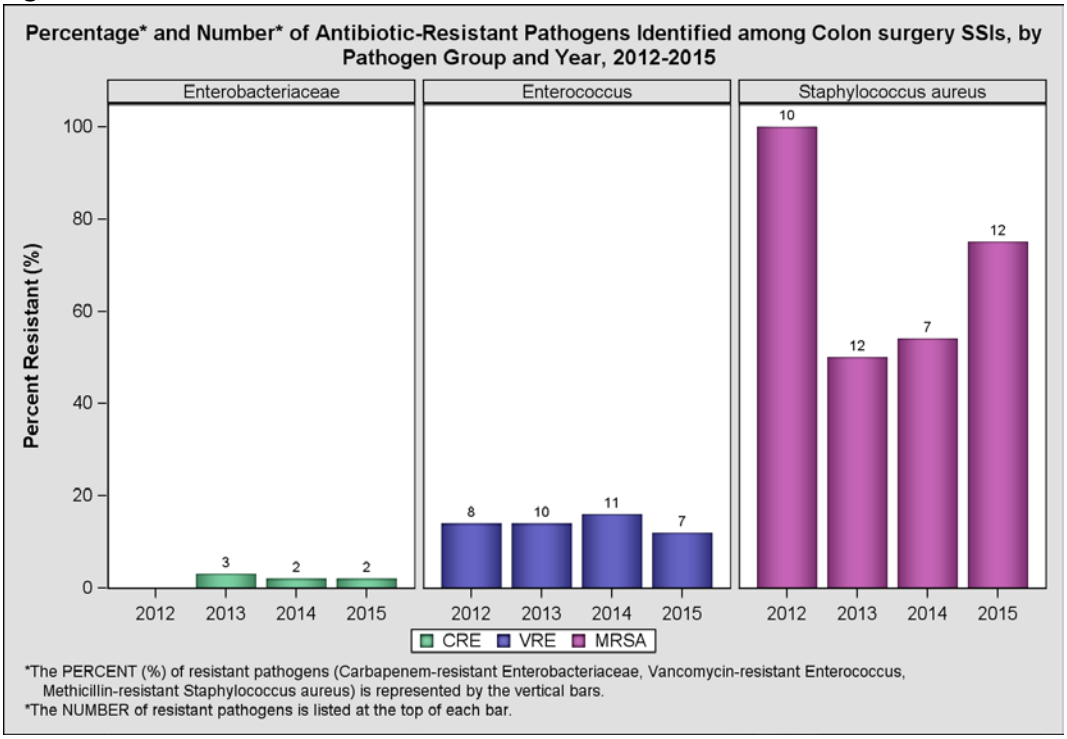
**Figure 22.**




**How to Understand Figure 19:**

- *E. coli* (21%) and *Enterococcus* (18%) were the most commonly reported pathogens isolated from patients with SSIs following colon surgeries

**Figure 23.**



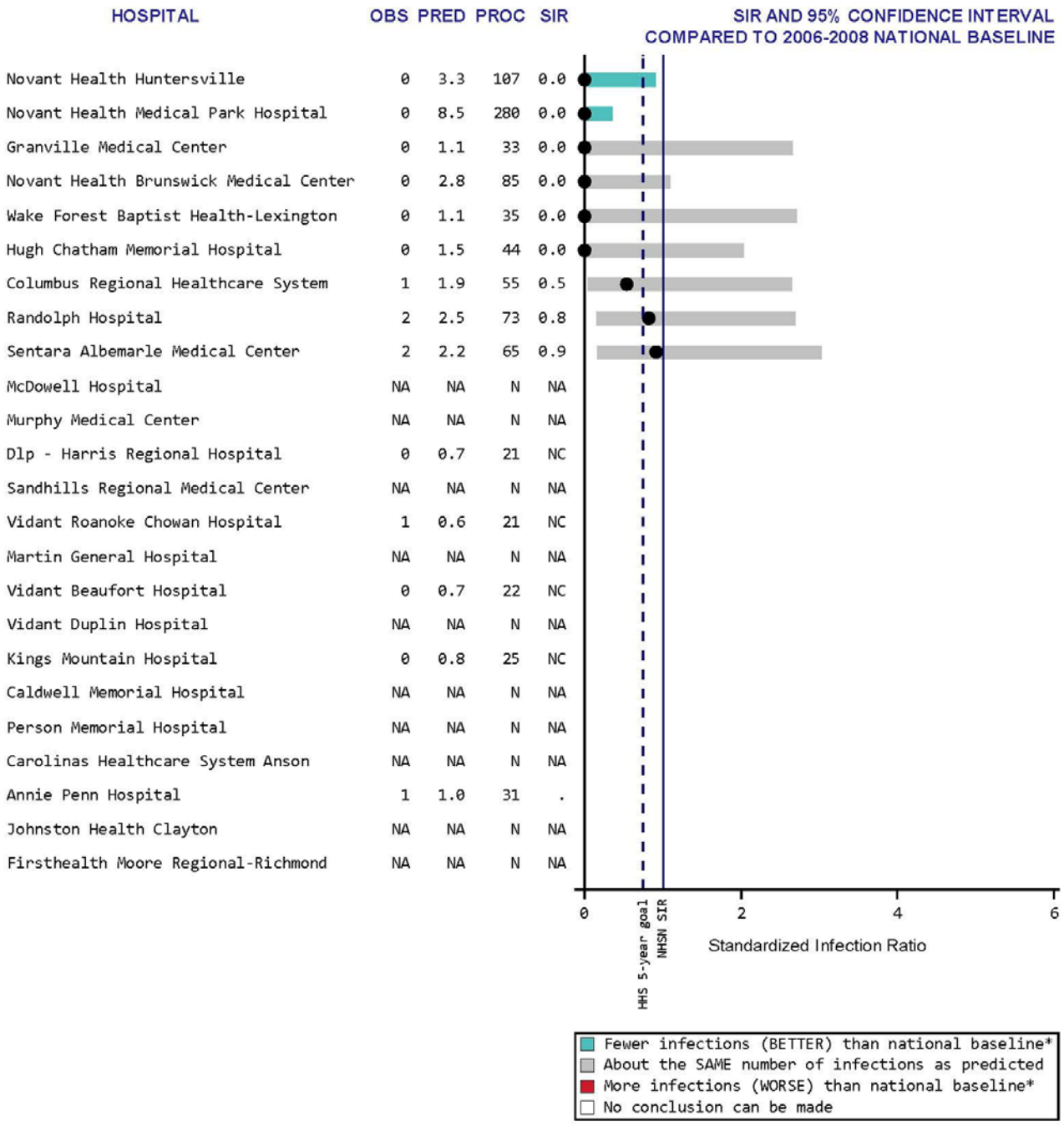

**How to Understand Figure 20:**

- In 2015, 75% of *Staphylococcus aureus* identified among SSIs following colon surgeries were resistant to methicillin. This is an increase from the past two years, when the percent of *Staphylococcus aureus* identified among SSIs following colon surgeries that were resistant to methicillin ranged from 50-54%.
- In 2015, the percentage and number of antibiotic-resistant *Enterobacteriaceae* and *Enterococcus* identified among SSIs following colon surgeries were similar to previous years

**The following SIR plots summarize colon surgery SSI infection data for North Carolina hospitals by hospital groups (Appendix E).**

## SSI Colon Surgeries in Short-Term Acute Care Hospitals
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with less than 100 Beds

| HOSPITAL | OBS | PRED | PROC | SIR |
|---|---|---|---|---|
| Novant Health Huntersville | 0 | 3.3 | 107 | 0.0 |
| Novant Health Medical Park Hospital | 0 | 8.5 | 280 | 0.0 |
| Granville Medical Center | 0 | 1.1 | 33 | 0.0 |
| Novant Health Brunswick Medical Center | 0 | 2.8 | 85 | 0.0 |
| Wake Forest Baptist Health-Lexington | 0 | 1.1 | 35 | 0.0 |
| Hugh Chatham Memorial Hospital | 0 | 1.5 | 44 | 0.0 |
| Columbus Regional Healthcare System | 1 | 1.9 | 55 | 0.5 |
| Randolph Hospital | 2 | 2.5 | 73 | 0.8 |
| Sentara Albemarle Medical Center | 2 | 2.2 | 65 | 0.9 |
| McDowell Hospital | NA | NA | N | NA |
| Murphy Medical Center | NA | NA | N | NA |
| Dlp - Harris Regional Hospital | 0 | 0.7 | 21 | NC |
| Sandhills Regional Medical Center | NA | NA | N | NA |
| Vidant Roanoke Chowan Hospital | 1 | 0.6 | 21 | NC |
| Martin General Hospital | NA | NA | N | NA |
| Vidant Beaufort Hospital | 0 | 0.7 | 22 | NC |
| Vidant Duplin Hospital | NA | NA | N | NA |
| Kings Mountain Hospital | 0 | 0.8 | 25 | NC |
| Caldwell Memorial Hospital | NA | NA | N | NA |
| Person Memorial Hospital | NA | NA | N | NA |
| Carolinas Healthcare System Anson | NA | NA | N | NA |
| Annie Penn Hospital | 1 | 1.0 | 31 | . |
| Johnston Health Clayton | NA | NA | N | NA |
| Firsthealth Moore Regional-Richmond | NA | NA | N | NA |




Data reported from adult/pediatric units as of March 14, 2016 .
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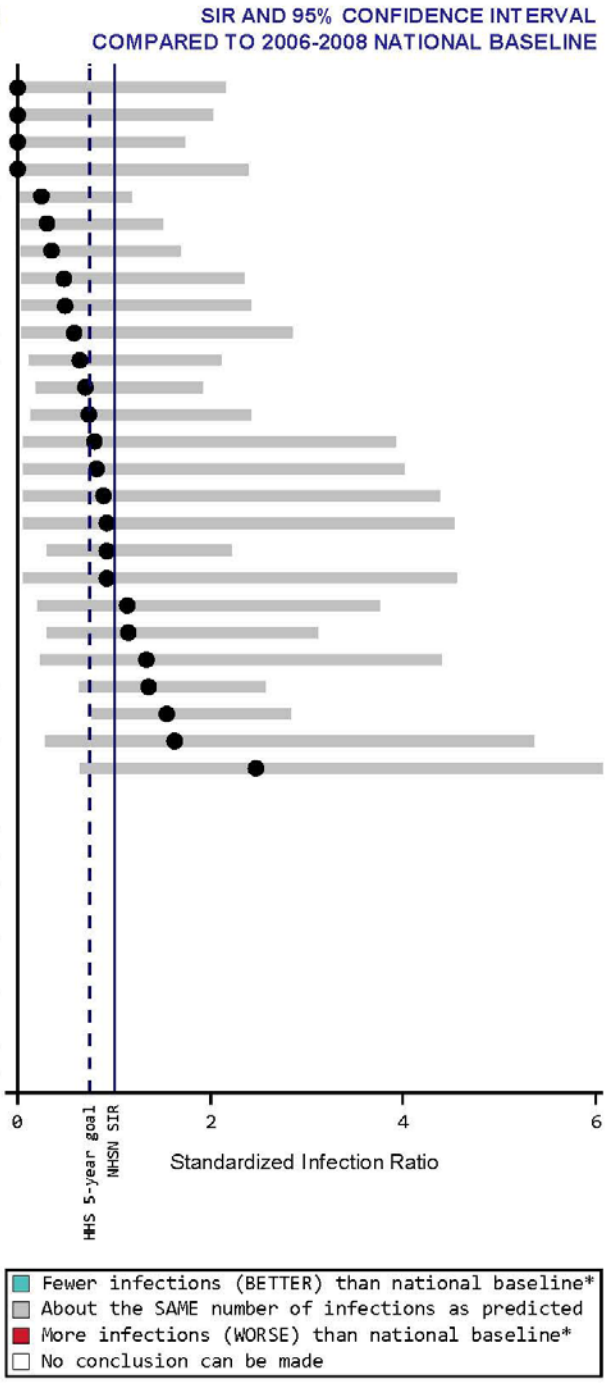
PRED = # infections statistically 'predicted' by national baseline
PROC = # procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## SSI Colon Surgeries in Short-Term Acute Care Hospitals
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 100 to 199 Beds

| HOSPITAL | OBS | PRED | PROC | SIR |
|---|---|---|---|---|
| Haywood Regional Medical Center | 0 | 1.4 | 49 | 0.0 |
| Novant Health Thomasville Medical Center | 0 | 1.5 | 48 | 0.0 |
| Maria Parham Medical Center | 0 | 1.7 | 55 | 0.0 |
| Central Carolina Hospital | 0 | 1.3 | 40 | 0.0 |
| Duke Raleigh Hospital | 1 | 4.2 | 120 | 0.2 |
| Catawba Valley Medical Center | 1 | 3.3 | 99 | 0.3 |
| Iredell Memorial Hospital | 1 | 2.9 | 88 | 0.3 |
| Carteret General Hospital | 1 | 2.1 | 66 | 0.5 |
| Carolinas Medical Center-University | 1 | 2.0 | 64 | 0.5 |
| Lake Norman Regional Medical Center | 1 | 1.7 | 57 | 0.6 |
| Frye Regional Medical Center | 2 | 3.1 | 107 | 0.6 |
| Carolinas Medical Center-Mercy | 3 | 4.3 | 126 | 0.7 |
| Novant Health Matthews Medical Center | 2 | 2.7 | 83 | 0.7 |
| Rutherford Regional Medical Center | 1 | 1.3 | 38 | 0.8 |
| Scotland Memorial Hospital | 1 | 1.2 | 36 | 0.8 |
| Carolinas Medical Center-Lincoln | 1 | 1.1 | 33 | 0.9 |
| Wilson Medical Center | 1 | 1.1 | 35 | 0.9 |
| Carolinas Healthcare System Blue Ridge | 4 | 4.3 | 130 | 0.9 |
| Park Ridge Health | 1 | 1.1 | 33 | 0.9 |
| Lenoir Memorial Hospital | 2 | 1.8 | 53 | 1.1 |
| Carolinas Medical Center-Union | 3 | 2.6 | 79 | 1.1 |
| Johnston Health | 2 | 1.5 | 60 | 1.3 |
| Wesley Long Hospital | 8 | 5.9 | 190 | 1.4 |
| WakeMed Cary Hospital | 9 | 5.8 | 178 | 1.5 |
| Pardee Hospital | 2 | 1.2 | 40 | 1.6 |
| Northern Hospital Of Surry County | 3 | 1.2 | 42 | 2.5 |
| ARHS-Watauga Medical Center | 0 | 0.6 | 22 | NC |
| Davis Regional Medical Center | NA | NA | N | NA |
| Vidant Edgecombe Hospital | NA | NA | N | NA |
| Sampson Regional Medical Center | NA | NA | N | NA |
| Onslow Memorial Hospital | 0 | 0.8 | 24 | NC |
| Stanly Regional Medical Center | NA | NA | N | NA |
| Halifax Regional Medical Center | 3 | 0.9 | 27 | NC |
| Betsy Johnson Regional | NA | NA | N | NA |
| Morehead Memorial Hospital | 1 | 0.8 | 24 | NC |
| Wilkes Regional Medical Center | NA | NA | N | NA |
| Women's Hospital | NA | NA | N | NA |

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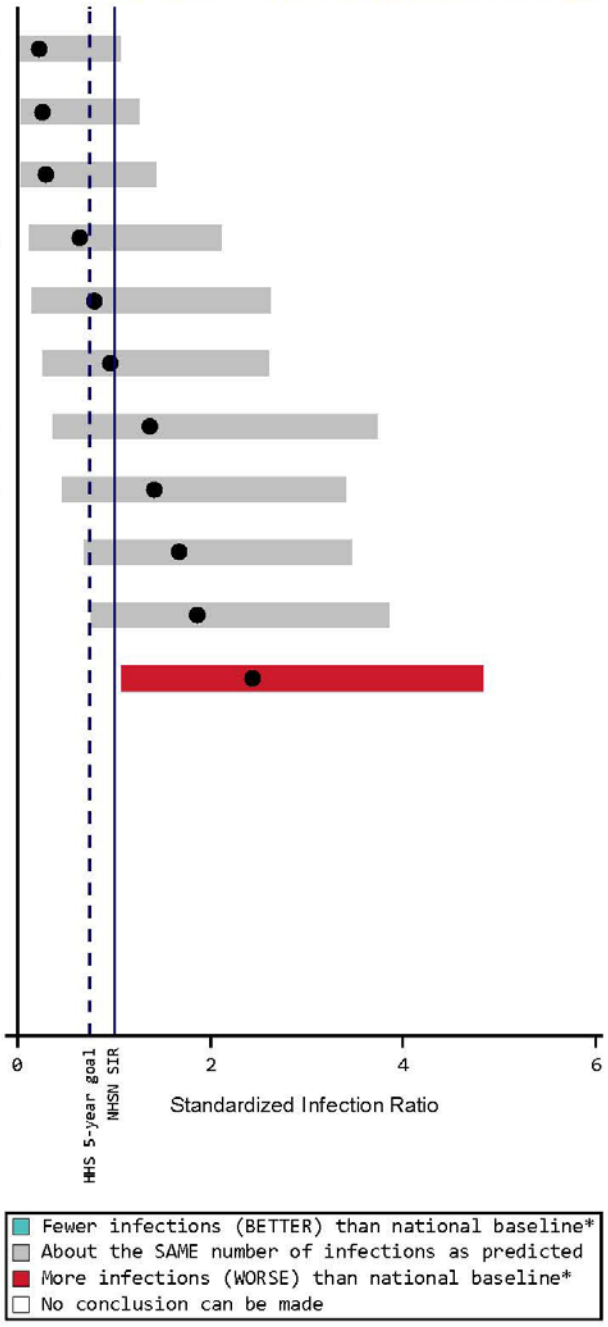
*Significantly different than 2009 national baseline

## SSI Colon Surgeries in Short-Term Acute Care Hospitals
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 200 to 399 Beds

| HOSPITAL | OBS | PRED | PROC | SIR |
|---|---|---|---|---|
| Carolinas Medical Center-Pineville | 1 | 4.6 | 148 | 0.2 |
| High Point Regional Health System | 1 | 3.9 | 116 | 0.3 |
| CarolinaEast Medical Center | 1 | 3.5 | 110 | 0.3 |
| Novant Health Rowan Medical Center | 2 | 3.1 | 95 | 0.6 |
| Southeastern Regional Medical Center | 2 | 2.5 | 72 | 0.8 |
| Wayne Memorial Hospital | 3 | 3.1 | 91 | 1.0 |
| Nash Health Care Systems | 3 | 2.2 | 67 | 1.4 |
| Carolinas Healthcare System Cleveland | 4 | 2.8 | 89 | 1.4 |
| FirstHealth Moore Regional Hospital | 6 | 3.6 | 123 | 1.7 |
| Alamance Regional Medical Center | 6 | 3.2 | 101 | 1.9 |
| Duke Regional Hospital | 7 | 2.9 | 92 | 2.4 |

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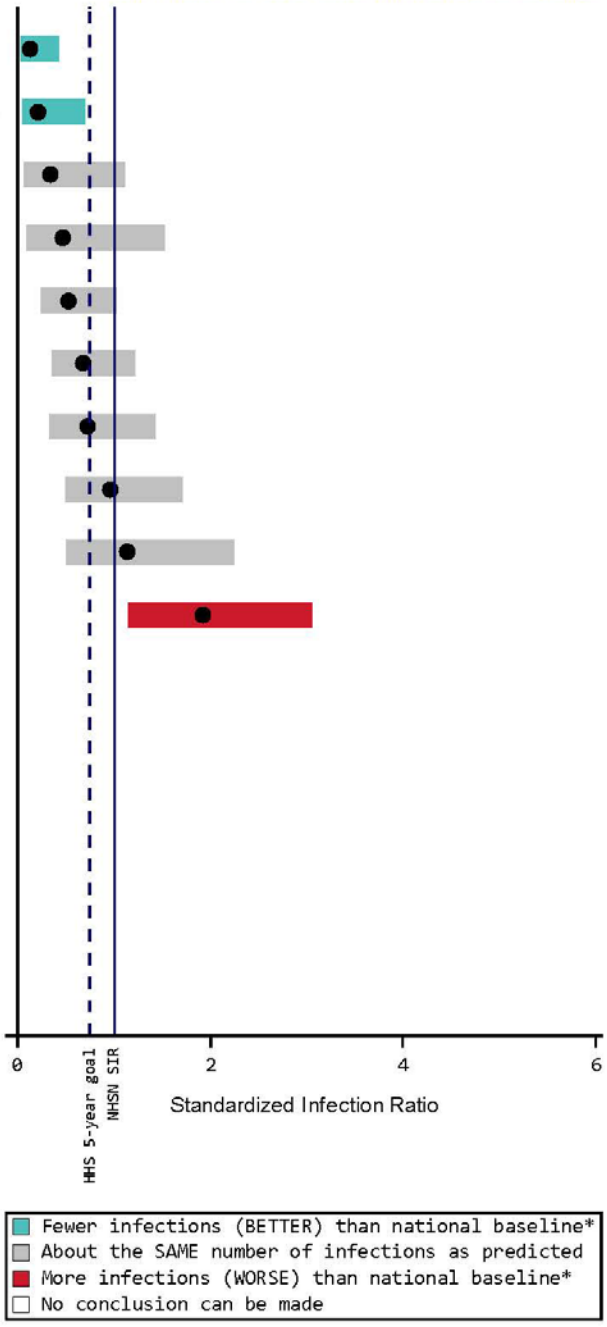
*Significantly different than 2009 national baseline

## SSI Colon Surgeries in Short-Term Acute Care Hospitals
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 400 or More Beds

| HOSPITAL | OBS | PRED | PROC | SIR |
|---|---|---|---|---|
| New Hanover Regional Medical Center | 2 | 15.8 | 472 | 0.1 |
| Novant Health Forsyth Medical Center | 2 | 9.6 | 293 | 0.2 |
| Gaston Memorial Hospital | 2 | 6.0 | 184 | 0.3 |
| Moses Cone Hospital | 2 | 4.4 | 127 | 0.5 |
| Mission Hospital | 7 | 13.5 | 426 | 0.5 |
| Rex Healthcare | 10 | 14.7 | 452 | 0.7 |
| Novant Health Presbyterian Medical | 7 | 9.7 | 306 | 0.7 |
| Cape Fear Valley Health System | 10 | 10.5 | 297 | 1.0 |
| WakeMed | 7 | 6.2 | 173 | 1.1 |
| Carolinas Medical Center-Northeast | 16 | 8.3 | 249 | 1.9 |

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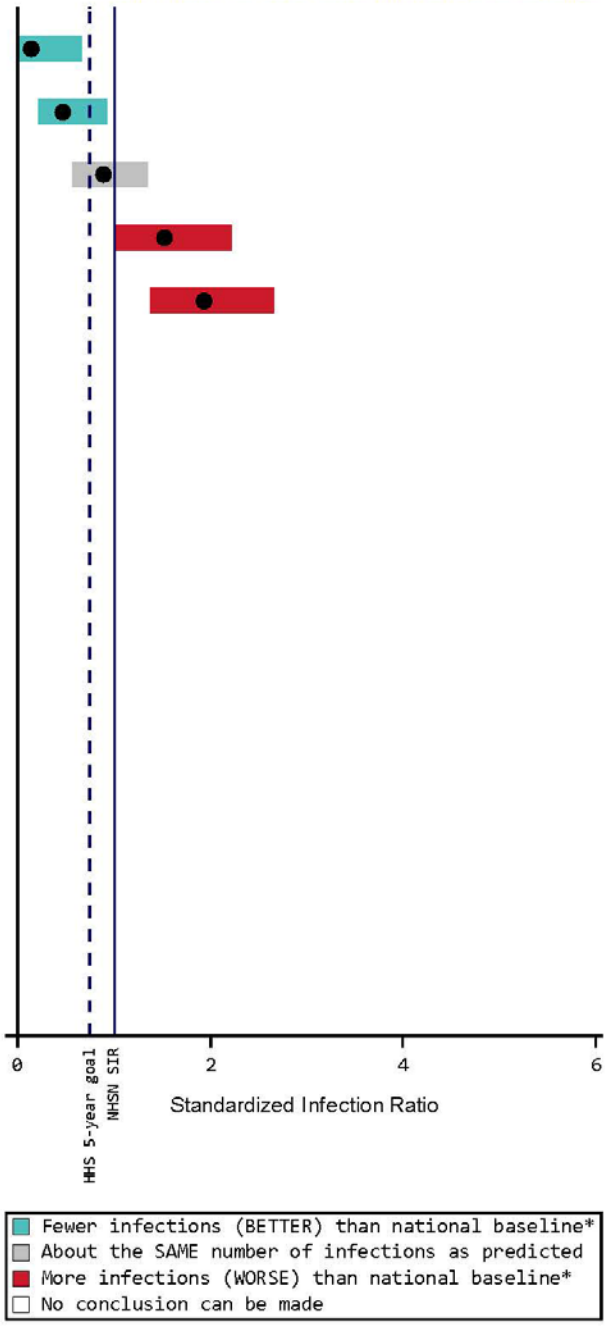
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PROC = # procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## SSI Colon Surgeries in Short-Term Acute Care Hospitals
## Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with Primary Medical School Affiliation

| HOSPITAL | OBS | PRED | PROC | SIR |
|---|---|---|---|---|
| Duke University Hospital | 1 | 7.5 | 218 | 0.1 |
| Carolinas Medical Center | 7 | 15.0 | 429 | 0.5 |
| UNC Health Care | 20 | 22.6 | 620 | 0.9 |
| Vidant Medical Center | 25 | 16.4 | 484 | 1.5 |
| Wake Forest University Baptist Medical | 35 | 18.1 | 494 | 1.9 |

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PRED = # infections statistically 'predicted' by national baseline
PROC = # procedures
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## D. Laboratory-Identified Events

### 1. *Methicillin-Resistant Staphylococcus aureus* Laboratory-Identified Events (MRSA LabID)

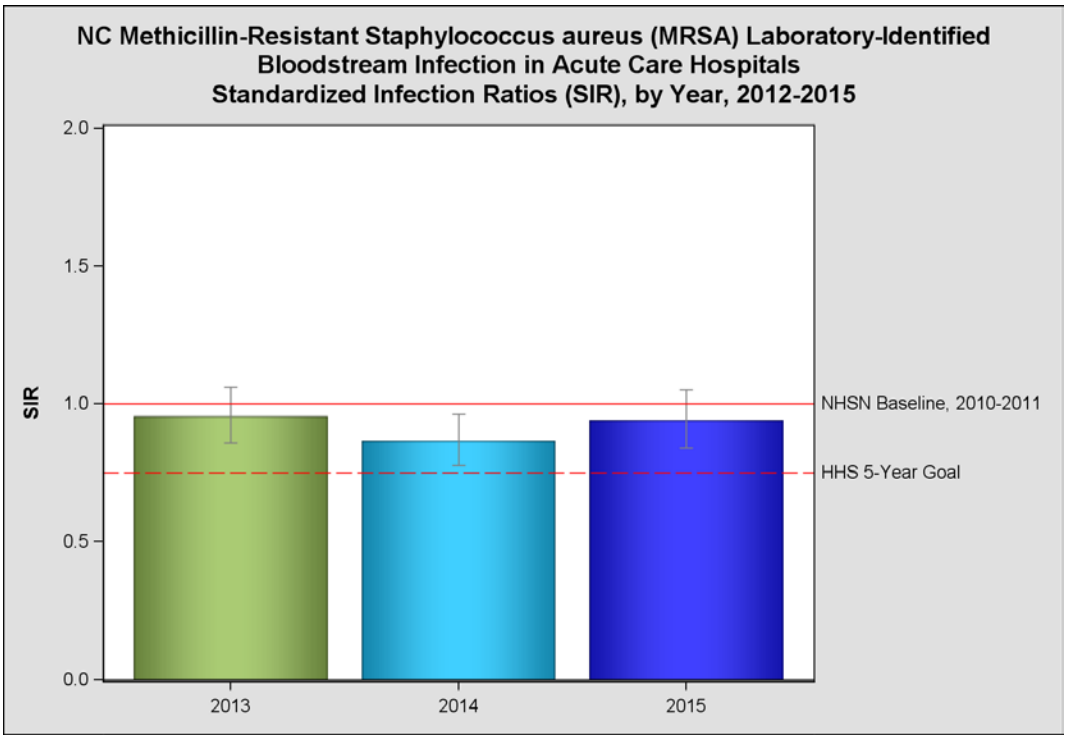
**North Carolina 2015 MRSA LabID Highlights**

- North Carolina hospitals reported 308 MRSA LabID events, compared to the 328 MRSA LabID events which were predicted. This was the same as the 2010-2011 national experience
- The U.S. Department of Health and Human Services set a goal to reduce MRSA nationally by 25% from the baseline experience in 2010-2011; North Carolina has not yet been met this goal.

**Table 6.**

| Year | # Observed Events | # Predicted Events | How Does North Carolina Compare to the National Experience? |
|---|---|---|---|
| **2013** | **341** | **359** | **= Same: about the same number of infections as were predicted (same as the national experience)** |
| **2014** | **337** | **389** | **★Better: Fewer infections than were predicted (better than the national experience)** |
| **2015** | **309** | **328** | **= Same: about the same number of infections as were predicted (same as the national experience)** |

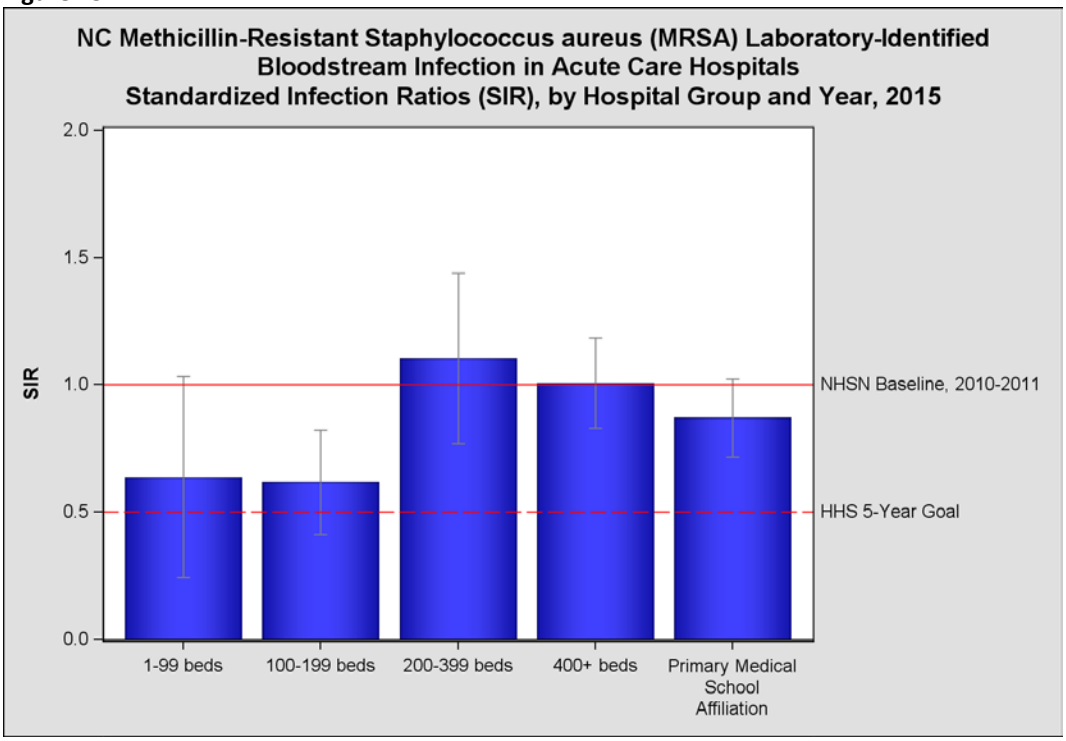
**Figure 24.**




**How to Understand Figure 21:**

- In 2015, North Carolina reported the SAME number of MRSA LabID events as predicted by the national experience
- The number of MRSA LabID events in 2015 was similar to the numbers observed in previous years
- The HHS 5-year goal to reduce MRSA LabID events by 25% has not yet been met in North Carolina

**Figure 25.**



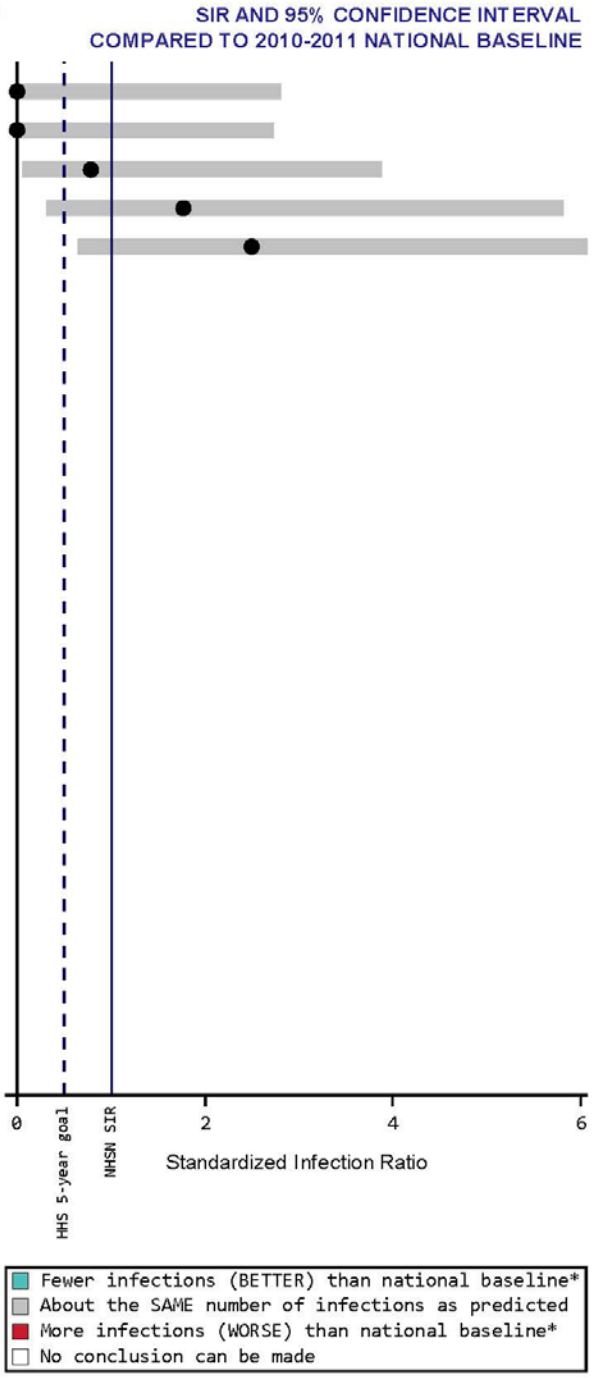

**How to Understand Figure 22:**

- Hospitals with 100-199 beds performed BETTER than the national experience, with fewer MRSA LabID events than predicted
- All other hospital groups reported about the SAME number of infections as were predicted by the national experience
- None of the hospital size groups met the HHS 5-year goal to reduce MRSA by 25%.

**The following SIR plots summarize MRSA labID data for North Carolina hospitals by hospital groups (Appendix E).**

## MRSA Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with less than 100 Beds

| HOSPITAL | OBS | PRED | PD | SIR |
|---|---|---|---|---|
| Columbus Regional Healthcare System | 0 | 1.1 | 19271 | 0.0 |
| Randolph Hospital | 0 | 1.1 | 18105 | 0.0 |
| Caldwell Memorial Hospital | 1 | 1.3 | 19696 | 0.8 |
| Sentara Albemarle Medical Center | 2 | 1.1 | 21968 | 1.8 |
| Novant Health Huntersville | 3 | 1.2 | 30735 | 2.5 |
| McDowell Hospital | 0 | 0.3 | 7719 | NC |
| Murphy Medical Center | 0 | 0.2 | 6732 | NC |
| Dlp - Harris Regional Hospital | 0 | 0.8 | 13963 | NC |
| Sandhills Regional Medical Center | 0 | 0.3 | 7631 | NC |
| Vidant Roanoke Chowan Hospital | 0 | 0.5 | 13382 | NC |
| Martin General Hospital | 1 | 0.2 | 4101 | NC |
| Vidant Beaufort Hospital | 2 | 0.4 | 10483 | NC |
| Granville Medical Center | 0 | 0.4 | 8003 | NC |
| Novant Health Brunswick Medical Center | 3 | 0.9 | 16924 | NC |
| Vidant Duplin Hospital | 0 | 0.5 | 10025 | NC |
| Kings Mountain Hospital | 0 | 0.3 | 8054 | NC |
| Person Memorial Hospital | 0 | 0.2 | 3959 | NC |
| Wake Forest Baptist Health-Lexington | 0 | 0.4 | 10248 | NC |
| Novant Health Medical Park Hospital | 0 | 0.3 | 5953 | NC |
| Hugh Chatham Memorial Hospital | 0 | 0.6 | 17343 | NC |
| Carolinas Healthcare System Anson | 0 | 0.0 | 372 | NC |
| Annie Penn Hospital | 2 | 0.6 | 14717 | NC |
| Wake Forest Baptist Health-Davie Medica | 0 | 0.2 | 5902 | NC |
| Johnston Health Clayton | 0 | 0.1 | 3884 | NC |
| Firsthealth Moore Regional-Hoke | 0 | 0.0 | 860 | NC |
| Firsthealth Moore Regional-Richmond | 0 | 0.2 | 5961 | NC |

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NA = Data not shown for hospitals with <50 catheter days
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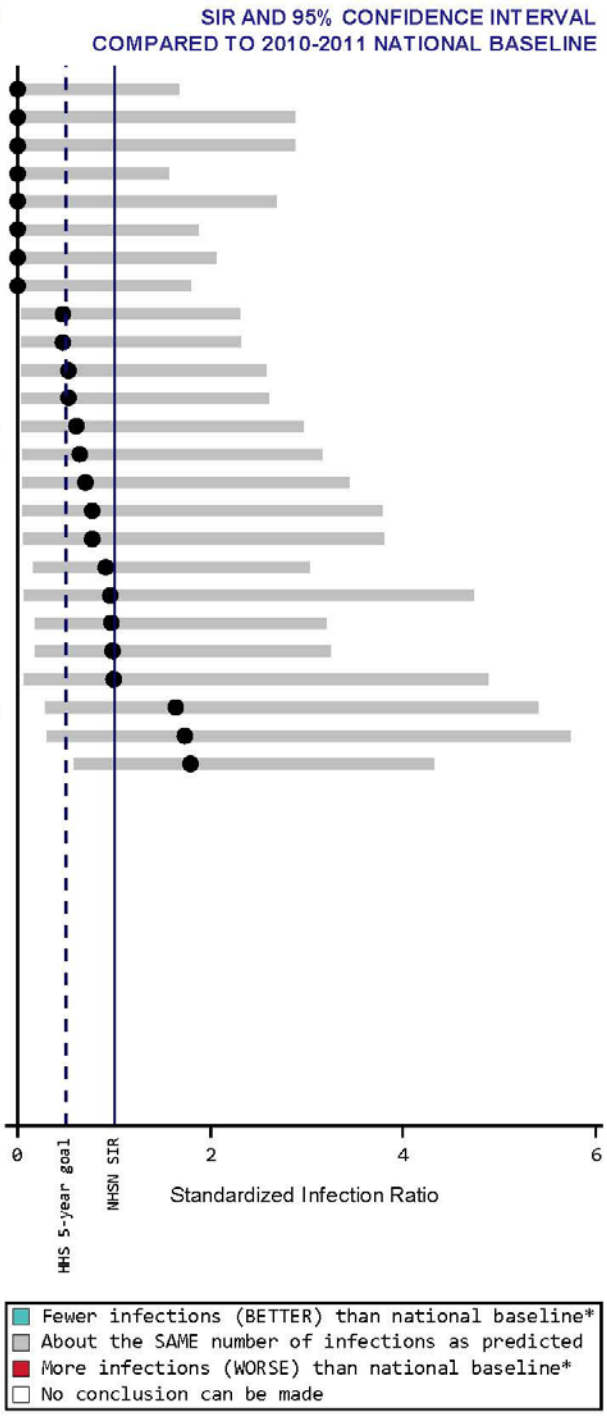
*Significantly different than 2009 national baseline

## MRSA Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 100 to 199 Beds

| HOSPITAL | OBS | PRED | PD | SIR |
|---|---|---|---|---|
| Carolinas Medical Center-Mercy | 0 | 1.8 | 37943 | 0.0 |
| Haywood Regional Medical Center | 0 | 1.0 | 23695 | 0.0 |
| Scotland Memorial Hospital | 0 | 1.0 | 21175 | 0.0 |
| Carolinas Healthcare System Blue Ridge | 0 | 1.9 | 38342 | 0.0 |
| Halifax Regional Medical Center | 0 | 1.1 | 20597 | 0.0 |
| Betsy Johnson Regional | 0 | 1.6 | 29687 | 0.0 |
| Wesley Long Hospital | 0 | 1.5 | 40555 | 0.0 |
| Women's Hospital | 0 | 1.7 | 46664 | 0.0 |
| Johnston Health | 1 | 2.1 | 42516 | 0.5 |
| Duke Raleigh Hospital | 1 | 2.1 | 42623 | 0.5 |
| Frye Regional Medical Center | 1 | 1.9 | 33337 | 0.5 |
| Wilson Medical Center | 1 | 1.9 | 31259 | 0.5 |
| Iredell Memorial Hospital | 1 | 1.7 | 40958 | 0.6 |
| Pardee Hospital | 1 | 1.6 | 30851 | 0.6 |
| Carolinas Medical Center-Lincoln | 1 | 1.4 | 19189 | 0.7 |
| Carolinas Medical Center-Union | 1 | 1.3 | 33182 | 0.8 |
| Onslow Memorial Hospital | 1 | 1.3 | 32640 | 0.8 |
| Novant Health Matthews Medical Center | 2 | 2.2 | 45066 | 0.9 |
| Carteret General Hospital | 1 | 1.0 | 24528 | 1.0 |
| Catawba Valley Medical Center | 2 | 2.1 | 51316 | 1.0 |
| WakeMed Cary Hospital | 2 | 2.0 | 56877 | 1.0 |
| Novant Health Thomasville Medical Cente | 1 | 1.0 | 12863 | 1.0 |
| Maria Parham Medical Center | 2 | 1.2 | 21804 | 1.6 |
| Vidant Edgecombe Hospital | 2 | 1.2 | 14935 | 1.7 |
| Lenoir Memorial Hospital | 4 | 2.2 | 26517 | 1.8 |
| Carolinas Medical Center-University | 1 | 0.9 | 25442 | NC |
| Rutherford Regional Medical Center | 2 | 0.9 | 15998 | NC |
| Park Ridge Health | 1 | 0.8 | 21553 | NC |
| ARHS-Watauga Medical Center | 0 | 0.8 | 20893 | NC |
| Davis Regional Medical Center | 1 | 0.7 | 15324 | NC |
| Sampson Regional Medical Center | 0 | 0.9 | 15087 | NC |
| Northern Hospital Of Surry County | 1 | 0.9 | 15609 | NC |
| Lake Norman Regional Medical Center | 0 | 0.7 | 17733 | NC |
| Central Carolina Hospital | 1 | 0.8 | 18172 | NC |
| Stanly Regional Medical Center | 1 | 0.6 | 16722 | NC |
| Morehead Memorial Hospital | 1 | 0.7 | 15139 | NC |
| Wilkes Regional Medical Center | 0 | 0.9 | 18869 | NC |

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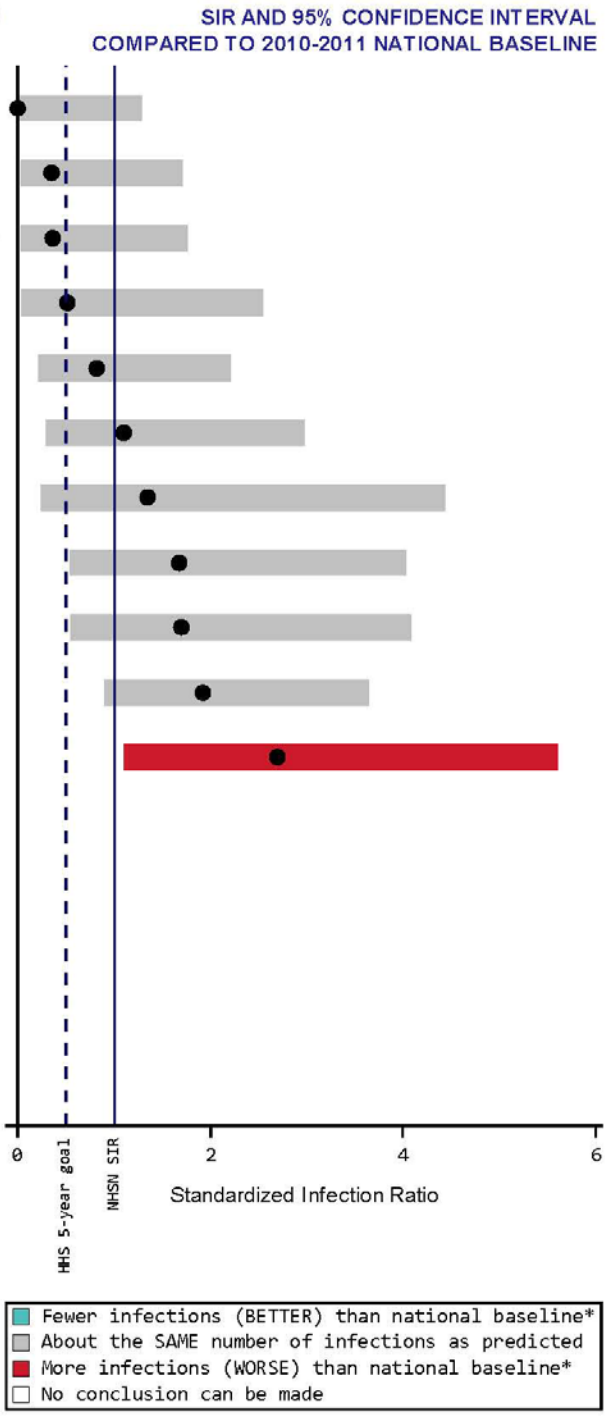
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## MRSA Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 200 to 399 Beds

| HOSPITAL | OBS | PRED | PD | SIR |
|---|---|---|---|---|
| CarolinaEast Medical Center | 0 | 2.3 | 59841 | 0.0 |
| Wayne Memorial Hospital | 1 | 2.9 | 49834 | 0.3 |
| High Point Regional Health System | 1 | 2.8 | 71844 | 0.4 |
| Alamance Regional Medical Center | 1 | 1.9 | 45588 | 0.5 |
| Duke Regional Hospital | 3 | 3.7 | 66115 | 0.8 |
| Southeastern Regional Medical Center | 3 | 2.7 | 68874 | 1.1 |
| Carolinas Healthcare System Cleveland | 2 | 1.5 | 35058 | 1.3 |
| Novant Health Rowan Medical Center | 4 | 2.4 | 43763 | 1.7 |
| Carolinas Medical Center-Pineville | 4 | 2.4 | 62471 | 1.7 |
| FirstHealth Moore Regional Hospital | 8 | 4.2 | 102290 | 1.9 |
| Nash Health Care Systems | 6 | 2.2 | 48766 | 2.7 |

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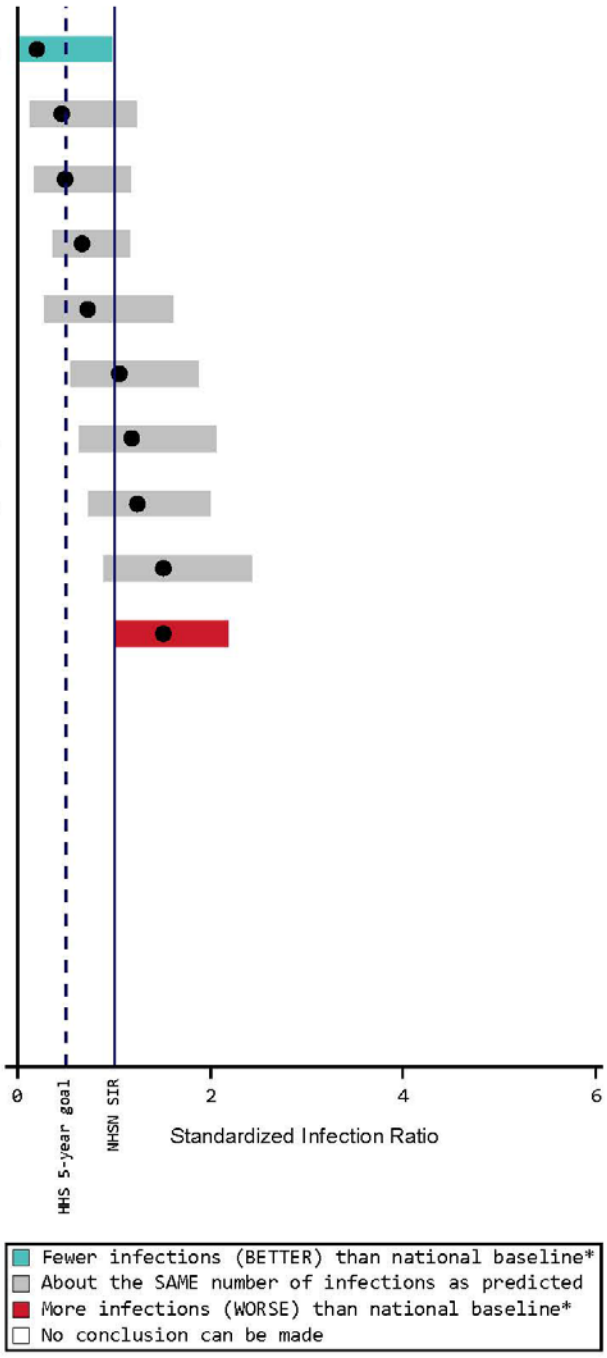
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## MRSA Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 400 or More Beds

| HOSPITAL | OBS | PRED | PD | SIR |
|---|---|---|---|---|
| Gaston Memorial Hospital | 1 | 5.1 | 91348 | 0.2 |
| Moses Cone Hospital | 3 | 6.6 | 118326 | 0.5 |
| Rex Healthcare | 4 | 8.3 | 120705 | 0.5 |
| New Hanover Regional Medical Center | 11 | 16.5 | 169318 | 0.7 |
| Carolinas Medical Center-Northeast | 5 | 6.9 | 110704 | 0.7 |
| WakeMed | 10 | 9.5 | 163548 | 1.1 |
| Cape Fear Valley Health System | 11 | 9.3 | 165301 | 1.2 |
| Mission Hospital | 15 | 12.1 | 197231 | 1.2 |
| Novant Health Presbyterian Medical | 15 | 10.0 | 154185 | 1.5 |
| Novant Health Forsyth Medical Center | 26 | 17.2 | 226331 | 1.5 |




Data reported from adult/pediatric units as of March 14, 2016 .
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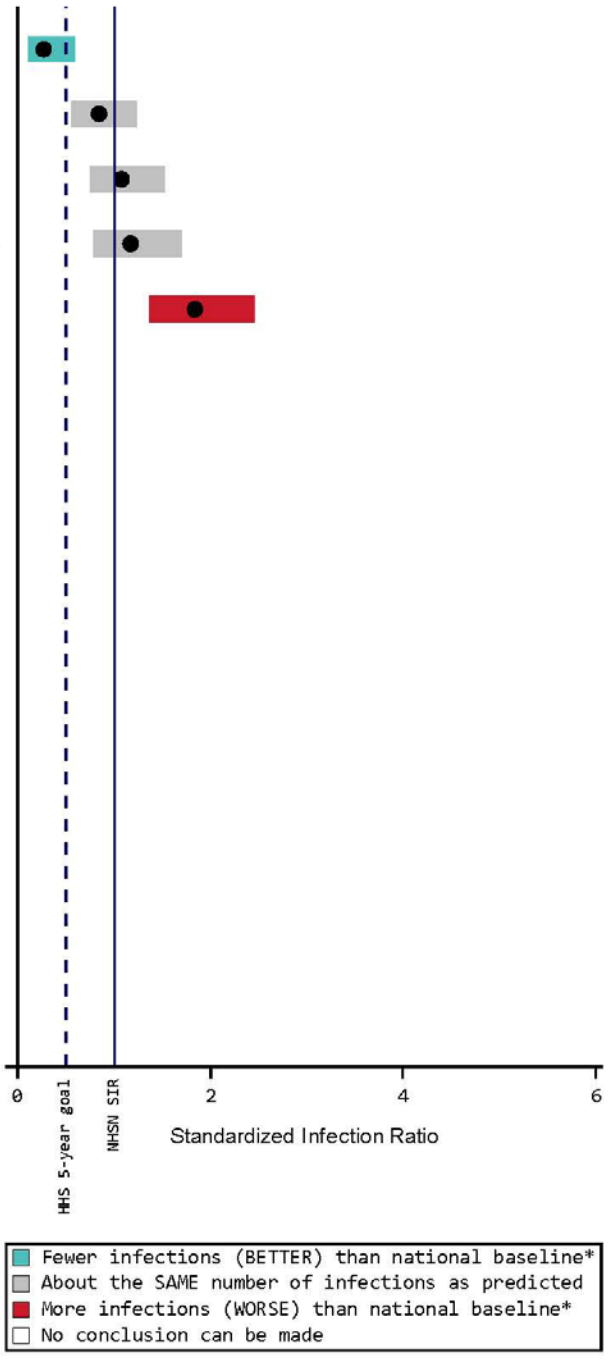
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## MRSA Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with Primary Medical School Affiliation

| HOSPITAL | OBS | PRED | PD | SIR |
|---|---|---|---|---|
| Vidant Medical Center | 5 | 18.9 | 235638 | 0.3 |
| Carolinas Medical Center | 23 | 27.5 | 276715 | 0.8 |
| Duke University Hospital | 30 | 27.8 | 302248 | 1.1 |
| UNC Health Care | 25 | 21.5 | 240621 | 1.2 |
| Wake Forest University Baptist Medical | 44 | 23.9 | 231828 | 1.8 |




Data reported from adult/pediatric units as of March 14, 2016 .
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PRED = # infections statistically 'predicted' by national baseline
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## 2. *Clostridium difficile* Laboratory-Identified Events (CDI LabID)

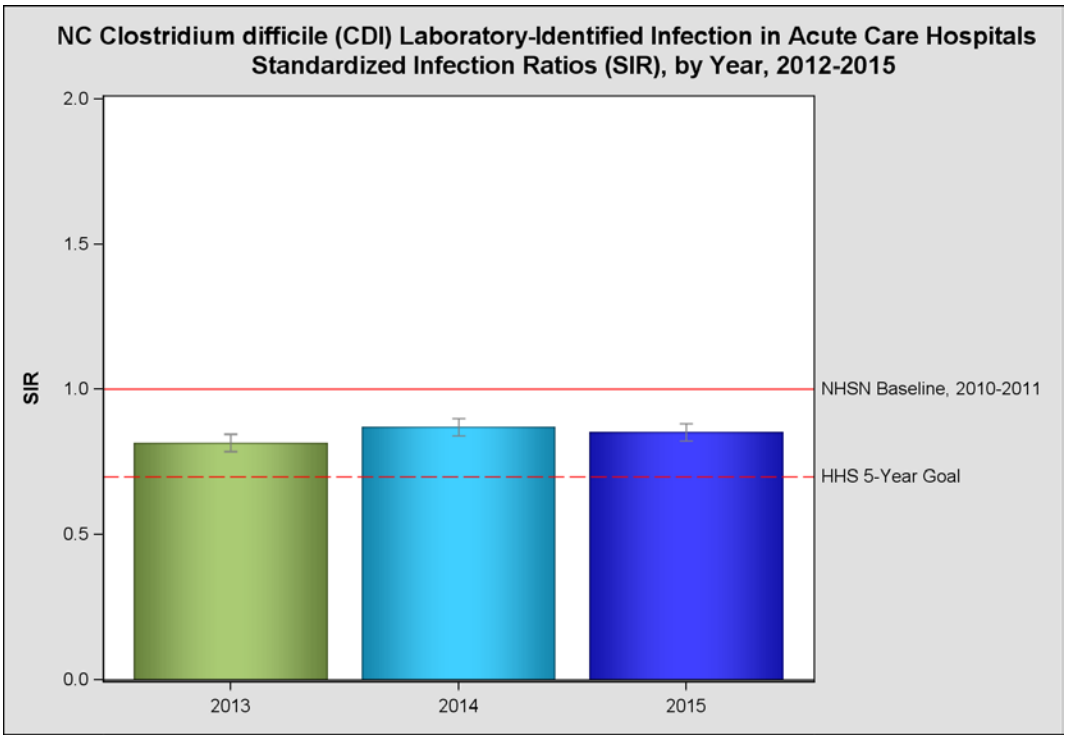
**North Carolina 2015 CDI LabID Highlights**

- North Carolina hospitals reported 3,046 CDI LabID events, compared to the 3,577 CDI LabID events which were predicted. This was better than the 2010-2011 national experience
- The U.S. Department of Health and Human Services set a goal to reduce CDI nationally by 30% from the baseline experience in 2010-2011; North Carolina has not yet met this goal.

**Table 7.**

| Year | # Observed Infections | # Predicted Infections | How Does North Carolina Compare to the National Experience? |
|---|---|---|---|
| **2013** | **2853** | **3561** | **★Better: Fewer infections than were predicted (better than the national experience)** |
| **2014** | **3040** | **3506** | **★Better: Fewer infections than were predicted (better than the national experience)** |
| **2015** | **3046** | **3577** | **★Better: Fewer infections than were predicted (better than the national experience)** |

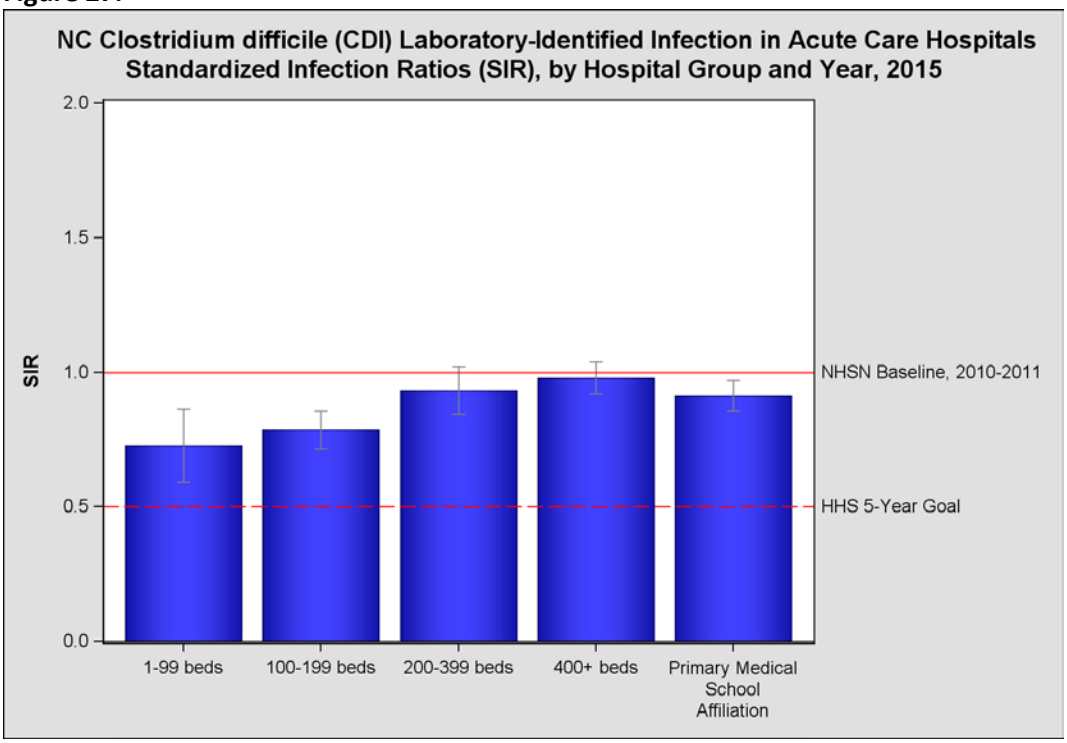
**Figure 26.**




**How to Understand Figure 23:**

- Since 2013, North Carolina, has performed BETTER than the national experience, with fewer CDI LabID events than predicted by the national experience
- The HHS 5-year goal to reduce CDI infections by 30% has not yet been met in North Carolina

**Figure 27.**



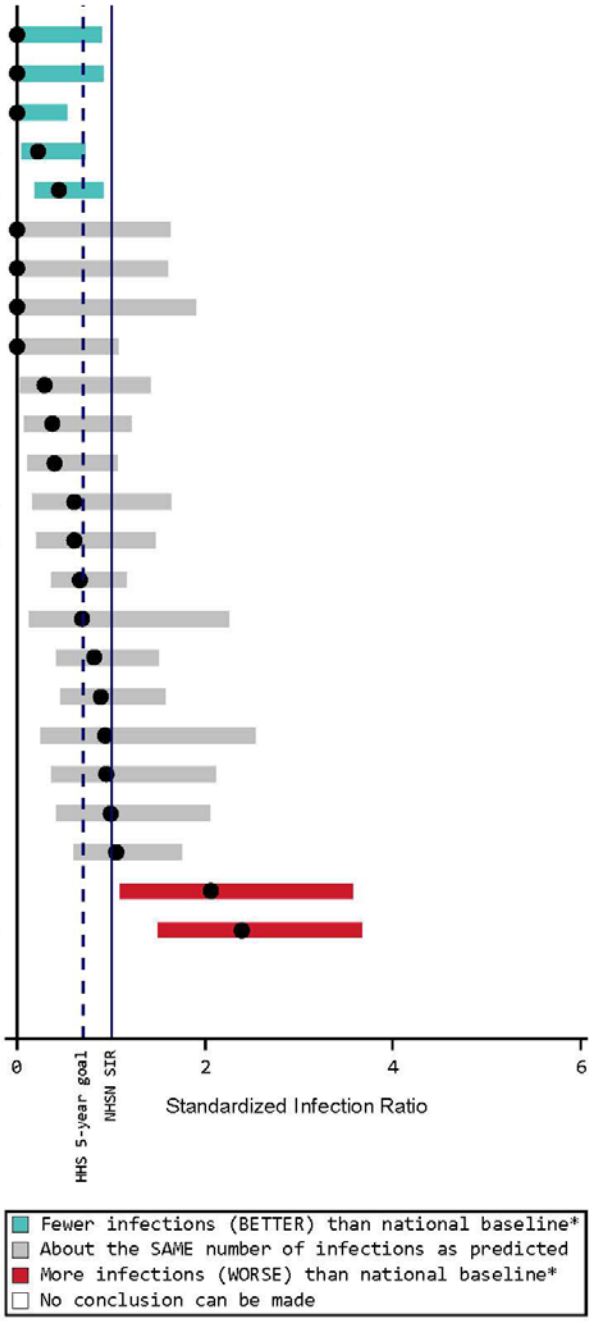

**How to Understand Figure 24:**

- Hospitals with <100 beds, hospitals with 100-199 beds and those affiliated with a primary medical school performed BETTER than the national experience, with fewer LabID CDI events than predicted
- Hospitals with 200-399 beds and with 400+ beds reported about the SAME number of observed infections as predicted by the national experience
- None of the hospital size groups met the HHS 5-year goal in 2015

**The following SIR plots summarize CDI labID data for North Carolina hospitals by hospital groups (Appendix E).**

## CDI Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with less than 100 Beds

| HOSPITAL | OBS | PRED | PD | SIR |
|---|---|---|---|---|
| Sandhills Regional Medical Center | 0 | 3.3 | 7631 | 0.0 |
| Novant Health Medical Park Hospital | 0 | 3.3 | 5953 | 0.0 |
| Hugh Chatham Memorial Hospital | 0 | 5.6 | 15191 | 0.0 |
| Columbus Regional Healthcare System | 2 | 9.1 | 18545 | 0.2 |
| Randolph Hospital | 6 | 13.6 | 18105 | 0.4 |
| Martin General Hospital | 0 | 1.8 | 4101 | 0.0 |
| Person Memorial Hospital | 0 | 1.9 | 3959 | 0.0 |
| Johnston Health Clayton | 0 | 1.6 | 3414 | 0.0 |
| Firsthealth Moore Regional-Richmond | 0 | 2.8 | 5961 | 0.0 |
| McDowell Hospital | 1 | 3.5 | 7300 | 0.3 |
| Vidant Duplin Hospital | 2 | 5.4 | 8993 | 0.4 |
| Novant Health Brunswick Medical Center | 3 | 7.7 | 16519 | 0.4 |
| Kings Mountain Hospital | 3 | 5.0 | 8054 | 0.6 |
| Dlp - Harris Regional Hospital | 4 | 6.6 | 13732 | 0.6 |
| Novant Health Huntersville | 11 | 16.5 | 26864 | 0.7 |
| Murphy Medical Center | 2 | 2.9 | 6732 | 0.7 |
| Sentara Albemarle Medical Center | 9 | 11.0 | 20969 | 0.8 |
| Annie Penn Hospital | 10 | 11.3 | 14717 | 0.9 |
| Wake Forest Baptist Health-Davie Medica | 3 | 3.2 | 5902 | 0.9 |
| Vidant Beaufort Hospital | 5 | 5.3 | 10426 | 1.0 |
| Wake Forest Baptist Health-Lexington | 6 | 6.1 | 9287 | 1.0 |
| Caldwell Memorial Hospital | 13 | 12.4 | 19007 | 1.1 |
| Granville Medical Center | 11 | 5.4 | 7557 | 2.1 |
| Vidant Roanoke Chowan Hospital | 19 | 7.9 | 12622 | 2.4 |
| Carolinas Healthcare System Anson | 1 | 0.2 | 313 | NC |
| Firsthealth Moore Regional-Hoke | 1 | 0.6 | 860 | NC |




Data reported from adult/pediatric units as of March 14, 2016 .
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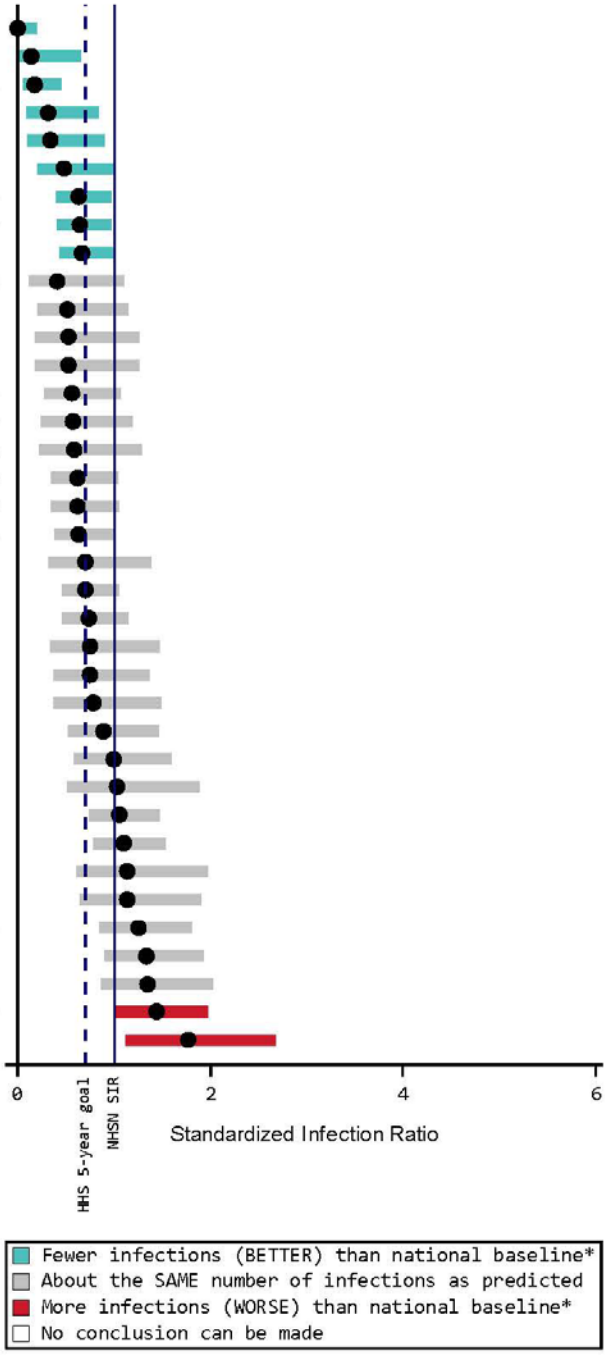
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## CDI Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 100 to 199 Beds

| HOSPITAL | OBS | PRED | PD | SIR |
|---|---|---|---|---|
| Women's Hospital | 0 | 15.7 | 26147 | 0.0 |
| Davis Regional Medical Center | 1 | 7.6 | 15324 | 0.1 |
| Lenoir Memorial Hospital | 3 | 18.1 | 25607 | 0.2 |
| Scotland Memorial Hospital | 3 | 9.8 | 19347 | 0.3 |
| Wilkes Regional Medical Center | 3 | 9.1 | 17944 | 0.3 |
| Carolinas Medical Center-University | 6 | 12.7 | 20835 | 0.5 |
| Carolinas Medical Center-Mercy | 18 | 28.7 | 37943 | 0.6 |
| Carolinas Healthcare System Blue Ridge | 20 | 31.5 | 37330 | 0.6 |
| WakeMed Cary Hospital | 21 | 31.6 | 49644 | 0.7 |
| Novant Health Thomasville Medical Cente | 3 | 7.5 | 11191 | 0.4 |
| Haywood Regional Medical Center | 5 | 9.7 | 23082 | 0.5 |
| Stanly Regional Medical Center | 4 | 7.7 | 14555 | 0.5 |
| Sampson Regional Medical Center | 4 | 7.7 | 14213 | 0.5 |
| ARHS-Watauga Medical Center | 8 | 14.2 | 20504 | 0.6 |
| Park Ridge Health | 6 | 10.5 | 21553 | 0.6 |
| Carolinas Medical Center-Lincoln | 5 | 8.6 | 8856 | 0.6 |
| Johnston Health | 12 | 19.6 | 39643 | 0.6 |
| Carolinas Medical Center-Union | 12 | 19.4 | 29986 | 0.6 |
| Catawba Valley Medical Center | 16 | 25.4 | 48537 | 0.6 |
| Morehead Memorial Hospital | 7 | 10.0 | 14265 | 0.7 |
| Duke Raleigh Hospital | 22 | 31.4 | 42623 | 0.7 |
| Frye Regional Medical Center | 18 | 24.5 | 32567 | 0.7 |
| Central Carolina Hospital | 7 | 9.4 | 16632 | 0.7 |
| Carteret General Hospital | 9 | 12.1 | 23692 | 0.7 |
| Vidant Edgecombe Hospital | 8 | 10.2 | 13681 | 0.8 |
| Pardee Hospital | 14 | 15.7 | 30851 | 0.9 |
| Betsy Johnson Regional | 15 | 15.2 | 28182 | 1.0 |
| Rutherford Regional Medical Center | 9 | 8.8 | 14891 | 1.0 |
| Wesley Long Hospital | 32 | 30.4 | 40555 | 1.1 |
| Novant Health Matthews Medical Center | 33 | 30.0 | 39602 | 1.1 |
| Northern Hospital Of Surry County | 11 | 9.7 | 14952 | 1.1 |
| Lake Norman Regional Medical Center | 13 | 11.4 | 15276 | 1.1 |
| Wilson Medical Center | 26 | 20.9 | 29334 | 1.2 |
| Onslow Memorial Hospital | 26 | 19.5 | 27364 | 1.3 |
| Maria Parham Medical Center | 21 | 15.6 | 20868 | 1.3 |
| Iredell Memorial Hospital | 35 | 24.4 | 39196 | 1.4 |
| Halifax Regional Medical Center | 20 | 11.3 | 19705 | 1.8 |

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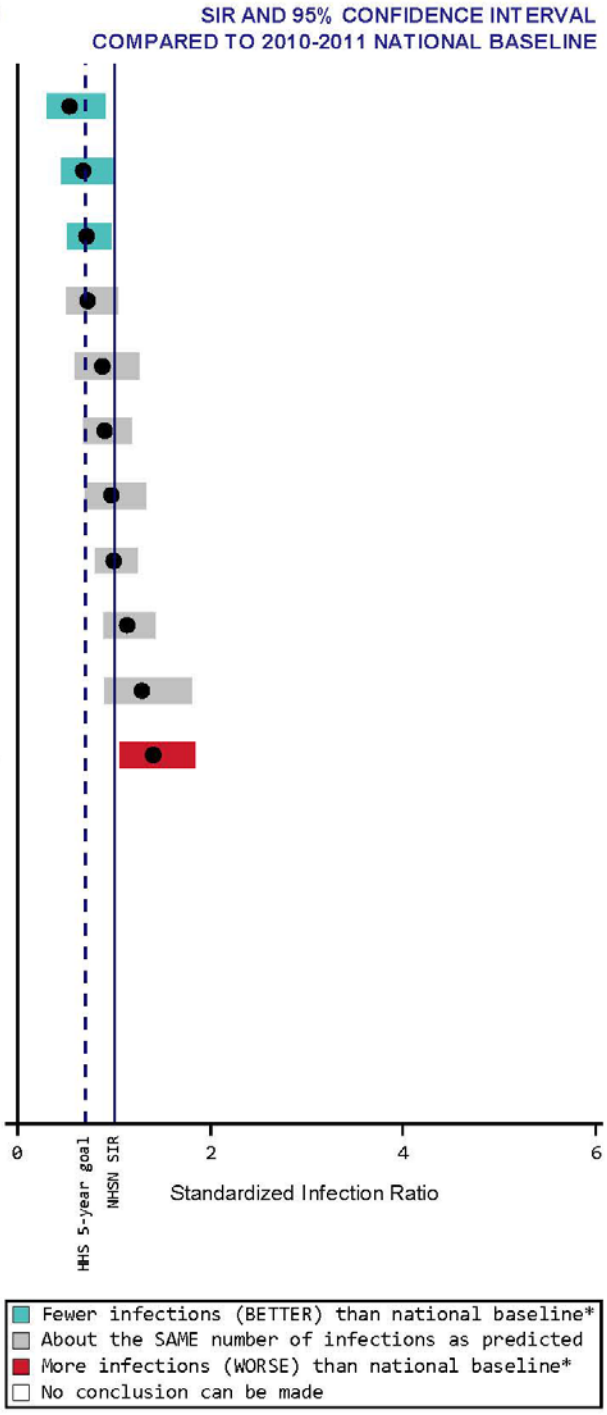
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## CDI Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 200 to 399 Beds

| HOSPITAL | OBS | PRED | PD | SIR |
|---|---|---|---|---|
| Carolinas Healthcare System Cleveland | 12 | 22.6 | 32967 | 0.5 |
| Wayne Memorial Hospital | 23 | 34.4 | 46907 | 0.7 |
| Southeastern Regional Medical Center | 35 | 49.6 | 64425 | 0.7 |
| CarolinaEast Medical Center | 28 | 38.6 | 57356 | 0.7 |
| Alamance Regional Medical Center | 26 | 29.9 | 42023 | 0.9 |
| Duke Regional Hospital | 47 | 52.6 | 57597 | 0.9 |
| Carolinas Medical Center-Pineville | 36 | 37.2 | 55223 | 1.0 |
| FirstHealth Moore Regional Hospital | 75 | 75.5 | 96890 | 1.0 |
| High Point Regional Health System | 65 | 57.7 | 68924 | 1.1 |
| Novant Health Rowan Medical Center | 31 | 24.1 | 42217 | 1.3 |
| Nash Health Care Systems | 48 | 34.3 | 45449 | 1.4 |

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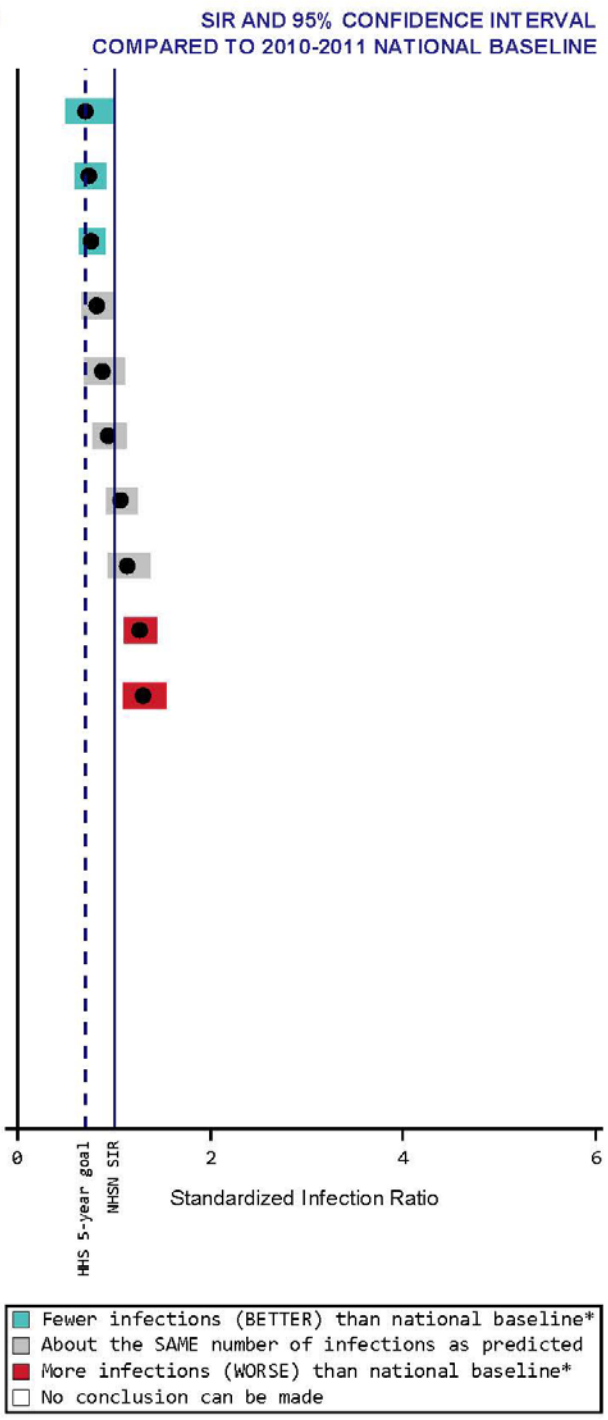
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## CDI Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with 400 or More Beds

| HOSPITAL | OBS | PRED | PD | SIR |
|---|---|---|---|---|
| Gaston Memorial Hospital | 31 | 44.2 | 83384 | 0.7 |
| Cape Fear Valley Health System | 76 | 104 | 142025 | 0.7 |
| New Hanover Regional Medical Center | 116 | 153 | 156877 | 0.8 |
| Rex Healthcare | 77 | 94.3 | 108111 | 0.8 |
| Carolinas Medical Center-Northeast | 65 | 74.6 | 100386 | 0.9 |
| WakeMed | 102 | 110 | 138683 | 0.9 |
| Mission Hospital | 158 | 148 | 174474 | 1.1 |
| Novant Health Presbyterian Medical | 100 | 88.3 | 118146 | 1.1 |
| Novant Health Forsyth Medical Center | 195 | 155 | 203457 | 1.3 |
| Moses Cone Hospital | 123 | 94.8 | 119232 | 1.3 |




Data reported from adult/pediatric units as of March 14, 2016 .
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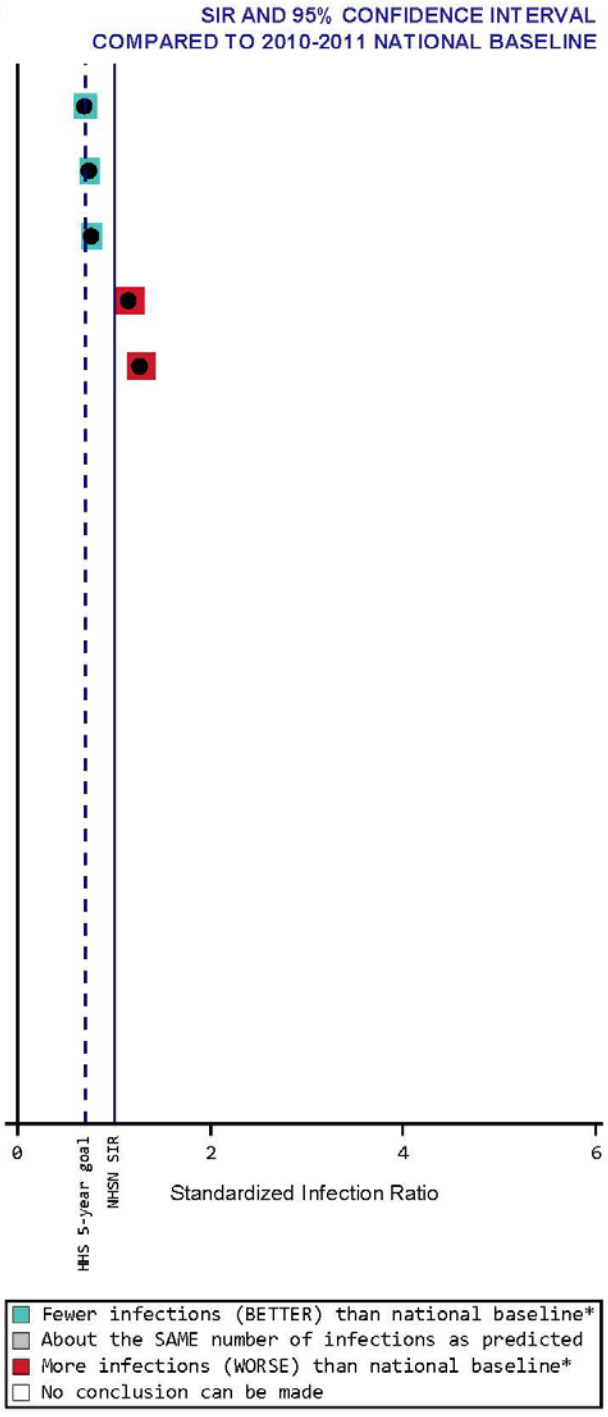
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 catheter days
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2009 national baseline

## CDI Standardized Infection Ratios: January 1 – December 31, 2015
## Hospital Group: Hospitals with Primary Medical School Affiliation

| HOSPITAL | OBS | PRED | PD | SIR |
|---|---|---|---|---|
| Vidant Medical Center | 114 | 167 | 230910 | 0.7 |
| Carolinas Medical Center | 174 | 238 | 249355 | 0.7 |
| Duke University Hospital | 193 | 256 | 282409 | 0.8 |
| UNC Health Care | 222 | 193 | 216452 | 1.1 |
| Wake Forest University Baptist Medical | 271 | 214 | 220398 | 1.3 |

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PD = # Patient days
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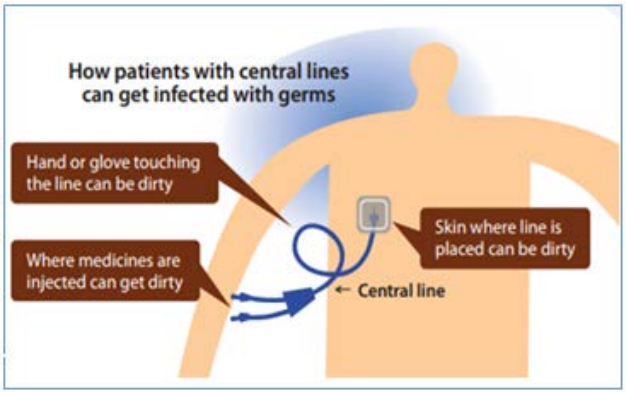
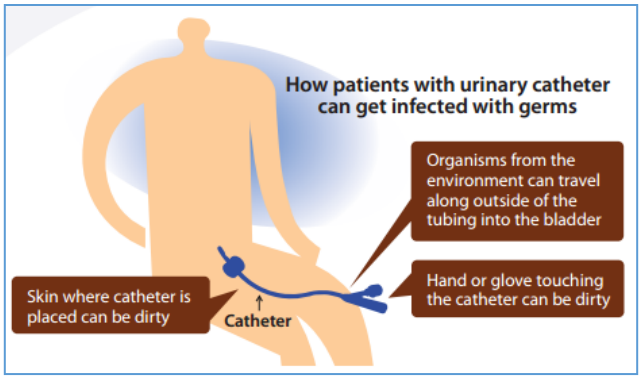
## FAST FACTS: What You Need to Know About Healthcare-Associated Infections

### Device-Associated HAIs

Sometimes, patients have medical devices inserted into their bodies to provide necessary medical care. These devices are called "invasive devices" and patients with these devices have a higher chance of getting an infection. Here is what you need to know about invasive devices and what kinds of infections they can be associated with:




- A **central line** is a tube placed in a large vein to allow access to the bloodstream and provide the patient with important medicine. A **central line-associated bloodstream infection (CLABSI)** can occur when bacteria or other germs travel along a central line and enter the blood. When not put in correctly or kept clean, central lines can become a pathway for germs to enter the body and cause serious bloodstream infections.

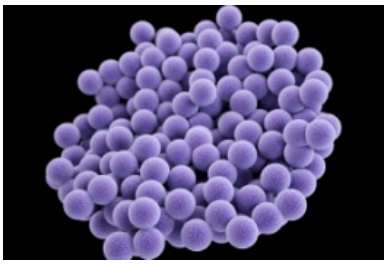



- A **urinary catheter** is a tube placed in the bladder to drain urine. A **catheter-associated urinary tract infection (CAUTI)** can occur when bacteria or other germs travel along a urinary catheter, resulting in an infection in your bladder or your kidney.

### Other HAIs

- A **surgical site infection (SSI)** occurs after surgery in the part of the body where the surgery took place. These infections may involve only the skin or may be more serious and involve tissue under the skin or organs. SSIs sometimes take days or months after surgery to develop. Symptoms may include fever, redness or pain around the surgical site, or drainage of fluid from the wound.

- **Methicillin-resistant *Staphylococcus aureus* (MRSA)** infections are caused by bacteria that are resistant to certain types of drugs. MRSA can cause skin or wound infections. Sometimes, MRSA can infect the blood and cause serious illness and even death. Only bloodstream infections are shown in this report.



- ***Clostridium difficile* (*C. difficile*)** is a type of bacteria that causes severe diarrhea and can be deadly. *C. difficile* infections usually occur in people who have recently taken antibiotics and been under medical care.

## READING GUIDE: Explanation of Each Variable in the Tables and Figures

**Below is a list of all variables shown in the data tables and figures:**

- **Title**: The title of the table gives you information about the infection type, time period, facility unit(s)/group(s) included in the table.

- **Procedure Type:** This is the specific type of surgery for which the surgical site infection (SSI) data are presented (e.g., abdominal hysterectomy, colon surgery).

- **Unit/Unit Type:** This is the specific unit/type of unit in the hospital from which the data was collected. Hospitals have distinct locations, or units, within the facility that are designated for certain types of patients. For example: "Med/Surg ICU" represents the intensive care unit (ICU) for very sick patients needing medical or surgical care.

- **Observed Infections (or Observed Events):** This is the number of infections (or events, for LabID measures) that was reported by the facility.

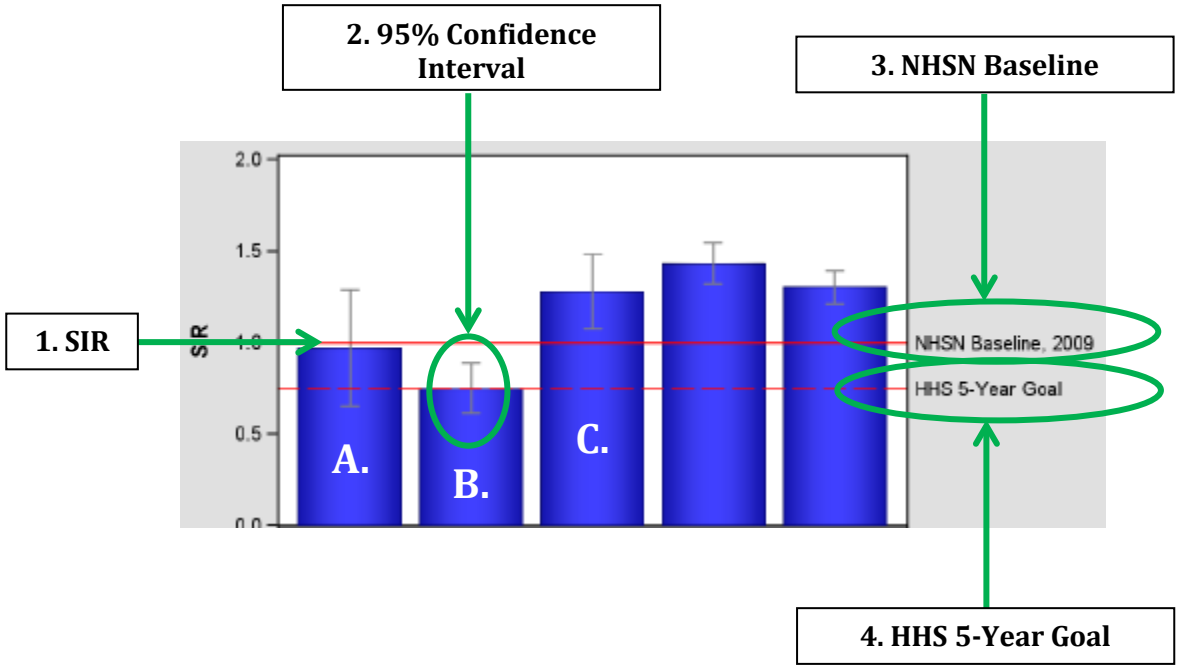
- **Predicted Infections (or Predicted Events):** This is a calculated value that reflects the number of infections (or events, for LabID measures) that we have "predicted" to occur in this facility, based on the national experience.

- **"How Does North Carolina Compare to the National Experience?"** Colors and symbols are used to help you quickly understand and interpret the hospital's data. This is the "take-home message" about healthcare-associated infections in this facility.

  **★ Indicates that North Carolina had fewer infections than were predicted (better than the national experience)**
  **= Indicates that North Carolina had about the same number of infections as were predicted (same as the national experience)**
  **✖ Indicates that North Carolina had more infections than were predicted (worse than the national experience)**
  **No Conclusion:** Indicates that North Carolina reported data, but there was not enough information to make a reliable comparison to the national experience (# of predicted infections was less than 1).

## NUMBERS GUIDE: Explanation of Numbers and Data Calculations

**Below is an explanation of numbers and data calculations used in the figures:**




**1). SIR** - Represented by the colored bars in each figure.

- SIR = number of *observed* infections / number of *predicted* infections based on the national baseline experience
- SIR is calculated for each HAI
- The SIR is considered a "best guess" or estimate of observed infections compared to those predicted during January 1, 2015 – December 31, 2015

A) Represents an SIR value of 1
B) Represents an SIR value of less than 1
C) Represents an SIR value of greater than 1

**2). 95% confidence intervals for the SIR** – Represented by the skinny gray lines in each figure.

These gray lines represent a lower and a higher limit around the SIR; together these limits create an interval. It means we are 95% confident the SIR estimate falls within this interval. Wider bars indicate less confidence in the SIR estimate.

**How to understand the 95% confidence intervals:**

- If the value of 1.0 is included between the lower and upper limit, there is NO significant difference between the number of observed and predicted infections.
- If the value of 1.0 is NOT included between the lower and upper limit, there IS a significant difference between the number of observed and predicted infections.

**3). NHSN Baseline (i.e., national experience) –** Represented by the solid red line in each figure.

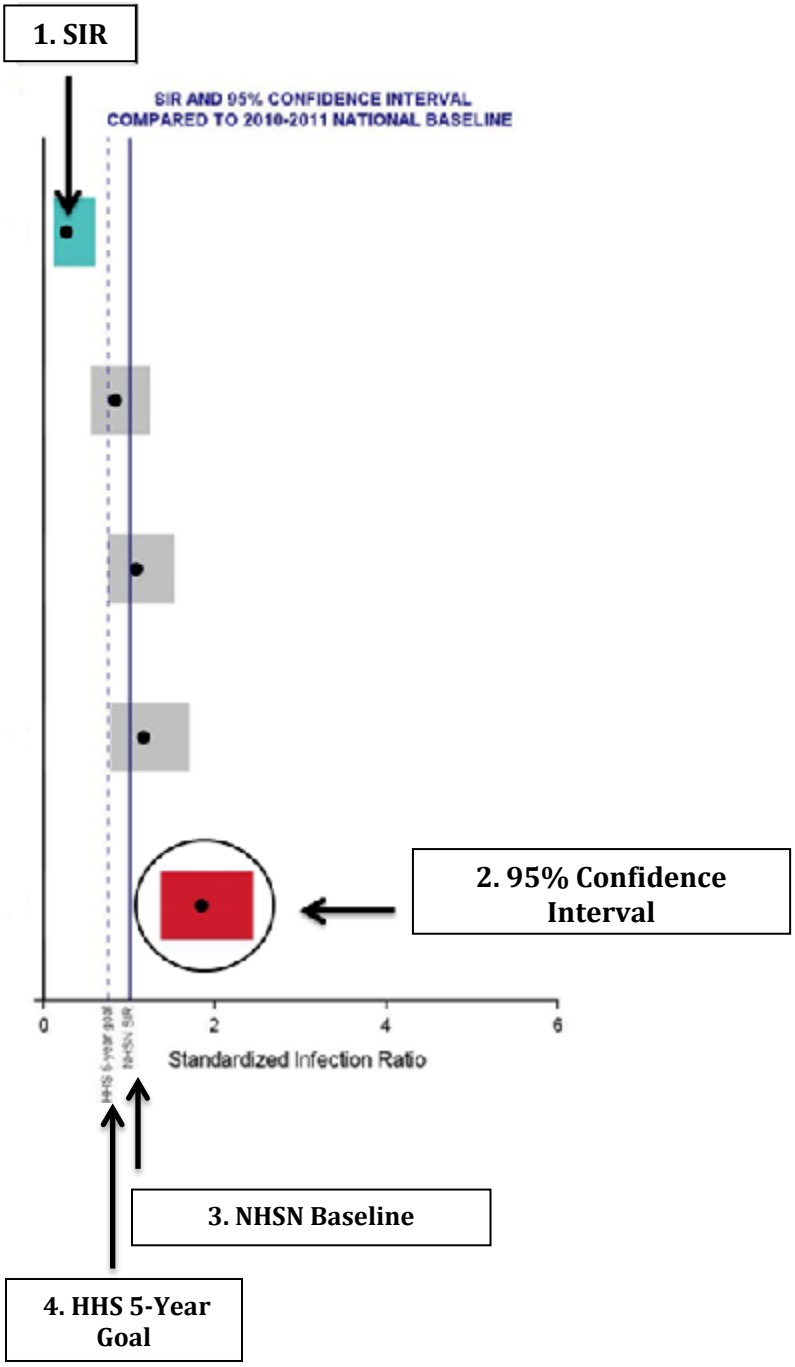
- The NHSN baseline is the number of predicted infections based on the national experience
- The NHSN baseline year may be different for each HAI:
    - The CLABSI and SSI baselines use data from 2006-2008
    - The CAUTI baselines use data from 2009
    - The MRSA and CDI LabID baselines use data from 2010-2011

**4). HHS 5-Year Goal** – Represented by the dotted red line in each figure.

- Health and Human Services established a 5-year goal to reduce each HAI by a certain percentage
- The CLABSI the 5-year goal is a 25% reduction, so the 5-year goal SIR will be 0.75 (or 1.0-.25).
- The goal is considered met when the SIR estimate is at or below this dotted line and the upper confidence limit is also at or below this dotted line.
- If the SIR estimate is at or below this dotted line but the upper confidence limit crosses this dotted line, the number of infections does not differ from the 5 year goal

**5). How can I use the SIR, 95% Confidence Interval, and the NHSN Baseline to know how North Carolina did compared to the national experience?** - To understand each figure, you will need to look at all three of these numbers. You'll Specifically need to know whether the SIR falls around 1.0, less than 1.0 or greater than 1.0 and whether the 95% Confidence Interval contains the value of 1.0.

**Below is an explanation of numbers and data calculations used in the SIR plots:**



SIR plots are used to compare HAI infection data in North Carolina by hospital size groups. Each plot displays the facilities in a particular hospital size group on the left hand side. To the right of each facility's information is the plot. The elements of this plot are described as follows:

**1). SIR** – Represented by a black circle on the plots

**2). 95% confidence intervals for the SIR** – Represented by the red, grey and green bands surrounding the SIR dot.

**How to understand the 95% confidence intervals:**

- Facilities with about the same number observed infections as predicted will have a grey confidence interval.
- Facilities with fewer observed infections than predicted will have a green confidence interval.
- Facilities with MORE observed infections than predicted will have a red confidence interval.

**3). NHSN Baseline (i.e. national experience) –** Represented by the solid line in each plot.

**4). HHS 5-Year Goal** – Represented by the dotted line in each plot.

# APPENDICES

## APPENDIX A. Definitions

| Term | Definition |
|---|---|
| Aggregate data | Sum or total data. For example, aggregate N.C. HAI data refers to the sum, or total, of HAI data for all hospitals in N.C. |
| ASA Class | Anesthesiologist's pre-operative assessment of the patient's physical condition, using the American Society of Anesthesiologists' (ASA) Classification of Physical Status.<br>1. Normally healthy patient<br>2. Patient with mild systemic disease<br>3. Patient with severe systemic disease that is not incapacitating<br>4. Patient with an incapacitating systemic disease, constant threat to life<br>5. Patient not expected to survive for 24 hours with or without the operation |
| Beds | The number of staffed beds in a facility or patient care location. This may be different from the number of licensed beds. |
| Catheter days | A daily count of the number of patients with an indwelling urinary catheter. For example, one patient with an indwelling catheter in place for two days or two patients with indwelling catheters in place for one day each would both result in two catheter days. This number is used when presenting rates of catheter-associated urinary tract infections. |
| Catheter-associated urinary tract infection | Urinary tract infection (UTI) that occurs in a patient who had an indwelling urinary catheter in place within the 48-hour period before the onset of the UTI. |
| Central line | A catheter (tube) that doctors place in a large vein in the neck, chest, or groin ending in a large vein near the heart. It is used to give medication or fluids or to collect blood for medical tests. Also known as a central venous catheter. |
| Central line-associated bloodstream infection | A bloodstream infection (BSI) that occurs in a patient who had a central line within the 48-hour period before the onset of the BSI and is not related to an infection at another site. |
| Central line days | A daily count of the number of patients with a central line. For example, one patient with a central line in place for two days or two patients with central lines in place for one day each would both result in two central line days. This number is used when presenting rates of central line-associated bloodstream infections. |
| Device days | A daily count of the number of patients with a specific device (e.g., central line, umbilical catheter, or urinary catheter) in the patient care location. For example, one patient with a device in place for two days or two patients with devices in place for one day each would both result in two device days. This number is used when presenting rates of infections associated with the use of devices. |
| Full-time equivalent | The equivalent of one person working full time for one year: 8 hour per day at 5 days per week for 52 weeks per year = 2080 hours per year |
| Hand hygiene | A general term that applies to routine hand washing, antiseptic hand wash, antiseptic hand rub, or surgical hand antisepsis.<br><br>*Routine hand washing* is the use of clean water and non-antimicrobial soap to remove germs, soil and other debris from the hands.<br><br>*Antiseptic hand washing* is the use of water and antimicrobial soap to remove or kill germs on the hands.<br><br>*Antiseptic hand rub* is the use of alcohol-based hand rubs to remove or destroy germs from the hands. Antiseptic hand rubs are less effective when hands are visibly dirty. |

| Term | Definition |
|---|---|
| | *Surgical hand antisepsis* is the use of water and antimicrobial soap to remove or kill germs and takes 2-6 minutes to complete as both hands and forearms are cleaned. Water and non-antimicrobial soap can also be used but must be followed with an alcohol-based surgical hand scrub. |
| Healthcare-associated infections | Healthcare-associated infections (HAI) are infections caused by a wide variety of common and unusual bacteria, fungi, and viruses during the course of receiving medical care. |
| Intensive care unit | A nursing care area that provides intensive observation, diagnosis, and therapeutic procedures for adults and/or children who are critically ill. Also referred to as critical care unit. |
| Medical affiliation | Affiliation with a medical school. There are four categories*:*<br>*Major teaching* – Hospital is an important part of the teaching program of a medical school and the majority of medical students rotate through multiple clinical services.<br>*Graduat*e – Hospital used by the medical school for graduate training programs only (i.e., residency and/or fellowships).<br>*Limited* – Hospital used in the medical school's teaching program to a limited extent.<br>*No* – Hospital not affiliated with a medical school. |
| Patient days | A daily count of the number of patients in the patient care location during a specified time period. |
| Rate | Describes the speed with which disease or events occur. The number of diseases or events per unit of time. |
| Standardized infection ratio | A ratio of observed to expected (or predicted) numbers of events that is adjusted for selected risk factors. |
| Surgical site infection | Infection that occurs after surgery, in the part of the body where the surgery took place. |
| Umbilical catheter | Long, thin plastic tubes that travel from the stump of a newborn baby's umbilical cord into the large vessels near the heart |
| Urinary catheter | A drainage tube that is inserted into the urinary bladder through the urethra, is left in place, and is connected to a closed collection system. |
| Validity (data) | The extent to which reported cases of a disease or event correspond accurately to cases of a disease event that actually occurred. |

## APPENDIX B. Acronyms

| | |
|---|---|
| ACL | Adult Care Licensure |
| APIC-NC | Association for Professionals in Infection Control and Epidemiology, N.C. Chapter |
| ASA | American Society of Anesthesiologists |
| BSI | Bloodstream infection |
| CAUTI | Catheter-associated urinary tract infection |
| CCME | Carolinas Center for Medical Excellence |
| CCU | Critical care unit |
| CDB | Communicable Disease Branch |
| CDC | Centers for Disease Control and Prevention |
| *C. diff* | *Clostridium difficile* |
| CDI | *Clostridium difficile* infection |
| CI | Confidence interval |
| CMS | Centers for Medicare and Medicaid Services |
| CLABSI | Central line-associated bloodstream infections |
| CRE | Carbapenem-resistant Enterobacteriaceae |
| DHHS | Department of Health and Human Services |
| DHSR | Division of Health Services Regulation |
| DPH | Division of Public Health |
| ED | Emergency department |
| HAI | Healthcare-associated Infections |
| ICU | Intensive care unit |
| IPs | Infection preventionists |
| MRSA | Methicillin resistant *Staphylococcus aureus* |
| NCHA | North Carolina Hospital Association |
| N.C. SPICE | North Carolina Statewide Program for Infection Control and Epidemiology |
| NCQC | North Carolina Quality Center |
| NHLC | Nursing Home Licensure and Certification |
| NHSN | National Healthcare Safety Network |
| NICU | Neonatal intensive (critical) care unit |
| QIO | Quality improvement organization |
| SIR | Standardized infection ratio |
| SSI | Surgical site infection |
| VRE | Vancomycin-resistant *Enterococcus* |

## APPENDIX C. Healthcare-Associated Infections Prevention Tips

### Appendix C1. Catheter (Central Line)-Associated Bloodstream Infections

# FAQs
(frequently asked questions)

about
# "Catheter-Associated Bloodstream Infections"
(also known as "Central Line-Associated Bloodstream Infections")

*What is a catheter-associated bloodstream infection?*

A "central line" or "central catheter" is a tube that is placed into a patient's large vein, usually in the neck, chest, arm, or groin. The catheter is often used to draw blood, or give fluids or medications. It may be left in place for several weeks. A bloodstream infection can occur when bacteria or other germs travel down a "central line" and enter the blood. If you develop a catheter-associated bloodstream infection you may become ill with fevers and chills or the skin around the catheter may become sore and red.

*Can a catheter-related bloodstream infection be treated?*

A catheter-associated bloodstream infection is serious, but often can be successfully treated with antibiotics. The catheter might need to be removed if you develop an infection.

*What are some of the things that hospitals are doing to prevent catheter-associated bloodstream infections?*

To prevent catheter-associated bloodstream infections doctors and nurses will:

- Choose a vein where the catheter can be safely inserted and where the risk for infection is small.
- Clean their hands with soap and water or an alcohol-based hand rub before putting in the catheter.
- Wear a mask, cap, sterile gown, and sterile gloves when putting in the catheter to keep it sterile. The patient will be covered with a sterile sheet.
- Clean the patient's skin with an antiseptic cleanser before putting in the catheter.
- Clean their hands, wear gloves, and clean the catheter opening with an antiseptic solution before using the catheter to draw blood or give medications. Healthcare providers also clean their hands and wear gloves when changing the bandage that covers the area where the catheter enters the skin.
- Decide every day if the patient still needs to have the catheter. The catheter will be removed as soon as it is no longer needed.
- Carefully handle medications and fluids that are given through the catheter.

*What can I do to help prevent a catheter-associated bloodstream infection?*

- Ask your doctors and nurses to explain why you need the catheter and how long you will have it.
- Ask your doctors and nurses if they will be using all of the prevention methods discussed above.
- Make sure that all doctors and nurses caring for you clean their hands with soap and water or an alcohol-based hand rub before and after caring for you.

**If you do not see your providers clean their hands, please ask them to do so.**

- If the bandage comes off or becomes wet or dirty, tell your nurse or doctor immediately.
- Inform your nurse or doctor if the area around your catheter is sore or red.
- Do not let family and friends who visit touch the catheter or the tubing.
- Make sure family and friends clean their hands with soap and water or an alcohol-based hand rub before and after visiting you.

*What do I need to do when I go home from the hospital?*

Some patients are sent home from the hospital with a catheter in order to continue their treatment. If you go home with a catheter, your doctors and nurses will explain everything you need to know about taking care of your catheter.

- Make sure you understand how to care for the catheter before leaving the hospital. For example, ask for instructions on showering or bathing with the catheter and how to change the catheter dressing.
- Make sure you know who to contact if you have questions or problems after you get home.
- Make sure you wash your hands with soap and water or an alcohol-based hand rub before handling your catheter.
- Watch for the signs and symptoms of catheter-associated bloodstream infection, such as soreness or redness at the catheter site or fever, and call your healthcare provider immediately if any occur.

If you have additional questions, please ask your doctor or nurse.

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**Appendix C2. Catheter-Associated Urinary Tract Infections**

# FAQs
(frequently asked questions)

about
# "Catheter-Associated Urinary Tract Infection"

*What is "catheter-associated urinary tract infection"?*

A urinary tract infection (also called "UTI") is an infection in the urinary system, which includes the bladder (which stores the urine) and the kidneys (which filter the blood to make urine). Germs (for example, bacteria or yeasts) do not normally live in these areas; but if germs are introduced, an infection can occur.

If you have a urinary catheter, germs can travel along the catheter and cause an infection in your bladder or your kidney; in that case it is called a catheter-associated urinary tract infection (or "CA-UTI").

*What is a urinary catheter?*

A urinary catheter is a thin tube placed in the bladder to drain urine. Urine drains through the tube into a bag that collects the urine. A urinary catheter may be used:

- If you are not able to urinate on your own
- To measure the amount of urine that you make, for example, during intensive care
- During and after some types of surgery
- During some tests of the kidneys and bladder

People with urinary catheters have a much higher chance of getting a urinary tract infection than people who don't have a catheter.

*How do I get a catheter-associated urinary tract infection (CA-UTI)?*

If germs enter the urinary tract, they may cause an infection. Many of the germs that cause a catheter-associated urinary tract infection are common germs found in your intestines that do not usually cause an infection there. Germs can enter the urinary tract when the catheter is being put in or while the catheter remains in the bladder.

*What are the symptoms of a urinary tract infection?*

Some of the common symptoms of a urinary tract infection are:

- Burning or pain in the lower abdomen (that is, below the stomach)
- Fever
- Bloody urine may be a sign of infection, but is also caused by other problems
- Burning during urination or an increase in the frequency of urination after the catheter is removed.

Sometimes people with catheter-associated urinary tract infections do not have these symptoms of infection.

*Can catheter-associated urinary tract infections be treated?*

Yes, most catheter-associated urinary tract infections can be treated with antibiotics and removal or change of the catheter. Your doctor will determine which antibiotic is best for you.

*What are some of the things that hospitals are doing to prevent catheter-associated urinary tract infections?*

To prevent urinary tract infections, doctors and nurses take the following actions.

**Catheter insertion**

- Catheters are put in only when necessary and they are removed as soon as possible.
- Only properly trained persons insert catheters using sterile ("clean") technique.
- The skin in the area where the catheter will be inserted is cleaned before inserting the catheter.
- Other methods to drain the urine are sometimes used, such as
  - External catheters in men (these look like condoms and are placed over the penis rather than into the penis)
  - Putting a temporary catheter in to drain the urine and removing it right away. This is called intermittent urethral catheterization.

**Catheter care**

- Healthcare providers clean their hands by washing them with soap and water or using an alcohol-based hand rub before and after touching your catheter.

  If you do not see your providers clean their hands, please ask them to do so.
- Avoid disconnecting the catheter and drain tube. This helps to prevent germs from getting into the catheter tube.
- The catheter is secured to the leg to prevent pulling on the catheter.
- Avoid twisting or kinking the catheter.
- Keep the bag lower than the bladder to prevent urine from backflowing to the bladder.
- Empty the bag regularly. The drainage spout should not touch anything while emptying the bag.

*What can I do to help prevent catheter-associated urinary tract infections if I have a catheter?*

- Always clean your hands before and after doing catheter care.
- Always keep your urine bag below the level of your bladder.
- Do not tug or pull on the tubing.
- Do not twist or kink the catheter tubing.
- Ask your healthcare provider each day if you still need the catheter.

*What do I need to do when I go home from the hospital?*

- If you will be going home with a catheter, your doctor or nurse should explain everything you need to know about taking care of the catheter. Make sure you understand how to care for it before you leave the hospital.
- If you develop any of the symptoms of a urinary tract infection, such as burning or pain in the lower abdomen, fever, or an increase in the frequency of urination, contact your doctor or nurse immediately.
- Before you go home, make sure you know who to contact if you have questions or problems after you get home.

If you have questions, please ask your doctor or nurse.

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**Appendix C3. Surgical Site Infections**

# FAQs
(frequently asked questions)

about
## "Surgical Site Infections"

*What is a Surgical Site Infection (SSI)?*

A surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place. Most patients who have surgery do not develop an infection. However, infections develop in about 1 to 3 out of every 100 patients who have surgery.

Some of the common symptoms of a surgical site infection are:

- Redness and pain around the area where you had surgery
- Drainage of cloudy fluid from your surgical wound
- Fever

*Can SSIs be treated?*

Yes. Most surgical site infections can be treated with antibiotics. The antibiotic given to you depends on the bacteria (germs) causing the infection. Sometimes patients with SSIs also need another surgery to treat the infection.

*What are some of the things that hospitals are doing to prevent SSIs?*

To prevent SSIs, doctors, nurses, and other healthcare providers:

- Clean their hands and arms up to their elbows with an antiseptic agent just before the surgery.
- Clean their hands with soap and water or an alcohol-based hand rub before and after caring for each patient.
- May remove some of your hair immediately before your surgery using electric clippers if the hair is in the same area where the procedure will occur. They should not shave you with a razor.
- Wear special hair covers, masks, gowns, and gloves during surgery to keep the surgery area clean.
- Give you antibiotics before your surgery starts. In most cases, you should get antibiotics within 60 minutes before the surgery starts and the antibiotics should be stopped within 24 hours after surgery.
- Clean the skin at the site of your surgery with a special soap that kills germs.

*What can I do to help prevent SSIs?*

***Before your surgery:***

- Tell your doctor about other medical problems you may have. Health problems such as allergies, diabetes, and obesity could affect your surgery and your treatment.
- Quit smoking. Patients who smoke get more infections. Talk to your doctor about how you can quit before your surgery.
- Do not shave near where you will have surgery. Shaving with a razor can irritate your skin and make it easier to develop an infection.

***At the time of your surgery:***

- Speak up if someone tries to shave you with a razor before surgery. Ask why you need to be shaved and talk with your surgeon if you have any concerns.
- Ask if you will get antibiotics before surgery.

***After your surgery:***

- Make sure that your healthcare providers clean their hands before examining you, either with soap and water or an alcohol-based hand rub.

  If you do not see your providers clean their hands, please ask them to do so.

- Family and friends who visit you should not touch the surgical wound or dressings.
- Family and friends should clean their hands with soap and water or an alcohol-based hand rub before and after visiting you. If you do not see them clean their hands, ask them to clean their hands.

*What do I need to do when I go home from the hospital?*

- Before you go home, your doctor or nurse should explain everything you need to know about taking care of your wound. Make sure you understand how to care for your wound before you leave the hospital.
- Always clean your hands before and after caring for your wound.
- Before you go home, make sure you know who to contact if you have questions or problems after you get home.
- If you have any symptoms of an infection, such as redness and pain at the surgery site, drainage, or fever, call your doctor immediately.

If you have additional questions, please ask your doctor or nurse.

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**Appendix C4. Methicillin-Resistant *Staphylococcus aureus* LabID Events**

# FAQs
(frequently asked questions)

about

# "MRSA"
(Methicillin-Resistant *Staphylococcus aureus*)

*What is MRSA?*

*Staphylococcus aureus* (pronounced staff-ill-oh-KOK-us AW-ree-us), or *"Staph"* is a very common germ that about 1 out of every 3 people have on their skin or in their nose. This germ does not cause any problems for most people who have it on their skin. But sometimes it can cause serious infections such as skin or wound infections, pneumonia, or infections of the blood.

Antibiotics are given to kill Staph germs when they cause infections. Some *Staph* are resistant, meaning they cannot be killed by some antibiotics. *"Methicillin-resistant Staphylococcus aureus"* or "MRSA" is a type of *Staph* that is resistant to some of the antibiotics that are often used to treat *Staph* infections.

*Who is most likely to get an MRSA infection?*

In the hospital, people who are more likely to get an MRSA infection are people who:

- have other health conditions making them sick
- have been in the hospital or a nursing home
- have been treated with antibiotics.

People who are healthy and who have not been in the hospital or a nursing home can also get MRSA infections. These infections usually involve the skin. More information about this type of MRSA infection, known as "community-associated MRSA" infection, is available from the Centers for Disease Control and Prevention (CDC). http://www.cdc.gov/mrsa

*How do I get an MRSA infection?*

People who have MRSA germs on their skin or who are infected with MRSA may be able to spread the germ to other people. MRSA can be passed on to bed linens, bed rails, bathroom fixtures, and medical equipment. It can spread to other people on contaminated equipment and on the hands of doctors, nurses, other healthcare providers and visitors.

*Can MRSA infections be treated?*

Yes, there are antibiotics that can kill MRSA germs. Some patients with MRSA abscesses may need surgery to drain the infection. Your healthcare provider will determine which treatments are best for you.

*What are some of the things that hospitals are doing to prevent MRSA infections?*

To prevent MRSA infections, doctors, nurses, and other healthcare providers:

- **Clean their hands** with soap and water or an alcohol-based hand rub before and after caring for every patient.
- Carefully **clean hospital rooms and medical equipment.**
- Use **Contact Precautions** when caring for patients with MRSA. Contact Precautions mean:
  - Whenever possible, patients with MRSA will have a single room or will share a room only with someone else who also has MRSA.
  - Healthcare providers will put on gloves and wear a gown over their clothing while taking care of patients with MRSA.
  - Visitors may also be asked to wear a gown and gloves.
  - When leaving the room, hospital providers and visitors remove their gown and gloves and clean their hands.
  - Patients on Contact Precautions are asked to stay in their hospital rooms as much as possible. They should not go to common areas, such as the gift shop or cafeteria. They may go to other areas of the hospital for treatments and tests.
- **May test** some patients to see if they have MRSA on their skin. This test involves rubbing a cotton-tipped swab in the patient's nostrils or on the skin.

*What can I do to help prevent MRSA infections?*

**In the hospital**

- Make sure that all doctors, nurses, and other healthcare providers clean their hands with soap and water or an alcohol-based hand rub before and after caring for you.

If you do not see your providers clean their hands, please ask them to do so.

**When you go home**

- If you have wounds or an intravascular device (such as a catheter or dialysis port) make sure that you know how to take care of them.

*Can my friends and family get MRSA when they visit me?*

The chance of getting MRSA while visiting a person who has MRSA is very low. To decrease the chance of getting MRSA your family and friends should:

- Clean their hands before they enter your room and when they leave.
- Ask a healthcare provider if they need to wear protective gowns and gloves when they visit you.

*What do I need to do when I go home from the hospital?*

To prevent another MRSA infection and to prevent spreading MRSA to others:

- Keep taking any antibiotics prescribed by your doctor. Don't take half-doses or stop before you complete your prescribed course.
- Clean your hands often, especially before and after changing your wound dressing or bandage.
- People who live with you should clean their hands often as well.
- Keep any wounds clean and change bandages as instructed until healed.
- Avoid sharing personal items such as towels or razors.
- Wash and dry your clothes and bed linens in the warmest temperatures recommended on the labels.
- Tell your healthcare providers that you have MRSA. This includes home health nurses and aides, therapists, and personnel in doctors' offices.
- Your doctor may have more instructions for you.

If you have questions, please ask your doctor or nurse.

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**Appendix C5. *Clostridium difficile* LabID Events**

# FAQs
(frequently asked questions)

about

# "Clostridium Difficile"

*What is Clostridium difficile infection?*

*Clostridium difficile* [pronounced Klo-STRID-ee-um dif-uh-SEEL], also known as "*C. diff*" [See-dif], is a germ that can cause diarrhea. Most cases of *C. diff* infection occur in patients taking antibiotics. The most common symptoms of a *C. diff* infection include:

- Watery diarrhea
- Fever
- Loss of appetite
- Nausea
- Belly pain and tenderness

*Who is most likely to get C. diff infection?*

The elderly and people with certain medical problems have the greatest chance of getting *C. diff*. *C. diff* spores can live outside the human body for a very long time and may be found on things in the environment such as bed linens, bed rails, bathroom fixtures, and medical equipment. *C. diff* infection can spread from person-to-person on contaminated equipment and on the hands of doctors, nurses, other healthcare providers and visitors.

*Can C. diff infection be treated?*

Yes, there are antibiotics that can be used to treat *C. diff*. In some severe cases, a person might have to have surgery to remove the infected part of the intestines. This surgery is needed in only 1 or 2 out of every 100 persons with *C. diff*.

*What are some of the things that hospitals are doing to prevent C. diff infections?*

To prevent *C. diff*. infections, doctors, nurses, and other healthcare providers:

- Clean their hands with soap and water or an alcohol-based hand rub before and after caring for every patient. This can prevent *C. diff* and other germs from being passed from one patient to another on their hands.
- Carefully clean hospital rooms and medical equipment that have been used for patients with *C. diff*.
- Use Contact Precautions to prevent *C. diff* from spreading to other patients. Contact Precautions mean:
  - Whenever possible, patients with *C. diff* will have a single room or share a room only with someone else who also has *C. diff*.
  - Healthcare providers will put on gloves and wear a gown over their clothing while taking care of patients with *C. diff*.
  - Visitors may also be asked to wear a gown and gloves.
  - When leaving the room, hospital providers and visitors remove their gown and gloves and clean their hands.
  - Patients on Contact Precautions are asked to stay in their hospital rooms as much as possible. They should not go to common areas, such as the gift shop or cafeteria. They can go to other areas of the hospital for treatments and tests.
- Only give patients antibiotics when it is necessary.

*What can I do to help prevent C. diff infections?*

- Make sure that all doctors, nurses, and other healthcare providers clean their hands with soap and water or an alcohol-based hand rub before and after caring for you.

  If you do not see your providers clean their hands, please ask them to do so.

- Only take antibiotics as prescribed by your doctor.
- Be sure to clean your own hands often, especially after using the bathroom and before eating.

*Can my friends and family get C. diff when they visit me?*

*C. diff* infection usually does not occur in persons who are not taking antibiotics. Visitors are not likely to get *C. diff*. Still, to make it safer for visitors, they should:

- Clean their hands before they enter your room and as they leave your room
- Ask the nurse if they need to wear protective gowns and gloves when they visit you.

*What do I need to do when I go home from the hospital?*

Once you are back at home, you can return to your normal routine. Often, the diarrhea will be better or completely gone before you go home. This makes giving *C. diff* to other people much less likely. There are a few things you should do, however, to lower the chances of developing *C. diff* infection again or of spreading it to others.

- If you are given a prescription to treat *C. diff*, take the medicine exactly as prescribed by your doctor and pharmacist. Do not take half-doses or stop before you run out.
- Wash your hands often, especially after going to the bathroom and before preparing food.
- People who live with you should wash their hands often as well.
- If you develop more diarrhea after you get home, tell your doctor immediately.
- Your doctor may give you additional instructions.

If you have questions, please ask your doctor or nurse.

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SHEA The Society for Healthcare Epidemiology of America · IDSA · American Hospital Association · APIC Spreading Knowledge Preventing Infection · CDC Centers for Disease Control and Prevention · The Joint Commission

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**Appendix E. Healthcare Facility Groupings, 2015 National Healthcare Safety Network Annual Hospital Survey**

**Appendix E1 Healthcare Facility Group: Short-term Acute Care Hospitals**

| Hospital Group | Hospital Name | Number of Beds |
|---|---|---|
| 1-99 beds | Firsthealth Moore Regional Hospital - Hoke Campus | 8 |
| | Cherokee Indian Hospital | 18 |
| | North Carolina Specialty Hospital | 18 |
| | Wake Forest Baptist Health-Davie Medical Center | 20 |
| | Novant Health Medical Park Hospital | 22 |
| | Carolinas Healthcare System Anson | 30 |
| | Murphy Medical Center | 31 |
| | Person Memorial Hospital | 44 |
| | McDowell Hospital | 45 |
| | Martin General Hospital | 49 |
| | Johnston Health Clayton | 50 |
| | Annie Penn Hospital | 53 |
| | Kings Mountain Hospital | 59 |
| | Granville Medical Center | 62 |
| | Sandhills Regional Medical Center | 64 |
| | Vidant Duplin Hospital | 72 |
| | Caldwell Memorial Hospital | 72 |
| | Novant Health Brunswick Medical Center | 74 |
| | Firsthealth Moore Regional Hospital - Richmond Campus | 79 |
| | Novant Health Charlotte Orthopedic Hospital | 80 |
| | Vidant Beaufort Hospital | 81 |
| | Hugh Chatham Memorial Hospital | 81 |

| Hospital Group | Hospital Name | Number of Beds |
|---|---|---|
| | Columbus Regional Healthcare System | 81 |
| | Randolph Hospital | 85 |
| | Wake Forest Baptist Health-Lexington Medical Center | 85 |
| | Dlp - Harris Regional Hospital | 86 |
| | Vidant Roanoke Chowan Hospital | 90 |
| | Novant Health Huntersville Medical Center | 91 |
| | Sentara Albemarle Medical Center | 95 |
| 100-199 beds | Carolinas Medical Center-University | 100 |
| | Haywood Regional Medical Center | 100 |
| | Northern Hospital Of Surry County | 100 |
| | Carolinas Medical Center-Lincoln | 101 |
| | Morehead Memorial Hospital | 101 |
| | Halifax Regional Medical Center | 101 |
| | Maria Parham Medical Center | 102 |
| | Park Ridge Health | 103 |
| | Scotland Memorial Hospital | 106 |
| | Stanly Regional Medical Center | 109 |
| | Sampson Regional Medical Center | 116 |
| | Central Carolina Hospital | 116 |
| | ARHS-Watauga Medical Center | 117 |
| | Vidant Edgecombe Hospital | 117 |

| Hospital Group | Hospital Name | Number of Beds |
|---|---|---|
| | Lake Norman Regional Medical Center | 123 |
| | Rutherford Regional Medical Center | 125 |
| | Davis Regional Medical Center | 130 |
| | Wilkes Regional Medical Center | 130 |
| | Women's Hospital | 134 |
| | Carteret General Hospital | 135 |
| | Betsy Johnson Regional | 135 |
| | Pardee Hospital | 138 |
| | Lenoir Memorial Hospital | 138 |
| | Wilson Medical Center | 145 |
| | Novant Health Matthews Medical Center | 146 |
| | Duke Raleigh Hospital | 148 |
| | Novant Health Thomasville Medical Center | 149 |
| | Johnston Health | 149 |
| | Wesley Long Hospital | 150 |
| | Carolinas Medical Center-Mercy | 160 |
| | Onslow Memorial Hospital | 162 |
| | Carolinas Healthcare System Blue Ridge | 162 |
| | Frye Regional Medical Center | 170 |
| | WakeMed Cary Hospital | 176 |
| | Carolinas Medical Center-Union | 182 |
| | Catawba Valley Medical Center | 190 |
| | Cherry Hospital | 197 |
| | Iredell Memorial Hospital | 199 |
| 200-399 beds | Carolinas Medical Center-Pineville | 206 |
| | Nash Health Care Systems | 212 |
| | Duke Regional Hospital | 223 |

| Hospital Group | Hospital Name | Number of Beds |
|---|---|---|
| | Alamance Regional Medical Center | 238 |
| | Carolinas Healthcare System Cleveland | 241 |
| | Wayne Memorial Hospital | 242 |
| | Novant Health Rowan Medical Center | 268 |
| | Broughton Hospital | 297 |
| | High Point Regional Health System | 348 |
| | CarolinaEast Medical Center | 350 |
| | Southeastern Regional Medical Center | 351 |
| | FirstHealth Moore Regional Hospital | 374 |
| 400+ beds | Gaston Memorial Hospital | 402 |
| | Central Regional Hospital | 405 |
| | Moses Cone Hospital | 443 |
| | Carolinas Medical Center-Northeast | 457 |
| | Cape Fear Valley Health System | 602 |
| | WakeMed | 626 |
| | Rex Healthcare | 660 |
| | New Hanover Regional Medical Center | 673 |
| | Novant Health Presbyterian Medical Center | 677 |
| | Mission Hospital | 763 |
| | Novant Health Forsyth Medical Center | 972 |
| Primary Medical School Affiliation | Carolinas Medical Center | 880 |
| | Wake Forest University Baptist Medical Center | 885 |
| | UNC Health Care | 896 |
| | Vidant Medical Center | 909 |
| | Duke University Hospital | 1037 |

**Appendix E. Healthcare Facility Groupings, 2015 National Healthcare Safety Network Annual Hospital Survey**

**Appendix E2 Healthcare Facility Group: Long-term Acute Care Hospitals**

| Hospital Name |
|---|
| Carolinas Continuecare Hospital At Kings Mountain |
| Select Specialty Hospital-Greensboro |
| Select Specialty Hospital-Durham |
| Asheville Specialty Hospital |
| Carolinas Specialty Hospital |
| Select Specialty Hospital-Winston Salem |
| Lifecare Hospitals Of North Carolina |
| Highsmith Rainey Specialty Hospital |
| Kindred Hospital-Greensboro |

**Appendix E3 Healthcare Facility Group: Inpatient Rehabilitation Facilities**

| Hospital Name |
|---|
| Carolinas Rehabilitation Mount Holly |
| Carolinas Rehabilitation North East |
| CHS Pineville Rehabilitation |
| Carolinas Rehabilitation |
| CarePartners Health Services |