2020

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Healthcare-Associated Infections in North Carolina

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Overview of Healthcare-Associated Infections in North Carolina

The U.S. Centers for Disease Control and Prevention (CDC) estimates that healthcare-associated infections (HAIs) affect one in 31 hospitalized patients, culminating in approximately 687,000 infections and 72,000 deaths each year[1] as well as $28–$33 billion in excess costs.[2] In North Carolina, HAIs result in approximate direct costs to facilities ranging from $124 million to $348 million annually.[3] In 2020, 3,169 HAIs were reported by North Carolina acute care hospitals, resulting in more than $29.8 million* of excess cost.[4] These numbers likely underestimate the true burden of HAIs because they include only a subset of acute care hospitals and healthcare-associated infections. This report is intended to provide an understanding of the burden of healthcare-associated infections in North Carolina in 2020.

Click here for fast facts about HAIs in North Carolina.

HAIs are infections caused by a variety of organisms, including bacteria and fungi, acquired while receiving medical care. Hospitals are required to report specific types of HAIs to the North Carolina Department of Health and Human Serivces, Division of Public Health (NC DPH). This report focuses on five important types of HAIs that occurred while patients were hospitalized in Acute Care Hospitals from January 1, 2020 through December 31, 2020. 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 *Clostridioides difficile* (CDI)

The prevention of healthcare-associated infections is a public health priority in North Carolina and is a collaborative effort between the healthcare and public health communities. This report is a product of this collaboration and is 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 the North Carolina Division of Public Health (NC DPH). Report definitions are provided (Appendix A). The report is provided as a resource for healthcare providers and the general public to provide information about state HAI prevention progress. Consumers can use this information to learn more about HAIs, and to take ownership of their healthcare by asking infection prevention questions when coming into contact with healthcare facilities. Providers can use this report to compare statewide and hospital-specific progress to the national experience and to learn from best practices highlighted in our Stories of Success in Elimination.

The mission of the NC SHARPPS Program is to work in partnerships to prevent, detect, and respond to events and outbreaks of healthcare-associated and antimicrobial-resistant infections in North Carolina.

The SHARPPS Program has five key program areas to achieve this mission: 1) infrastructure; 2) surveillance, investigation, and response; 3) prevention, education, and training; 4) monitoring and evaluation; and 5) communication. The Program works to eliminate preventable infections in healthcare settings by:

1. Conducting statewide surveillance for selected HAIs;
2. Providing useful, unbiased information to healthcare 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.

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[1] Centers for Disease Control and Prevention. Healthcare Associated Infections (HAI) HAI Data Data Portal. Last reviewed January 2020. Available at https://www.cdc.gov/hai/data/portal/index.html

[2] 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.

[3] 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.

[4] APIC. APIC Cost of healthcare-associated Infections. May 2011 Available at https://apic.org/resources/cost-calculators. Accessed July 28, 2021.

*CLABSIs are not included in this cost estimate as APIC uses different criteria to measure these events. It is unclear how many CLABSIs meet that definition so they are left out of the cost calculation. This is true for the 2017, 2018 and 2019 reports as well and this will be true for future reports.

We welcome your feedback to improve the usefulness of future reports (nchai@dhhs.nc.gov).

For more information:

- For more information on HAIs and the NC SHARPPS Program, please visit https://epi.dph.ncdhhs.gov/cd/diseases/hai.html
- To review background information on HAI surveillance in North Carolina and details information on common statistics used: https://epi.dph.ncdhhs.gov/cd/hai/figures.html

Acknowledgements

We acknowledge the extensive time and effort that collective stakeholders across North Carolina daily put into infection prevention. We at NC DPH remain committed to our partners and dedicated to our common goal of patient safety.

The COVID-19 pandemic resulted in unprecedented challenges to the healthcare and public health infrastructure during 2020.The SHARPPS Program would like to thank and commend hospital infection preventionists across the state who worked tirelessly to protect the health and safety of both patients and staff in their institutions during the pandemic, all while continuing to perform their routine responsibilities including HAI surveillance. It is thanks to these dedicated individuals that the SHARPPS Program is able to present and analyze these HAI data for 2020 despite the impact of the pandemic. Hospital infection preventionists provided the data used to create this report and worked with their hospital colleagues to identify and reconcile any potential problems with the data. The recent progress and successes in fighting healthcare-associated infections would not have been possible without their continuing efforts, dedication and collaboration.

The SHARPPS Program would also like to recognize the contributions of the SHARPPS Advisory Group members listed in Appendix C. In particular, the Program is grateful for their ongoing guidance and feedback on the presentation and content of NC 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 Healthcare Association (NCHA), the North Carolina Statewide Program for Infection Control and Epidemiology (NC SPICE), the North Carolina Chapter of the Association for Professionals in Infection Control and Epidemiology (APIC), Alliant Quality, 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 2020

A. NC Surveillance for Healthcare Associated and Resistant Pathogens Patient Safety Program

Key accomplishments and activities of the North Carolina Surveillance for Healthcare-Associated and Resistant Pathogens Patient Safety (SHARPPS) Program in 2020 include the following:

- ***MDRO Investigation and Response:*** In 2020, the SHARPPS Program led or participated in 35 acute responses to MDROs statewide, including outbreaks and sentinel events (a single event initiating response) investigations. Of these responses, 34 were outbreaks in various types of healthcare settings both inpatient and outpatient.

- ***GAS and Legionellosis Investigation and Response:*** In 2020, the SHARPPS program led or participated in 22 acute responses for invasive Group A Streptococcus (GAS) and one sentinel investigation for Legionellosis in healthcare facilities. There were five invasive GAS outbreaks, all of which occurred in long-term care facilities.

- ***Program Infrastructure:*** The SHARPPS team consists of a program director, program manager, and two epidemiologists. The SHARPPS team continued to work to increase communication and outreach to our stakeholders and customers, publishing newsletters and infographics. Excluding COVID-19 related activities, the SHARPPS team has provided 11 educational sessions focusing on infection prevention and the role of public health, outbreak investigation and response, antimicrobial-resistant pathogens including Carbapenem Resistant Enterobacterales and *Candida auris*, and antimicrobial stewardship.

- ***One and Only Safe Injection Practices Campaign****:* A new One & Only Campaign webpage has been created that centralizes the campaign's suite of resources available to educate about the basics of injection safety. It features multi-media resources developed over the last 10 years that address injection safety and related topics such as insulin pens and drug diversion. The webpage also highlights campaign partners and members that have committed to amplifying injection safety messaging.

- ***Be Antibiotics Aware: Smart Use Best Care:*** The North Carolina Department of Health and Human Services celebrated Antibiotics Awareness Week by announcing nine winners of the "Be Antibiotics Aware: Smart Use, Best Care Campaign" poster contest on November 18. Students from grades K–12 statewide were invited to submit artwork regarding antibiotic awareness. We received the largest number of entries this year – 146! The "Be Antibiotics Aware: Smart Use, Best Care Campaign" is CDC's national educational effort to improve antibiotic prescribing among healthcare providers, educate the public about appropriate use of antibiotics, and combat antibiotic resistance. In 2014, North Carolina became an active member of the Campaign, further promoting a goal of the NC Department of Health and Human Services "to advance the health and well-being of North Carolinians utilizing the programmatic tools of our Department."

- ***Antimicrobial Resistance:*** Antimicrobial resistance is an urgent public health threat and remains a priority for the SHARPPS Program. The SHARPPS Program collaborates with the NC State Laboratory of Public Health (NC SLPH), the Centers for Disease Control and Prevention (CDC) Antibiotic Resistance Laboratory Network (ARLN) and Local Health Departments (LHDs) on Carbapenem-Resistant Enterobacterales (CRE) and *Candida auris* containment efforts. NC SLPH provides support for the identification of carbapenemase-producing CRE (CP-CRE) to facilities statewide. NC SLPH also recruited two acute care hospitals to participate in sentinel surveillance for carbapenem resistant *Acinetobacter* species in partnership with ARLN and one acute care hospital for *Candida* sentinel surveillance. ARLN funding provides infrastructure and laboratory capacity to screen for CRE and *C. auris*, and LHD staff provide onsite support for investigations. The most current MDRO toolkit created by SHARPPS team members can be found here: (https://epi.dph.ncdhhs.gov/cd/docs/MDROToolkit_080819.pdf).

- ***Antimicrobial Stewardship***: The STewardship of Antimicrobial Resources (STAR) Partners initiative launched July 2018. This tiered, recognition-based incentive program encourages antimicrobial stewardship program development and addresses activities related to antimicrobial resistance and surveillance. The initiative encourages facilities who attain the highest tier to partner as mentors to facilities with less advanced stewardship programs. So far, 19 acute care hospitals have enrolled; eight Champion facilities and 11 Advanced facilities. We plan to expand this initiative to include all healthcare settings in a stepwise fashion, with the initial expansion planned for long-term care. STAR Partners provides recognition through certificates, listing participating facilities on the NC SHARPPS website, receipt of the NC SHARPPS newsletter, as well as access to a mentorship program and educational offerings. For more information visit: https://epi.publichealth.nc.gov/cd/antibiotics/star_partners.html.

B. Healthcare-Associated Infections Partner Updates

North Carolina Statewide Program for Infection Control and Epidemiology (NC SPICE)

The NC Statewide Program for Infection Control and Epidemiology (SPICE) promotes prevention and control of healthcare-associated infections in North Carolina by providing evidence-based education and consultation across the healthcare spectrum. Activities for 2020 are summarized below.

Classroom Courses:

- In 2020, SPICE offered infection control courses targeting new infection preventionists (IPs) in long-term care settings via classroom and virtual webinar, training 657 healthcare professionals.

.0206 NC Administrative Code Requirement for Infection Control:

- 381 outpatient, dental and home health/hospice health care professionals completed the .0206 NC Infection Control Curriculum online.
- 1379 outpatient, dental and home health/hospice health care professionals completed the .0206 NC Infection Control Curriculum in a classroom/webinar setting.

Enhanced Education of Infection Prevention in Nursing Homes:

- Free modules (on-line) covering Antibiotic Resistant Bacteria, Isolation Precautions, Injection Safety, Environment, *Clostridioides difficile*, and UTIs. 5980 module completions.
- Coursera also houses these modules as a course. 3985 learners completed the course in 2020.

Phone and Email Consultations:

- SPICE provided 3154 infection control consultations by phone or email in 2020.

Special Projects:

- Through a contract with NC DHHS, SPICE
    - Hired three part-time and two full-time infection prevention specialists
    - Analyzed 404 infection control self-assessments from CMS certified nursing homes (92% of NC nursing homes), and identified 46 facilities which participated in on-site/virtual assessments.
    - Developed educational videos on Hand Hygiene and Personal Protective Equipment

- Served as a “force multiplier” providing consultation, outbreak response, and development of infection control guidance

In-Services/Presentations during 2020 by Evelyn Cook, SPICE Associate Director:

- July 14, 2020: APIC Podcast - “Advanced in years should not be advanced with tears: Infection Prevention and Control in LTCF”
- July 24, 2020: “Basics of Infection Control” Webinar for NCDHHS Strike Teams
- August 20, 2020: APIC Town Hall Part 2 - Managing COVID-19 in Long Term Care Facilities
- August 28, 2020: DHSR Surveyor (Mental Health Section) Coronavirus Disease - Information for DHSR Survey Team
- September 18, 2020: Southern Regional AHEC - “Before and After: Determining the Impact of SARS-CoV-2”
- October 5 & 6, 2020: Q&A Training Sessions with NCDHHS Regional Prevention Support Teams
- October 9, 2020: Infection Control in Home Health/Hospice Settings with Greensboro AHEC
- October 14, 2020: Webinar for Senior Living Assocation - "SARS-CoV-2: The Good, The Bad and The Ugly
- October 23, 2020: Southern Regional AHEC - "Aspesis- What is in a name?"
- December 2, 2020: NY Academy of Medicine Virtual Summit - "Impact of COVID-19 on Healthcare Personnel in Nursing Homes"
- December 10, 2020: National APIC Virtual Briefing - "Nursing Homes and Skilled Nursing Facilities in the Era of COVID-19”
- December 18, 2020: COVID-19 Update and Q&A webinar for DHSR

Alliant Quality, The Quality Innovation Network – Quality Improvement Organization (QIN-QIO) for Georgia and North Carolina

Alliant Quality serves as the QIN-QIO for North Carolina. Tools, resources, and educational opportunities are offered to nursing homes for infection control activities to include enrollment and reporting information into CDC’s National Healthcare Safety Network (NHSN). Monthly Shop Talk calls continue with additional information posted on the Alliant Quality website: https://www.alliantquality.org/topic/shop-talks/. Additionally, Shop Talk Shorts have been developed as quick references to guide providers through NHSN processes. All sessions are recorded and posted along with the presentations to allow providers access to information about how to complete various NHSN processes such as managing users. Other offerings have been the addition of Office Hour sessions for frequently asked questions when major changes have occurred such as additional reporting requirements. Nursing Home LAN (Learning and Action Network) events are offered monthly addressing not only infection control topics but others pertinent to nursing home quality measures. The recordings and presentations from these events are posted on the main Alliant website: www.alliantquality.org. At the direction of CMS, Alliant Quality continues to provide Technical Assistance to facilities identified with infection prevention deficiencies through Quality Improvement Methodologies via one-on-one calls, emails, and Webex conferencing.

North Carolina Healthcare Association and Foundation (NCHA and NCHF)

The North Carolina Healthcare Association (NCHA) and North Carolina Healthcare Foundation (NCHF) promote prevention and control of healthcare-associated infections and communicable diseases in North Carolina by providing services such as communications, convenings, education, learning collaboratives, coordination of resources, and advocacy for policy and legislation to support NC healthcare facilities. Below is a summary of several programs offered by NCHA/NCHF in 2020 related to prevention of communicable and healthcare-associated infections. This is a partial listing only. For more information, go to the NCHA and NCHF websites.

1. COVID-19 Prevention and Management Highlights
    a. COVID-19 Fill the Gap Response Fund: partnered with private philanthropy, corporate partners, and major gift donors to rapidly meet critical needs of organizations across North Carolina as they responded to the COVID-19 pandemic. The fund deployed resources to organizations working on the frontlines of the crisis to address emerging, acute, and long-term needs. The fund was designed to bolster and support the efforts of government and public health officials responding to all aspects of the outbreak in North Carolina.
    b. Feed the Soul Campaign: The NCHF COVID-19 Healthcare Hero Response Fund partnered with locally owned restaurants in communities across the state to provide meals to healthcare heroes who are on the front lines of caring for patients and communities. This effort nourished the bodies and souls of physicians, nurses and other healthcare heroes while also boosting local economies during a time of acute need.
    c. Digital PPE Partnership: NCHA Strategic Partners (NCHASP) mobilized to develop and execute this partnership in 2020. Following basic supplier vetting, which included asking for W-9's, NIOSH certifications, FDA certificates, pricing, and product specifications, NCHASP organized group buys through a hub-and-spoke model. Through collaborations with vendors and other partners, NCHASP was able to support hospitals and other healthcare organizations in locating and affording available, vetted PPE for the healthcare workforce.
    d. NC Hospital COVID-19 Preparedness Program: In April 2020, The NCHA, through the NCHF, was awarded funding from the US Department of Health and Human Services, Assistant Secretary for Preparedness and Response (ASPR) under the COVID-19 Hospital Preparedness Program (HPP). This funding is intended to support the urgent preparedness and response needs of hospitals, health systems, and healthcare workers on the front lines of the COVID-19 outbreak. NCHF awarded hospitals grant funds to focus on the following defined activities:

        - Quickly update and train staff to implement pandemic or emergency preparedness plans at the facility level to respond to COVID-19
        - Procure supplies and equipment in accordance with CDC guidelines, especially considering growing supply chain shortages
        - Rapidly ramp up infection control and triage training for healthcare professionals, especially in context of growing supply chain shortages
        - Retrofit separate areas to screen and treat large numbers of people with suspected COVID-19 infections, including isolation areas in or around hospital emergency departments to assess potentially large numbers of people under investigation for COVID-19 infection
        - Plan, train, and implement expanded telemedicine and telehealth capabilities to ensure that appropriate care can be provided to individuals in their homes or residential facilities when social distancing measures are used to reduce virus transmission
        - Increase the numbers of patient care beds to provide surge capacity using alternate care sites such as temporary hospitals that are deployed in a pandemic

        NCHF awarded $1.15 million to 25 Critical Access Hospitals (CAHs) and other small and rural hospitals under 50 beds (using the federal SHIP grant eligibility criteria) in early May 2020, and $2.78 million to an additional 21 hospitals and health systems in December 2020 – a total of $3.9 million to these facilities to support their COVID response. Grant awards and activities extend through 2021, and NCHF is working with these hospitals to monitor and assess progress and to identify promising practices that can be shared throughout the state.

        Under NCHF's cooperative agreement with ASPR, NCHF will also offer statewide healthcare environmental hygiene training and certification options for environmental service workers in health systems and non-acute settings. NCHF engaged the Association for the Healthcare Environment (AHE) in

late 2020 to explore their training programs and to draft a menu of potential offerings for North Carolina. Collaborations with state partners such as the NC Division of Public Health and the NC Statewide Program for Infection Control and Epidemiology also occurred to assess needs and to help finalize the menu of training and certification options. NCHF aims to launch a training program by the 3rd quarter of 2021.

e. **NCHA Pandemic Playbook**: NCHA's three Regional Policy Councils are collaborating on a playbook which will focus on key areas such as data collection, facility hardening, supply chain, etc. and with a focus on thematic elements while using hospital examples to illustrate how hospitals adapted to challenges during the COVID-19 epidemic. This playbook will serve as a resource guide for NC hospitals to further evolve emergency responses to pandemics.

2. The Eastern U.S. Quality Improvement Collaborative (EQIC): As part of the CMS Hospital Quality Improvement Contract, EQIC is a four-year initiative of the Healthcare Association of New York State, the North Carolina Healthcare Foundation, the Connecticut Hospital Association, Foundation for Health Communities/New Hampshire Hospital Association, Vermont Association of Hospitals and Health Systems, Vermont Program for Quality in Health Care, Inc., and the West Virginia Hospital Association. This program is focused on supporting critical access and rural hospitals in their journey to reach zero preventable harms. Healthcare-associated infections are one of the priorities of the program, with initial focus on CLABSI prevention. Twenty-one NC critical access and rural hospitals have joined EQIC, which began in September 2020.

3. The Quality Center Patient Safety Organization: As one of the first listed Patient Safety Organizations in the nation and the first in North Carolina, The Quality Center Patient Safety Organization (TQC PSO) exists to support its members in reducing all-cause, preventable harm, including healthcare-associated infections as well as prevention of communicable disease transmission. In 2020, TQC PSO began the journey to examine harm events reported to it by race/ethnicity to help further identify at-risk populations. PSO programming is continuing to encourage and support members in looking at process and outcomes data such as HAIs through a lens of equity as well. TQC PSO believes healthcare cannot be safe for everyone unless it is equitable.

II. Healthcare-Associated Infections Data

The SHARPPS HAI Annual Report for 2020 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. While not reflected in this Annual Report, data for these additional facility types are provided in Quarterly Reports, available here: http://epi.publichealth.nc.gov/cd/hai/figures.html.

A. WHAT IS THE PURPOSE OF THIS REPORT?

This report is provided to help patients who need inpatient medical treatment decide whether they should be concerned about healthcare-associated infections (HAIs) at the hospital they may choose. 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 *Clostridioides 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 NC DPH using a free, web-based software system called the National Healthcare Safety Network (NHSN). The CDC and the NC 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.

Hospitals are usually required to report their HAI data for each month by the end of the following calendar month. Due to the extraordinary burden placed on hospitals and hospital infection preventionists during the COVID-19 pandemic, HAI reporting deadlines for the first 3 quarters in 2020 were extended to the end of the third quarter of 2020. Facilities were required to report data for all months of 2020 and this report should reflect the complete burden of these HAIs in North Carolina during 2020.

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 North Carolina performed in terms of infection prevention by displaying how many HAIs they reported from January 1, 2020 through December 31, 2020. These infection counts alone do not show how well a facility or North Carolina is doing in preventing HAIs. Therefore, the report also presents a key measure used to determine HAI progress, the standardized infection ratio (SIR). **The SIR is the number used to represent how well a facility did in preventing HAIs compared to similar facilities using the national average (i.e., national experience).** When presenting SIRs, the report data tables and figures show whether North Carolina, a hospital-sized group, or location type had more HAIs ("worse"), fewer HAIs ("better"), or about the same number of HAIs ("same") compared to the national average based on previous years of reported data. The predicted value of the national average for each HAI is also called the "NHSN baseline". The SIR is considered a "best guess" or estimate of observed infections compared to the number of infections that would be predicted based on the NHSN baseline. The comparison made by the SIR between observed and predicted infections 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.

More information on how the SIR is calculated can be found here: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf.

SIRs are presented for the state overall and for each hospital size group; for some HAIs, SIR is also presented by location type (i.e., adult/pediatric units v. neonatal locations). The hospital size 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.

In 2015, NHSN updated the national baseline for all HAIs. The original national experience (NSHN baseline) was used in SHARPPS Program reports from 2012-2016. When calculating the SIR based on the original baseline, the way differences in facilities (such as types of patients and procedures, or facility size) were accounted for varied by both HAI type and facility type. Starting in 2017, NC SHARPPS began presenting SIRs calculated on the new NHSN baseline. All HAIs use data from 2015 to come up with their predicted baseline values and the 2015 baseline serves as the reference point for assessing progress. SIRs calculated under this baseline cannot be compared to SIRs calculated using the original baselines. You can read more about the change in baseline here.

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

a. WHAT DO THE NUMBERS MEAN?

This report shows how the state performed during a single year (2020) and compares each hospital's performance to the national average or baseline experience.

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, the 95% confidence interval, 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 if the difference between the observed and predicted infections is statistically significant.

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

b. ORGANISMS IDENTIFIED FROM HAIs

In NHSN, hospitals may report up to three organisms identified from one HAI. These organisms were categorized into one of 10 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 national leading causes of 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.

Excluded organisms: Some organisms are rarely associated with HAIs or not known to cause HAIs. These organisms may be the causes of community-associated infections. For this reason, NHSN excludes organisms from the following genera from reporting: *Blastomyces, Histoplasma, Coccidioides, Paracoccidioides, Cryptococcus*, and *Pneumocystis*. Additional organism exclusions specific to a HAI can be found in the patient safety manual (https://www.cdc.gov/nhsn/pdfs/validation/2020/pcsmanual_2020-508.pdf).

c. THINGS TO CONSIDER WHEN LOOKING AT THE REPORT

A total of 123 North Carolina hospitals reported HAIs in 2020, including 98 short-term acute-care hospitals, seven long-term acute-care hospitals, seven inpatient rehabilitation facilities, and 11 specialty hospitals. This report includes data from the 98 short-term acute-care hospitals. Facility-specific data for all of these hospital types can be found here: http://epi.publichealth.nc.gov/cd/hai/figures.html.

These reports cover data from January 1, 2020 through Decemnber 31, 2020. Data were downloaded from the National Healthcare Safety Network (NHSN) on May 3, 2020; 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. **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 additional data validation is completed, numbers should be interpreted with caution.

2. **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.

3. **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.

4. **The North Carolina SHARPPS Program chose not to present some data** 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.

5. **The North Carolina SHARPPS Program does not calculate an SIR when the number of predicted infections is less than one**. 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; 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 for calculating an SIR. In other words, there is not enough information to make a reliable conclusion about performance on this measure.

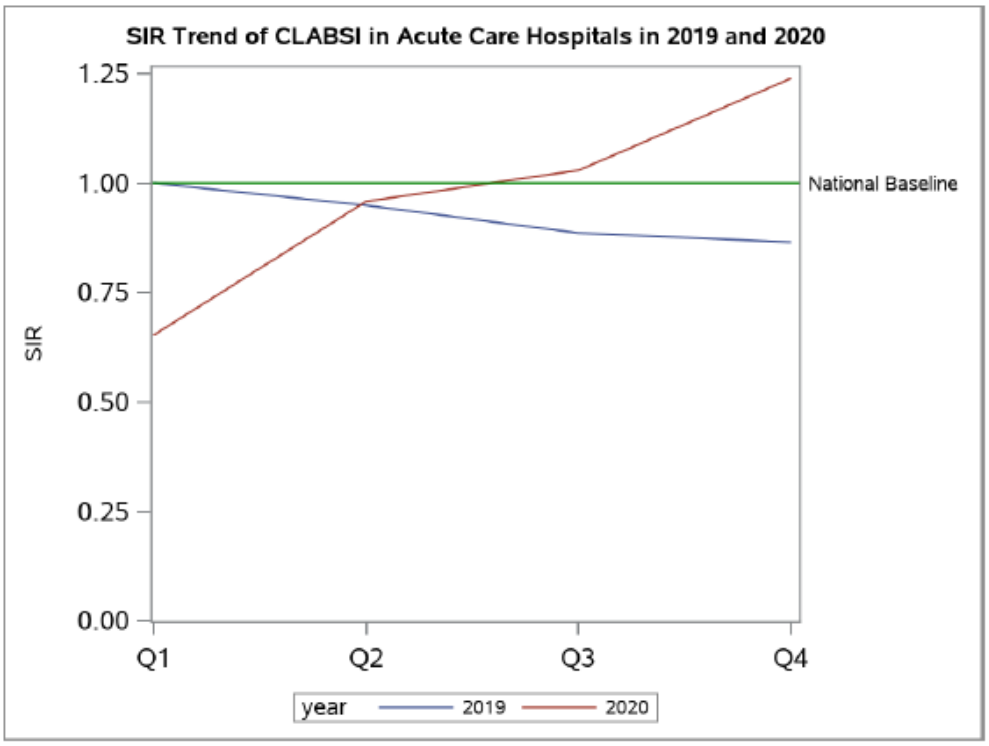
6. **Laboratory-Identified Events (LabID Events):** *Clostridioides difficile* infections (CDI) and methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia (blood infection) LabID events rely on laboratory data. Patients did not have to be ill to have a positive result, and a positive result can be determined without requiring clinical information about the patient. 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 methodologies, particularly for CDI may vary. NHSN makes risk adjustments to account for these differences when calculating SIRs for LabID CDI events.

As of 2018 Q1, CDI events will be risk adjusted for the last test performed if multiple tests were used. For example, if 'NAAT plus EIA, if NAAT positive' was performed, the event will be risk adjusted for EIA. More information can be found in the Guide to the SIR (https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf).

D. HEALTHCARE-ASSOCIATED INFECTIONS TRENDS FOR 2019 AND 2020

For all types of HAIs, there were some months/quarters that performed BETTER than the national experience. North Carolina facilities strive to bring the SIR down to below the national baseline and this effort is reflected in the data. See below for how the SIR tracks across the year for 2019 and 2020.

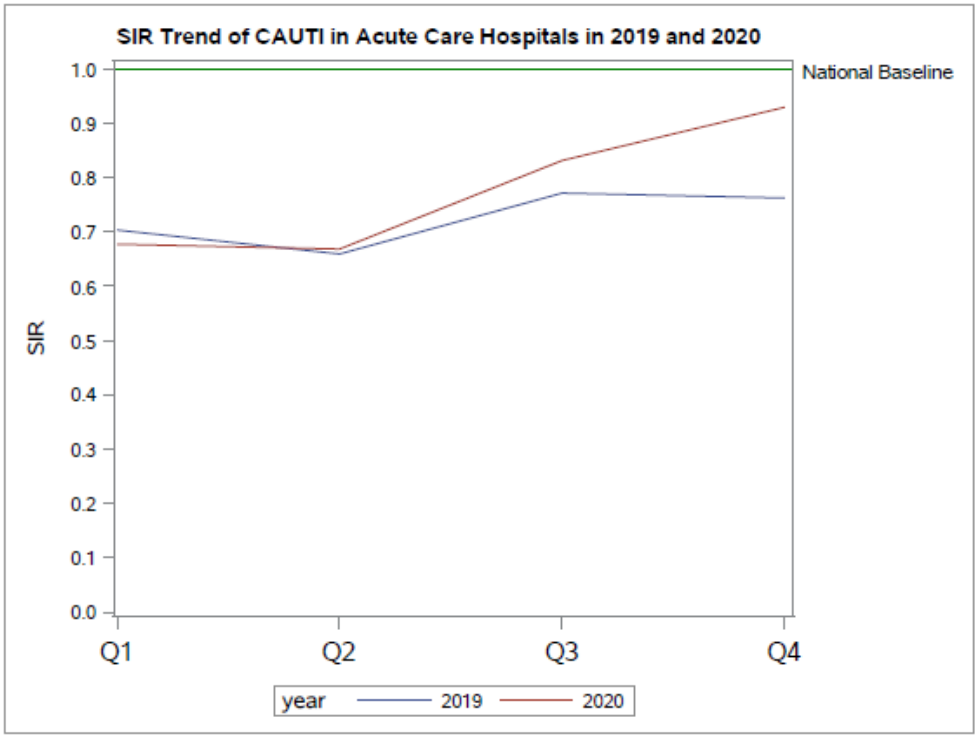
Figure 1:



Interpreting Figure 1:

- All quarters in 2019 and 2020Q2-3 experienced the same number of CLABSIs as predicted, performing the SAME as the national experience
- 2020Q1 experienced fewer CLABSIs than predicted, performing BETTER than the national experience
- 2020Q4 experienced more CLABSIs than predicted, performing WORSE than the national experience

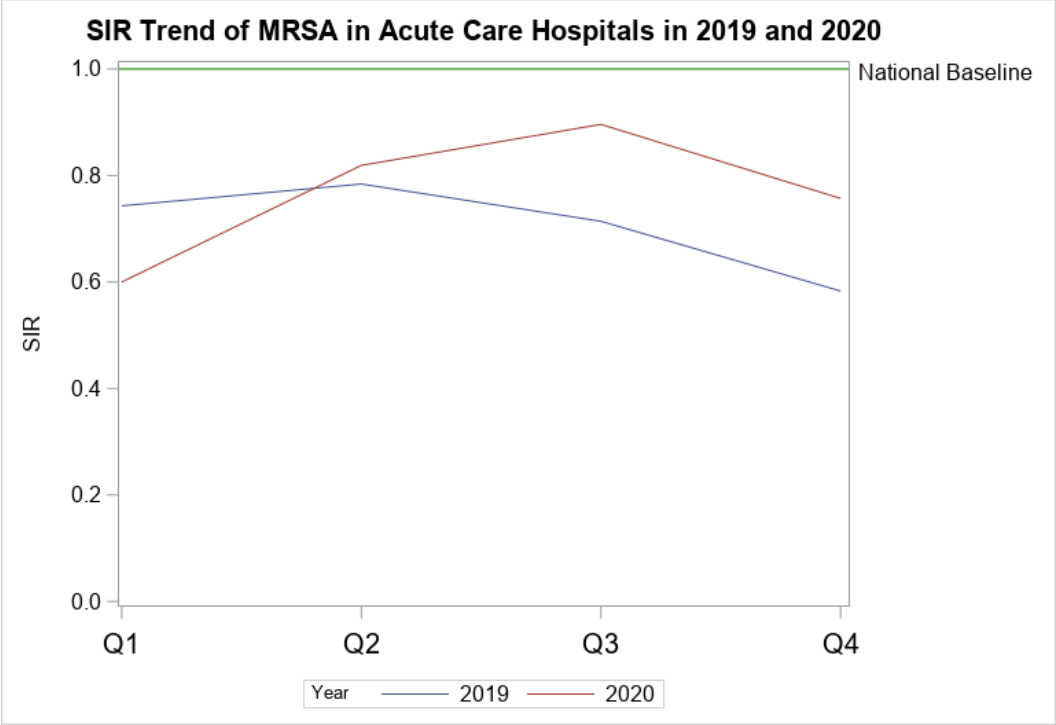
Figure 2:



Interpreting Figure 2:

- All quarters except 2020Q4 experienced fewer CAUTIs than predicted, performing BETTER than the national experience
- 2020Q4 experienced the same number of CAUTIs as predicted, performing the SAME as the national experience

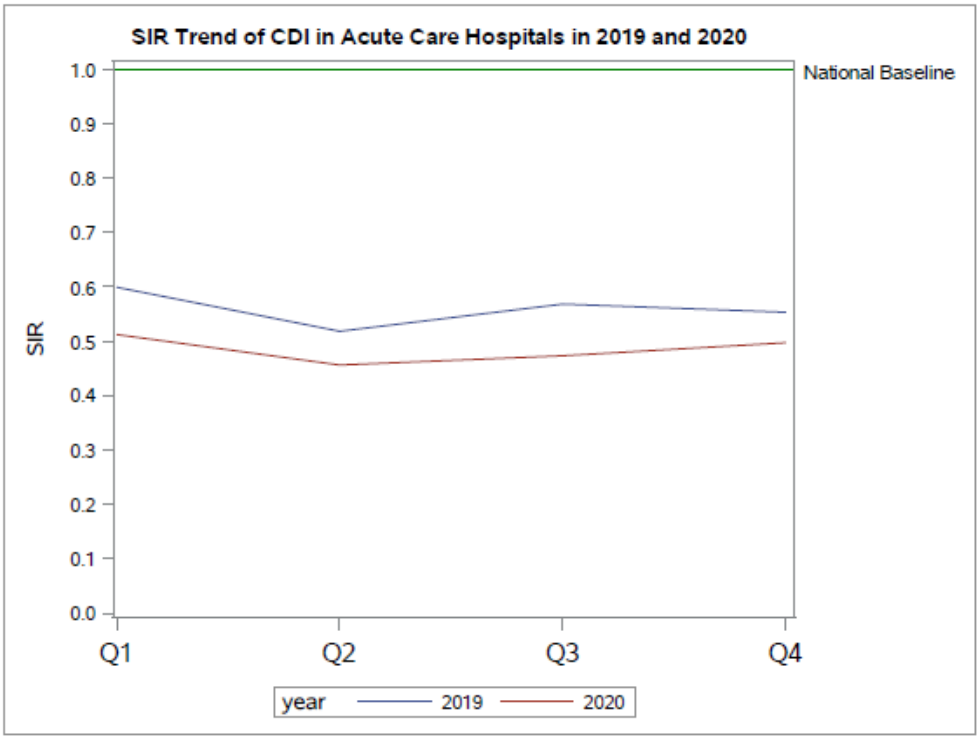
Figure 3:



Interpreting Figure 3:

- All quarters in 2019 and 2020Q1 and 2020Q4 experienced fewer MRSA LabID Events than predicted, performing BETTER than the national experience
- 2020Q2 and 2020Q3 experienced the same number of MRSA LabID Events as predicted, performing the SAME as the national experience

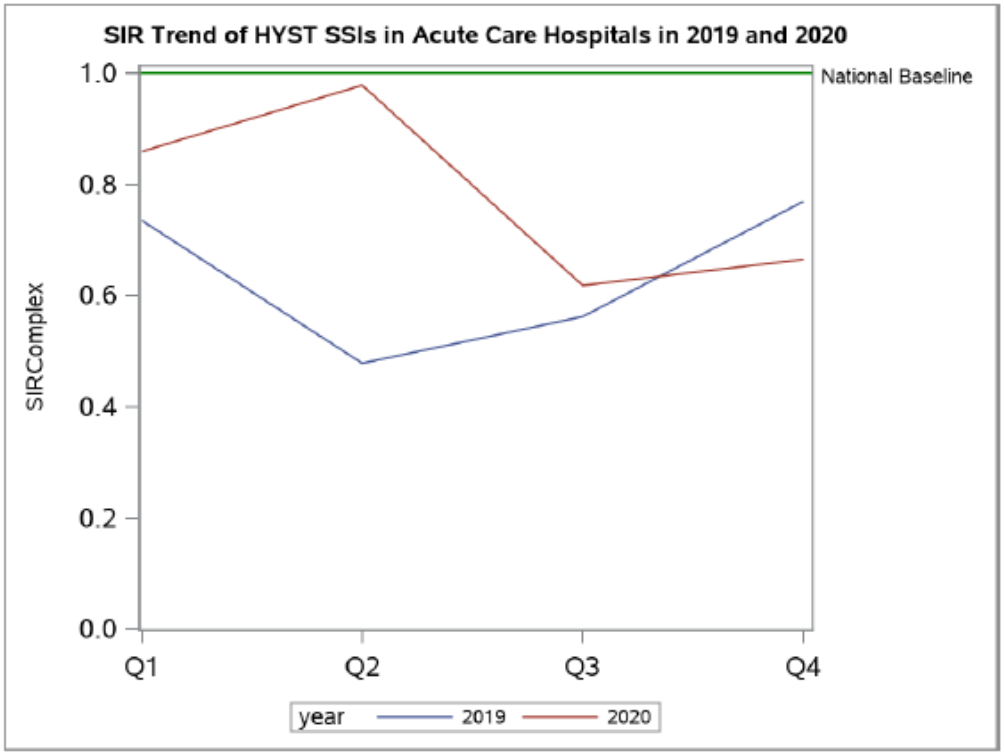
Figure 4:



Interpreting Figure 4:

- All Quarters had fewer than predicted CDI LabID events, performing BETTER than the national experience

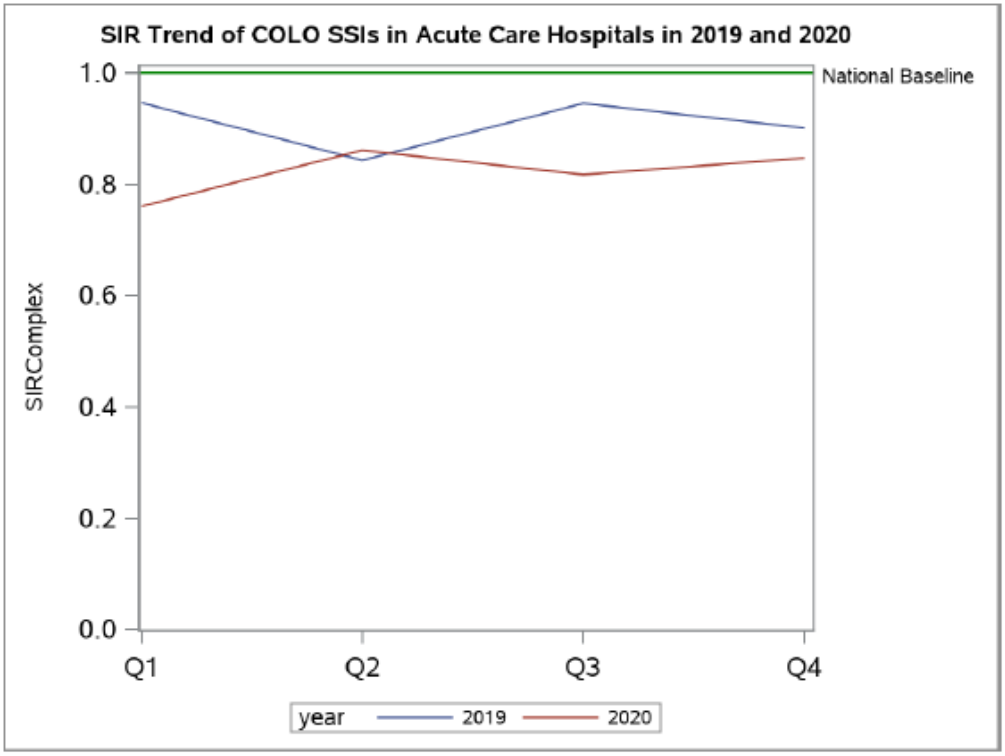
Figure 5:



Interpreting Figure 5:

- All quarters in 2020 and 2019Q1 and 2019Q4 experienced the same number of SSIs associated with a HYST procedure as predicted, performing the SAME as the national experience
- 2019Q2 and 2019Q3 experienced fewer SSIs associated with a HYST procedure than predicted, performing BETTER than the national experience

Figure 6:



Interpreting Figure 6:

- All quarters except 2020Q1 experienced the same number of SSIs associated with a COLO procedure as predicted, performing the SAME as the national experience
- 2020Q1 experienced fewer SSIs associated with a COLO procedure than predicted, performing BETTER than the national experience

III. Statewide Healthcare-Associated Infections

A. Central Line-Associated Bloodstream Infections (CLABSI)

1. CLABSI in Adult/Pediatric ICUs

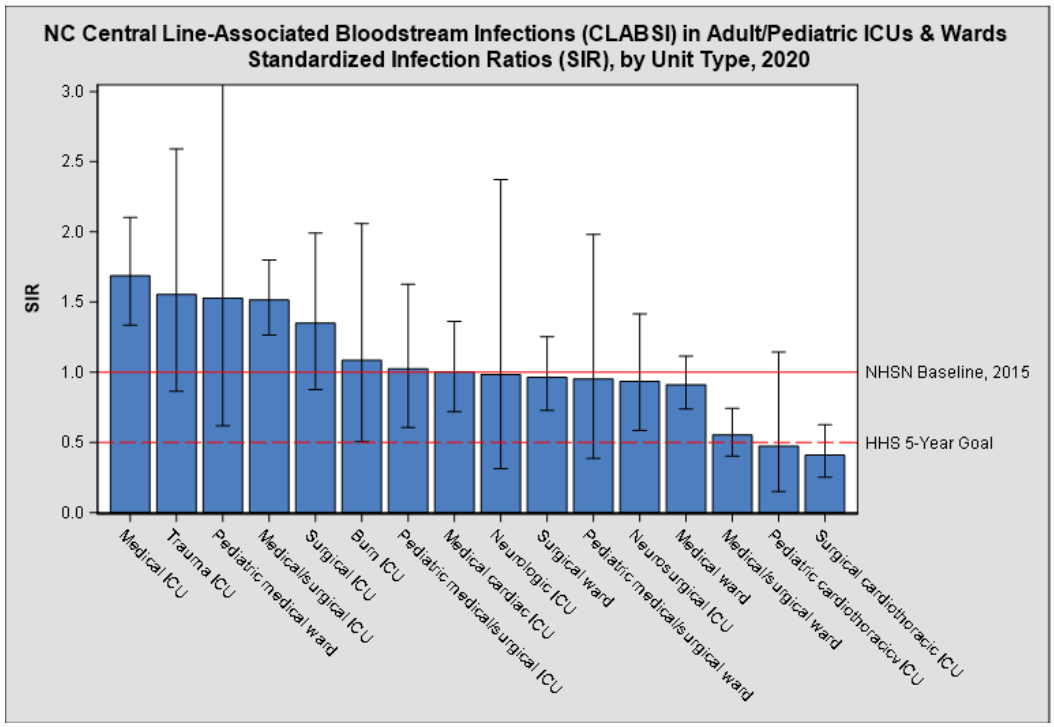
North Carolina 2020 CLABSI Highlights in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards & ICUs

- North Carolina hospitals reported 541 infections, compared to the 531.8 infections predicted by the national experience; this was about the same as the 2015 national experience.
- In 2020, North Carolina did not meet the U.S. Department of Health and Human Services 2020 goal to reduce CLABSIs by 50% from the 2015 national baseline experience.
- The most commonly identified organisms from adult and pediatric CLABSI patients were *Candida* and other yeasts/fungi followed by coagulase-negative *Staphylococcus*.

Table 1. NC Central Line Associated Bloodstream Infections (CLABSI) in Adult/Pediatric Medical, Surgical and Medical/Surgical Wards & ICUs, 2020

Year	# Observed Infections	# Predicted Infections	How Does North Carolina Compare to the National Experience?
2020	541	531.87	= SAME: about the same number of infections as were predicted (same as the national experience)

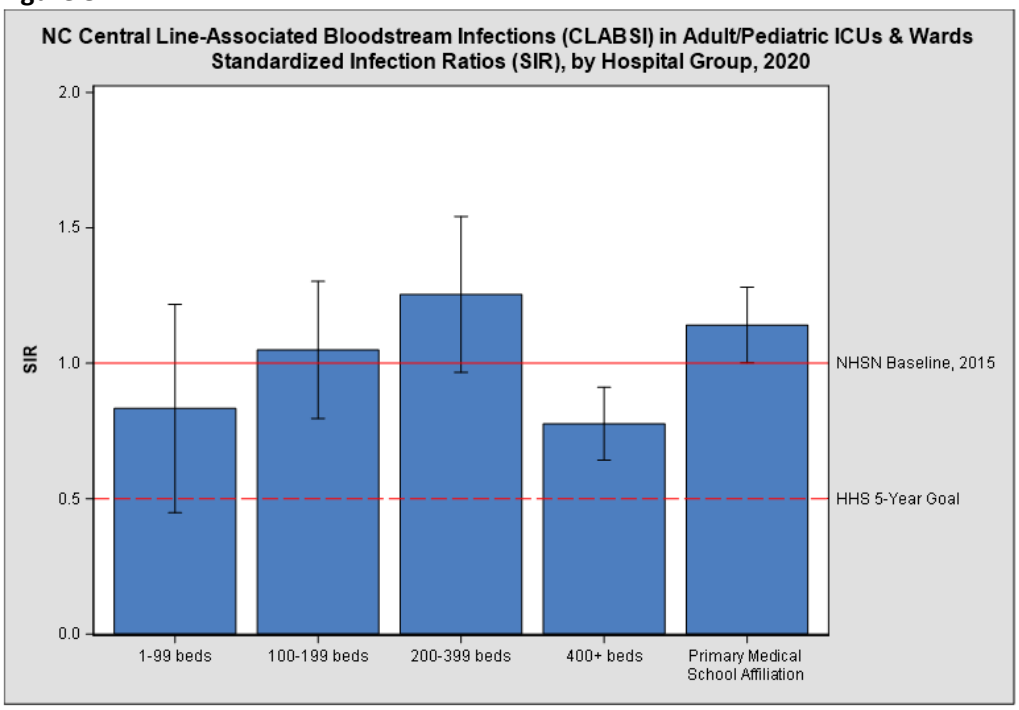
Figure 7.



Interpreting Figure 7:

- In 2020, medical surgical wards and surgical cardiothoracic ICUs reported fewer infections than predicted, performing BETTER than the national experience
- In 2020, medical ICUs and Medical/Surgical ICUs reported more infections than predicted, performing WORSE than the national experience
- All other locations experienced the same number of CLABSIs as predicted

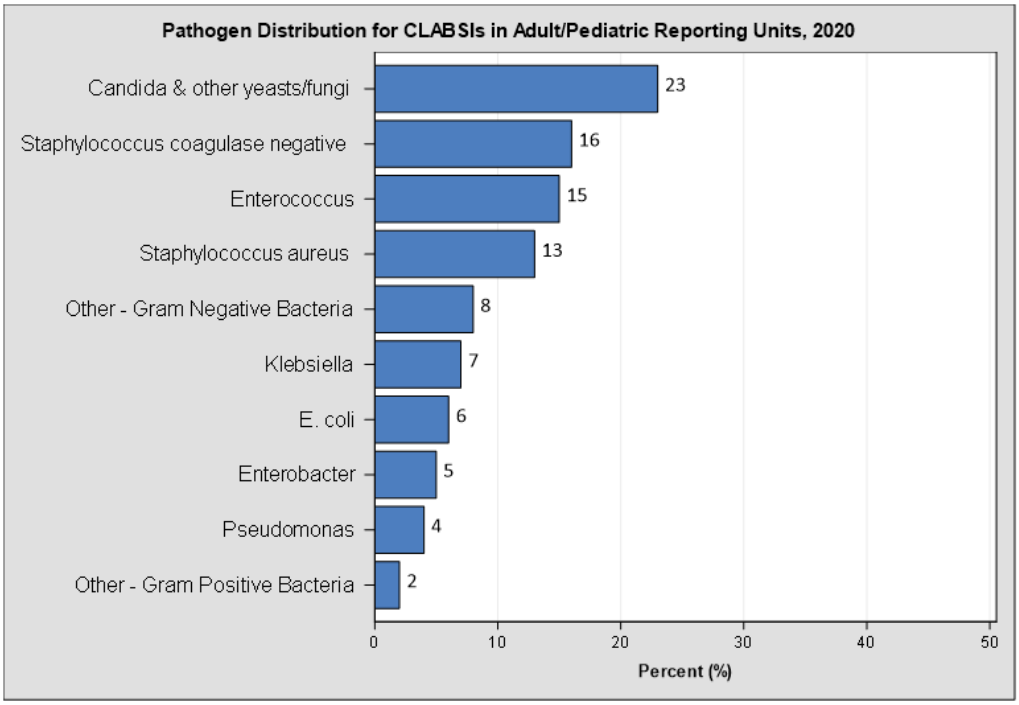
Figure 8.



Interpreting Figure 8:

- In 2020, hospitals with 400+ beds observed fewer CLABSIs than predicted, performing BETTER than the national experience
- All other hospitals observed about the same number of CLABSIs as predicted, performing the SAME as the national experience

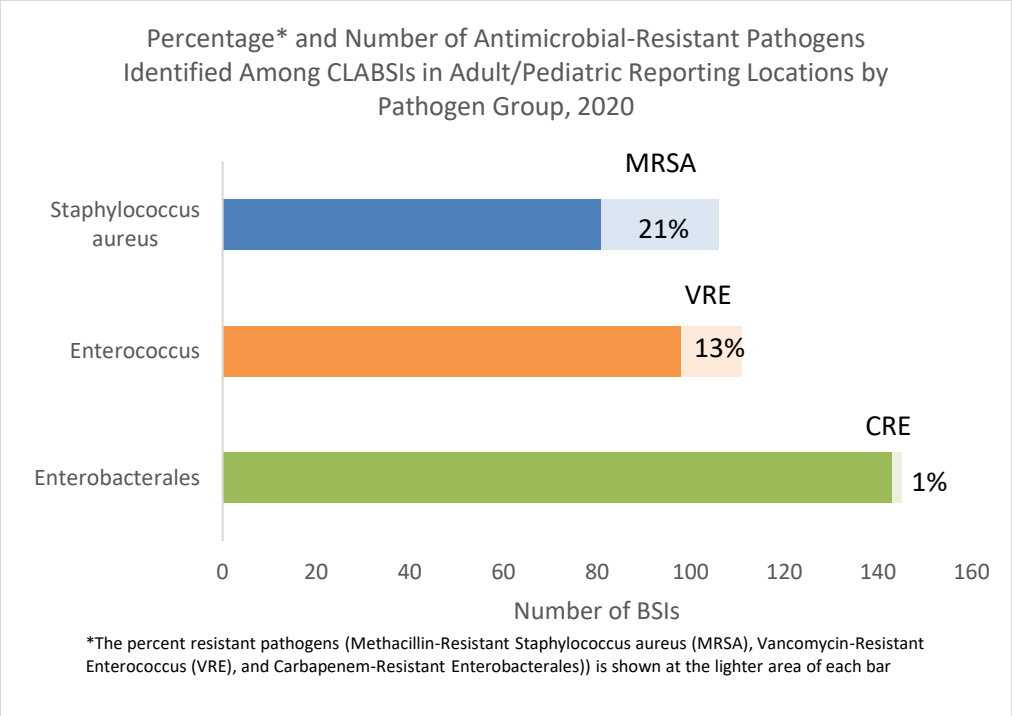
Figure 9.



Interpreting Figure 9:

- In 2020, The most commonly identified organisms from adult and pediatric CLABSI patients were *Candida* & other yeasts/fungi (23%) followed by coagulase negative *Staphylococcus* (16%)

Figure 10.



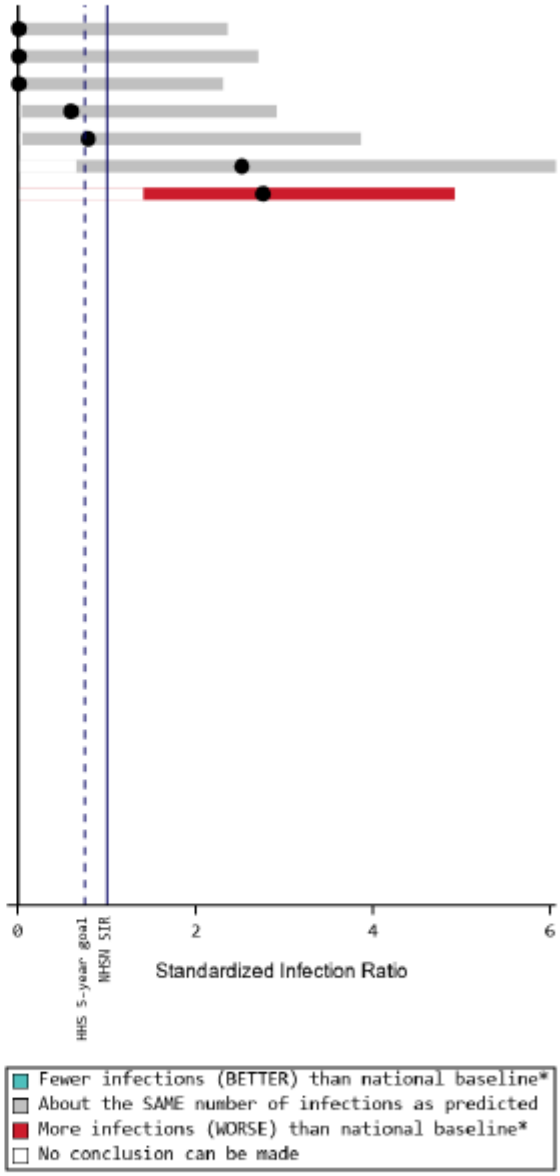
Interpreting Figure 10:

- In 2020, 21% of *Staphylococcus aureus* identified among adult/pediatric CLABSIs were resistant to methicillin.
- 13% of *Enterococcus* identified among adult/pediatric CLABSIs were resistant to vancomycin.
- The percentage of *Enterobacterales* identified among adult/pediatric CLABSIs resistant to carbapenems is low (1%).

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, 2020
Hospital Group: Hospitals with less than 100 Beds

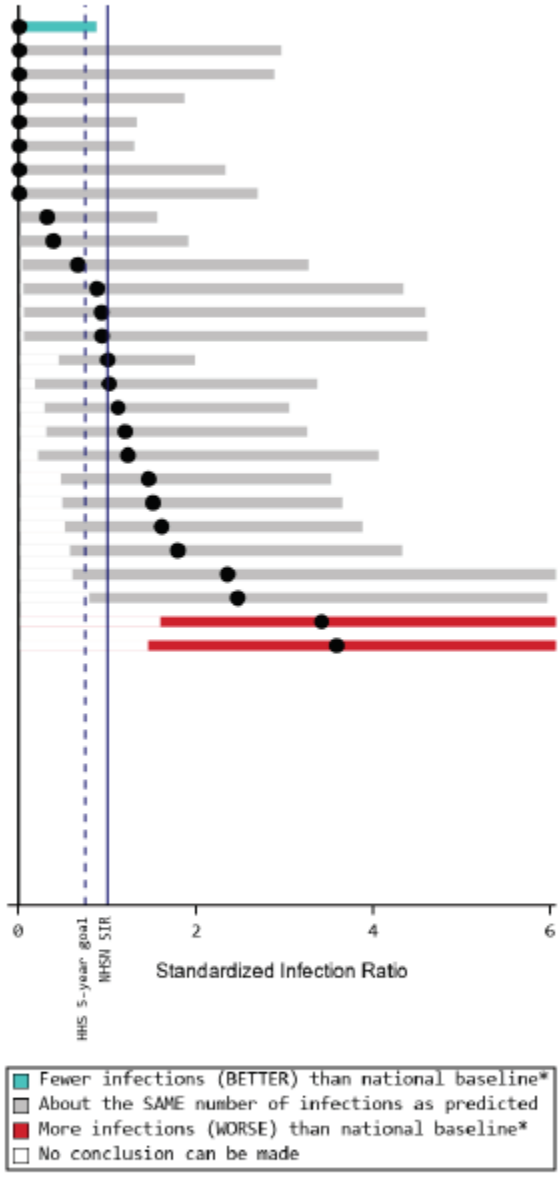
HOSPITAL INTERVAL	OBS	PRED	CLdays	SIR
Dlp - Harris Regional Hospital	0	1.3	2037	0.0
Central Carolina Hospital	0	1.1	1806	0.0
Betsy Johnson Hospital	0	1.3	1835	0.0
Maria Parham Medical Center	1	1.7	2415	0.6
Columbus Regional Healthcare System	1	1.3	2068	0.8
Wake Forest Baptist Health-Lexington	3	1.2	1522	2.5
Catawba Valley Medical Center	10	3.6	5796	2.8
McDowell Hospital	1	0.3	560	NC
Cherokee Indian Hospital	0	0.2	319	NC
Martin General Hospital	0	0.4	578	NC
Randolph Hospital Dba Randolph Health	0	0.2	367	NC
Vidant Beaufort Hospital	1	0.8	1324	NC
Granville Medical Center	0	0.6	1059	NC
Carteret General Hospital	0	0.5	881	NC
Novant Health Brunswick Medical Center	0	0.6	1024	NC
Vidant Duplin Hospital	0	0.8	1006	NC
Kings Mountain Hospital	0	0.1	231	NC
Person Memorial Hospital	0	0.3	417	NC
Novant Health Medical Park Hospital	0	0.3	414	NC
Carolinas Healthcare System Anson	NA	NA	N	NC
Annie Penn Hospital	0	0.7	1195	NC
North Carolina Specialty Hospital	0	0.0	70	NC
Wake Forest Baptist Health-Davie Medical	0	0.5	785	NC
Johnston Health Clayton	0	0.3	453	NC
Firsthealth Moore Regional-Hoke	0	0.0	56	NC
Firsthealth Moore Regional-Richmond	1	0.4	590	NC
Cape Fear Valley Hoke Hospital	0	0.1	155	NC
Novant Health Kernersville Medical Cente	0	0.8	1034	NC
Wakemed North Family Health & Women's Ho	0	0.1	116	NC
Central Harnett Hospital	0	0.5	631	NC
Novant Health Clemmons Medical Center	0	0.1	113	NC
Novant Health Mint Hill Medical Center	0	0.5	823	NC



Data reported as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
CLdays = # Central Line Days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 central line days
NC = SIR not calculated for hospitals with <1 predicted infection
N = < 50 Central Line Days reported
*Significantly different than 2015 national baseline

CLABSI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 100 to 199 Beds

HOSPITAL INTERVAL	OBS	PRED	CLdays	SIR
Vidant Edgecombe Hospital	0	3.4	3828	0.0
Rutherford Regional Medical Center	0	1.0	1470	0.0
Haywood Regional Medical Center	0	1.0	1141	0.0
Vidant Roanoke Chowan Hospital	0	1.6	1781	0.0
Johnston Health	0	2.3	2954	0.0
Novant Health Huntersville	0	2.3	2668	0.0
Wake Forest Baptist Health Wilkes Medica	0	1.3	1857	0.0
Cone Green Valley	0	1.1	1475	0.0
Caldwell Memorial Hospital	1	3.2	4620	0.3
Novant Health Matthews Medical Center	1	2.6	3747	0.4
Carolinas Healthcare System Blue Ridge	1	1.5	1678	0.7
Sentara Albemarle Medical Center	1	1.1	1550	0.9
Atrium Health Lincoln	1	1.1	1570	0.9
Onslow Memorial Hospital	1	1.1	1420	0.9
Duke Raleigh Hospital	7	7.0	7929	1.0
Wesley Long Hospital	2	2.0	2712	1.0
Nash Health Care Systems	3	2.7	3838	1.1
Iredell Memorial Hospital	3	2.5	3499	1.2
Atrium Health University City	2	1.6	2000	1.2
Atrium-Mercy	4	2.7	3433	1.5
Atrium-Union	4	2.6	3748	1.5
Frye Regional Medical Center	4	2.5	3458	1.6
Lenoir Memorial Hospital	4	2.2	3259	1.8
Lake Norman Regional Medical Center	3	1.3	1837	2.4
Halifax Regional Medical Center	4	1.6	2393	2.5
WakeMed Cary Hospital	8	2.3	3411	3.4
Pardee Hospital	6	1.7	2106	3.6
Advent Health Hendersonville	0	0.4	609	NC
ARHS-Watauga Medical Center	1	0.5	550	NC
Davis Regional Medical Center	1	0.3	434	NC
Novant Health Thomasville Medical Center	0	0.9	1101	NC
Sampson Regional Medical Center	0	0.4	449	NC
Northern Regional Hospital	0	0.6	813	NC
Scotland Memorial Hospital	2	0.6	888	NC
Wilson Medical Center	1	0.4	571	NC
Atrium Health Stanly	1	0.6	919	NC
UNC Rockingham Health	0	0.7	1062	NC



Data reported as of May 3, 2020 .
OBS = # infections observed
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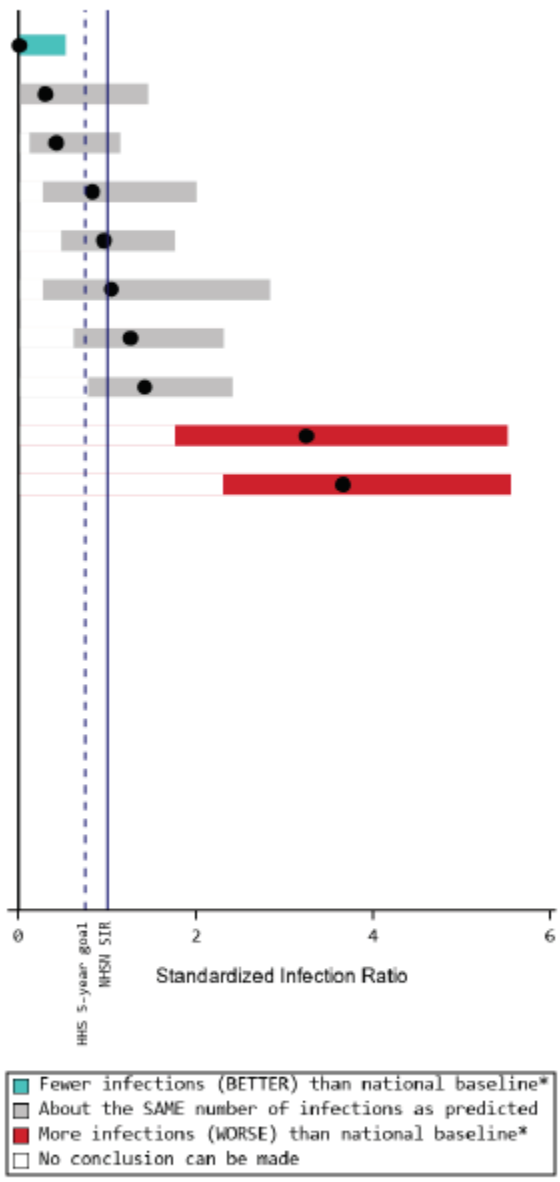
CLdays = # Central Line Days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 central line days
NC = SIR not calculated for hospitals with <1 predicted infection
N = < 50 Central Line Days reported
*Significantly different than 2015 national baseline

CLABSI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 200 to 399 Beds

HOSPITAL INTERVAL	OBS	PRED	CLdays	SIR
CarolinaEast Medical Center	0	5.8	7242	0.0
Alamance Regional Medical Center	1	3.4	3238	0.3
Duke Regional Hospital	3	7.2	7944	0.4
Atrium-Pineville	4	4.8	5169	0.8
High Point Regional Health System	9	9.4	9103	1.0
Novant Health Rowan Medical Center	3	2.9	3580	1.0
Wayne Memorial Hospital	9	7.2	7717	1.3
FirstHealth Moore Regional Hospital	12	8.5	10650	1.4
Carolinas Healthcare System Cleveland	12	3.7	4482	3.2
Southeastern Regional Medical Center	20	5.5	5883	3.7

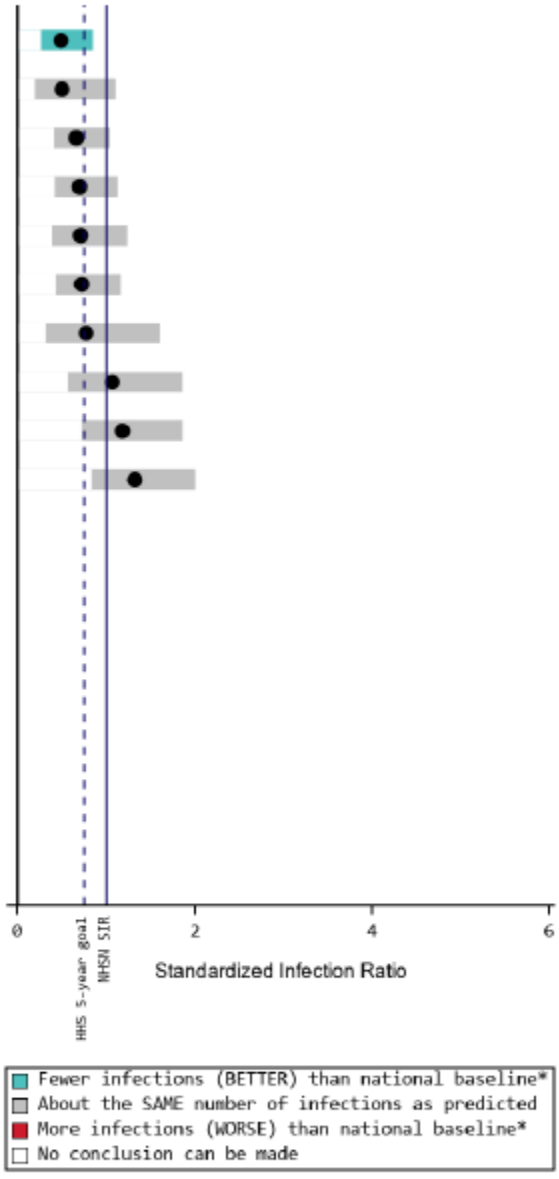


Data reported as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
CLdays = # Central Line Days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 central line days
NC = SIR not calculated for hospitals with <1 predicted infection
N = < 50 Central Line Days reported
*Significantly different than 2015 national baseline

CLABSI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 400 or More Beds

HOSPITAL INTERVAL	OBS	PRED	CLdays	SIR
Rex Healthcare	11	22.8	21897	0.5
Gaston Memorial Hospital	5	10.1	9512	0.5
Mission Hospital	17	25.9	24461	0.7
New Hanover Regional Medical Center	15	21.6	20539	0.7
Moses Cone Hospital	11	15.6	14632	0.7
Novant Health Forsyth Medical Center	15	20.9	19252	0.7
Novant Health Presbyterian Medical	6	7.8	7091	0.8
Atrium Health Cabarrus	11	10.4	11196	1.1
Cape Fear Valley Health System	17	14.4	13397	1.2
WakeMed	20	15.2	13675	1.3

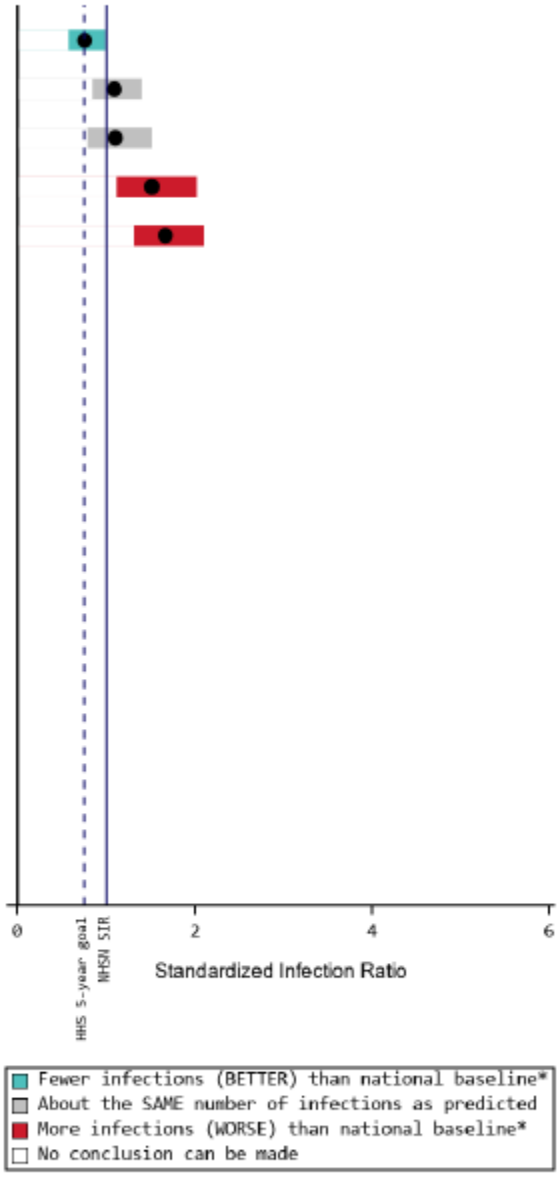
SIR AND 95% CONFIDENCE
COMPARED TO 2015 NATIONAL BASELINE



Data reported as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
CLdays = # Central Line Days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 central line days
NC = SIR not calculated for hospitals with <1 predicted infection
N = < 50 Central Line Days reported
*Significantly different than 2015 national baseline

CLABSI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with Primary Medical School Affiliation

HOSPITAL INTERVAL	OBS	PRED	CLdays	SIR
Duke University Hospital	52	69.4	64210	0.7
UNC Health Care	59	54.3	45696	1.1
Carolinas Medical Center	35	31.9	30738	1.1
Wake Forest University Baptist Medical	43	28.5	26331	1.5
Vidant Medical Center	67	40.3	37835	1.7



Data reported as of May 3, 2020 .
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CLdays = # Central Line Days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 central line days
NC = SIR not calculated for hospitals with <1 predicted infection
N = < 50 Central Line Days reported
*Significantly different than 2015 national baseline

2. CLABSI in Neonatal Intensive Care Units

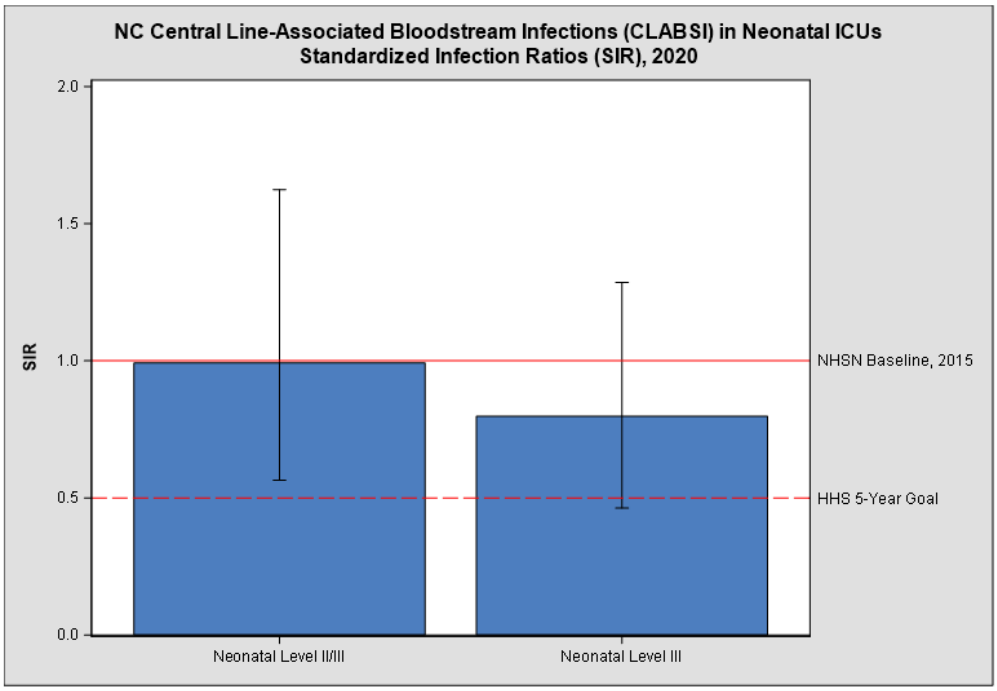
North Carolina 2020 CLABSI Highlights in NICUs

- In 2020, North Carolina hospitals reported 48 infections in neonatal ICUs, compared to the 61.81 infections that were predicted. This was about the same as the 2015 national experience.
- In 2020, North Carolina did not meet the U.S. Department of Health and Human Services 2020 goal to reduce CLABSIs by 50% from the 2015 national baseline experience.
- The most commonly identified organism from NICU CLABSI patients was *Escherichia coli*.

Table 3. NC Central Line Associated Bloodstream Infections (CLABSI) in neonatal ICUs, 2020

Year	# Observed Infections	# Predicted Infections	How Does North Carolina Compare to the National Experience?
2020	**48**	**61.81**	**= SAME: about the same number of infections as were predicted (same as the national experience)**

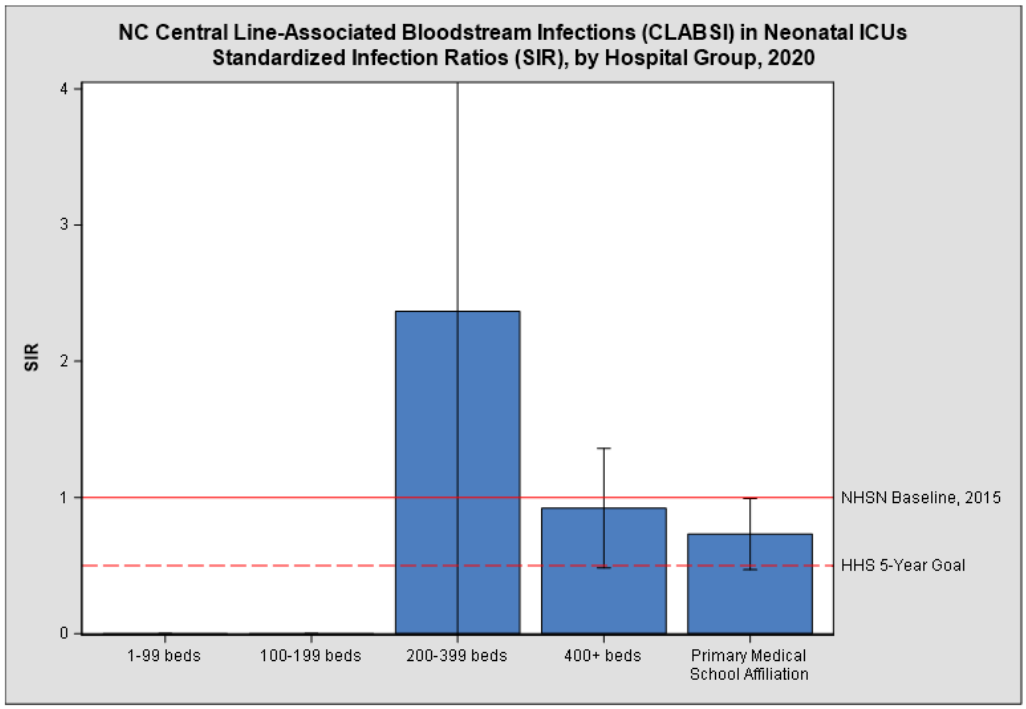
Figure 11.



Interpreting Figure 11:

- In 2020, level II/III and level III Neonatal ICUs observed the same number of CLABSIs as predicted, performing the SAME as the 2015 national experience
- Neither neonatal ICU II/III nor neonatal III locations met the HHS 5-year goal

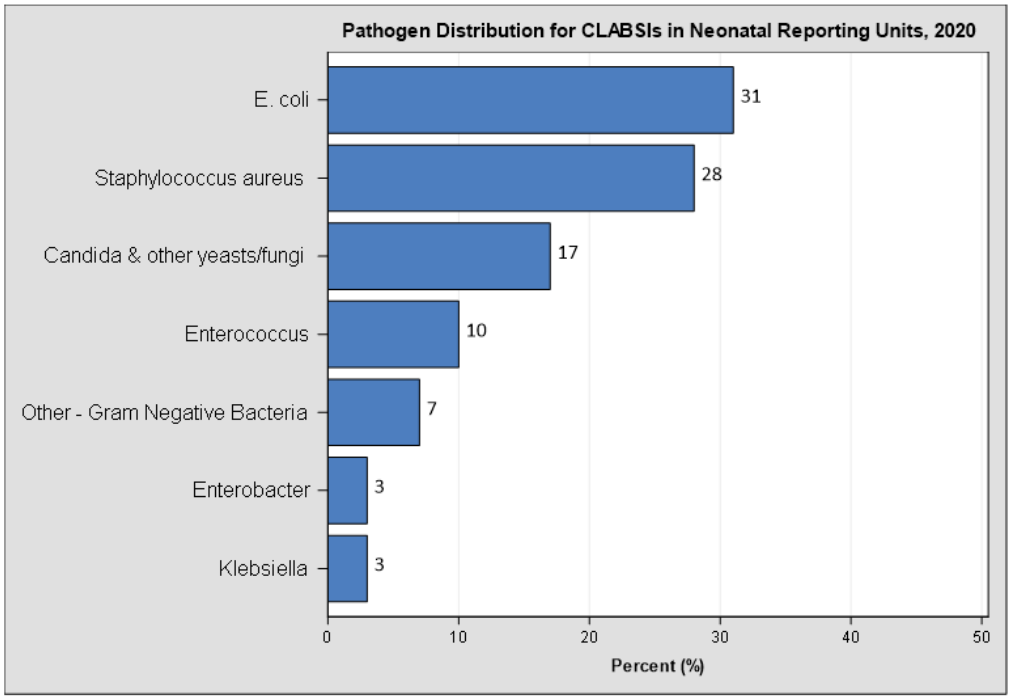
Figure 12.



Interpreting Figure 12:

- Not all hospital size groups have NICU locations
- Hospitals with 200-399 beds and hospitals with 400+ beds experienced the same number of CLABSIs in NICUs as predicted, performing the SAME as the national experience
- Hospitals with primary medical school affiliation experienced fewer CLABSIs in NICUs than predicted, performing BETTER than the national experience

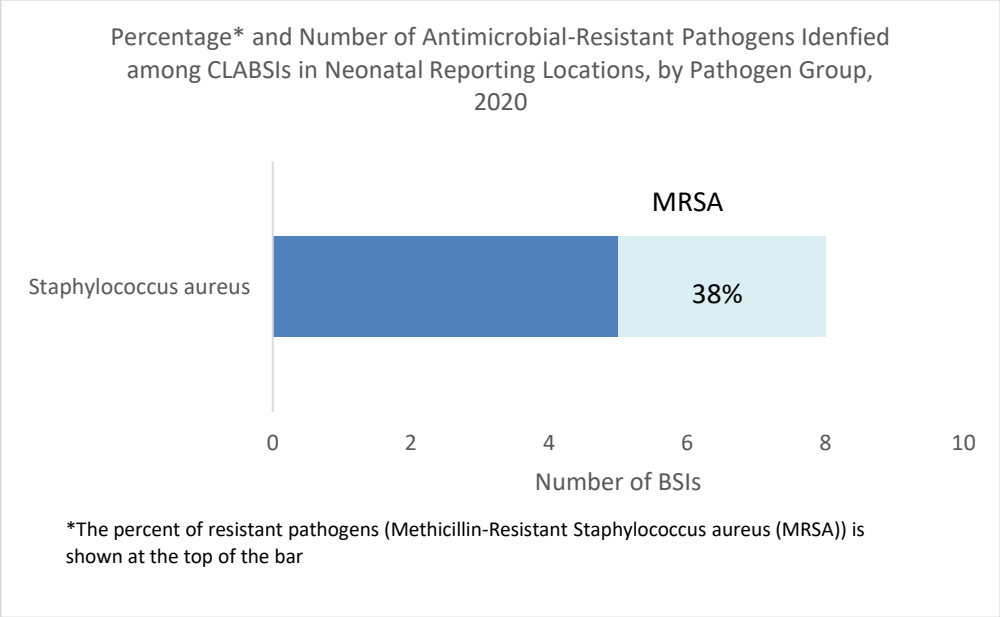
Figure 13.



Interpreting Figure 13:

- In 2020, *Escherichia coli* (31%), was the most common pathogen identified from CLABSIs in NICU locations followed by *Staphylococcus aureus*
- The most common pathogen identified from CLABSIs in NICU locations is different than the most common pathogen from CLABSIs in adult/pediatric locations

Figure 14.



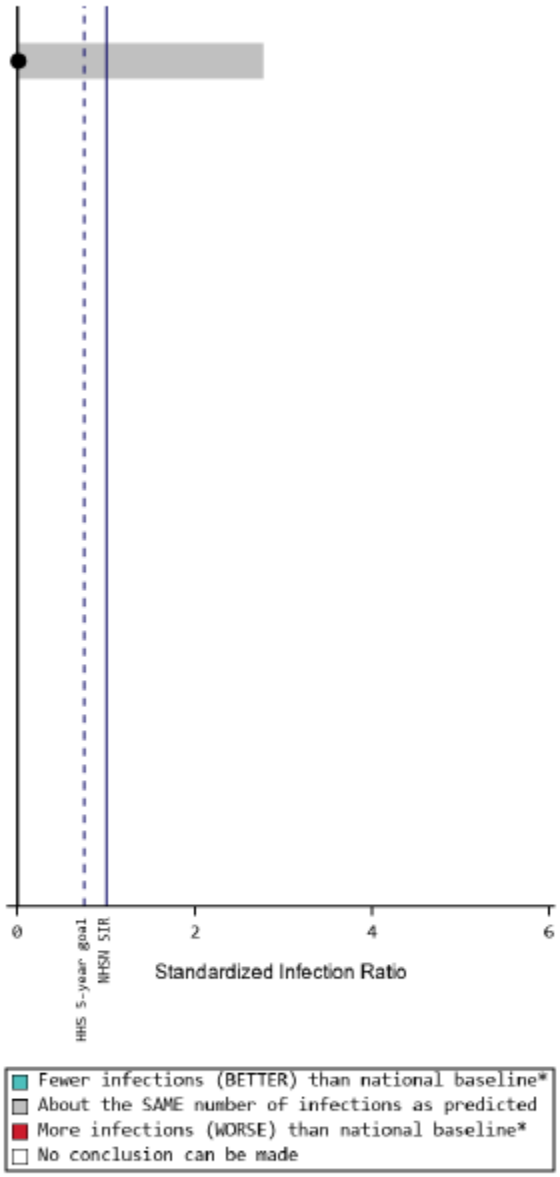
Interpreting Figure 14:

- In 2020, 3 of 8 (38%) *Staphylococcus aureus* identified among observed CLABSI infections in NICUs were resistant to methicillin

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

CLABSI in Neonatal ICUs
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 100 to 199 Beds

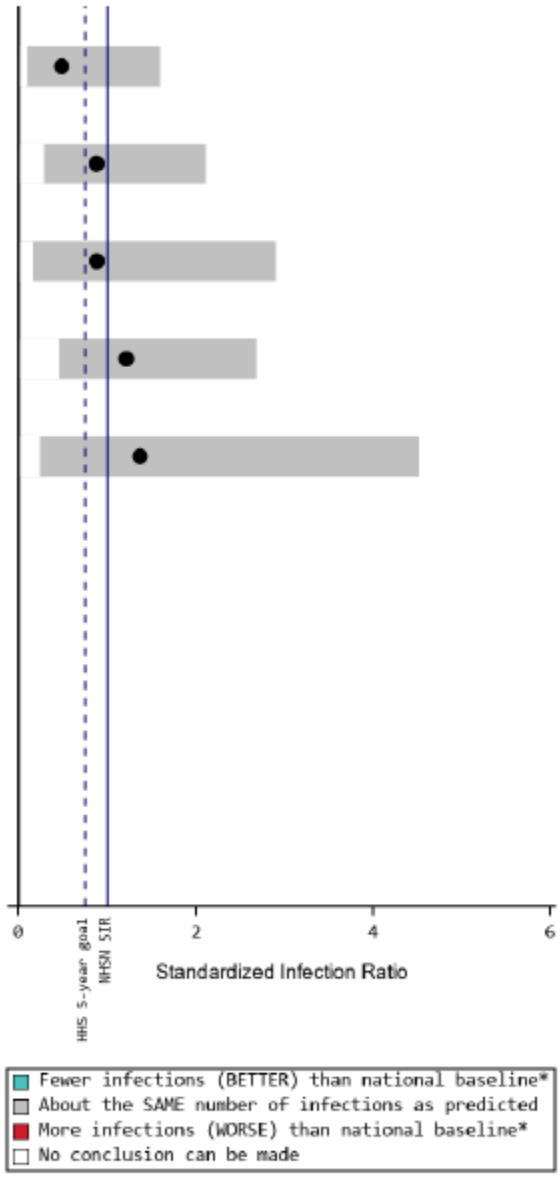
HOSPITAL INTERVAL	OBS	PRED	CLDays	SIR
Cone Green Valley	0	1.1	905	0.0
Atrium Health University City	0	0.1	130	NC
Nash Health Care Systems	NA	NA	N	NA
Novant Health Matthews Medical Center	NA	NA	N	NA
Novant Health Huntersville	NA	NA	N	NA
Onslow Memorial Hospital	NA	NA	N	NA



Data reported as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
CLdays = # Central Line Days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 Central Line Days
NC = SIR not calculated for hospitals with <1 predicted infection
N = < 50 Central Line Days reported
*Significantly different than 2015 national baseline

CLABSI in Neonatal ICUs
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 400 or More Beds

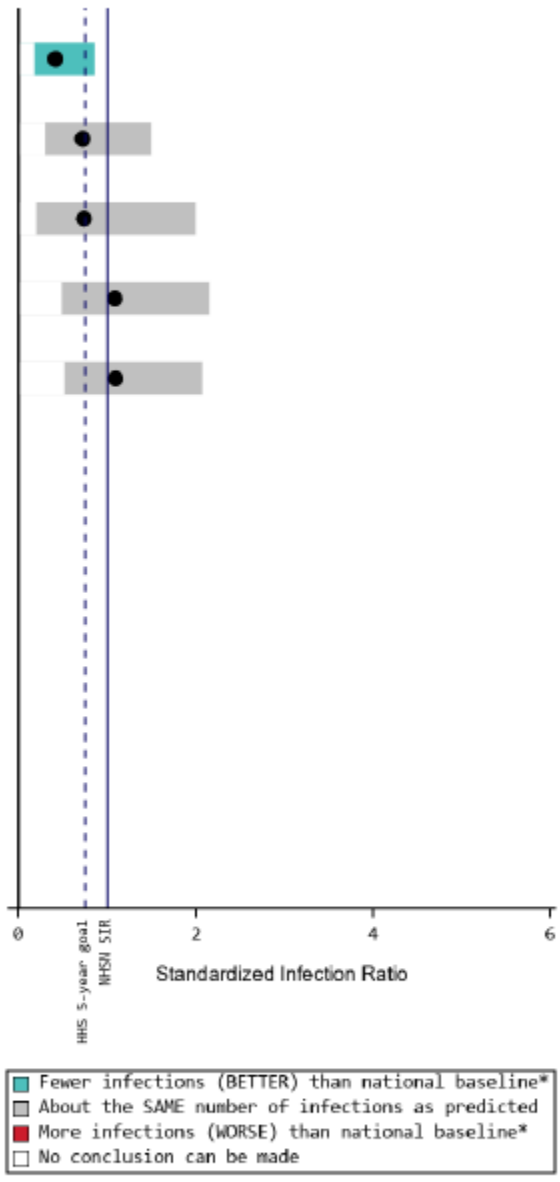
HOSPITAL INTERVAL	OBS	PRED	CLDays	SIR
Novant Health Presbyterian Medical	2	4.2	2429	0.5
New Hanover Regional Medical Center	4	4.6	3264	0.9
Mission Hospital	2	2.3	1821	0.9
WakeMed	5	4.1	2854	1.2
Novant Health Forsyth Medical Center	2	1.5	821	1.4
Rex Healthcare	0	0.4	423	NC
Atrium Health Cabarrus	0	0.6	433	NC
Gaston Memorial Hospital	0	0.2	216	NC
Cape Fear Valley Health System	2	0.6	320	NC



Data reported as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
CLdays = # Central Line Days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 Central Line Days
NC = SIR not calculated for hospitals with <1 predicted infection
N = < 50 Central Line Days reported
*Significantly different than 2015 national baseline

CLABSI in Neonatal ICUs
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with Primary Medical School Affiliation

HOSPITAL INTERVAL	OBS	PRED	CLDays	SIR
Duke University Hospital	6	14.7	8313	0.4
Carolinas Medical Center	6	8.4	6140	0.7
Vidant Medical Center	3	4.1	2437	0.7
Wake Forest University Baptist Medical	7	6.5	4487	1.1
UNC Health Care	8	7.3	4782	1.1



Data reported as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
CLdays = # Central Line Days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <50 Central Line Days
NC = SIR not calculated for hospitals with <1 predicted infection
N = < 50 Central Line Days reported
*Significantly different than 2015 national baseline

B. Catheter-Associated Urinary Tract Infections (CAUTI)

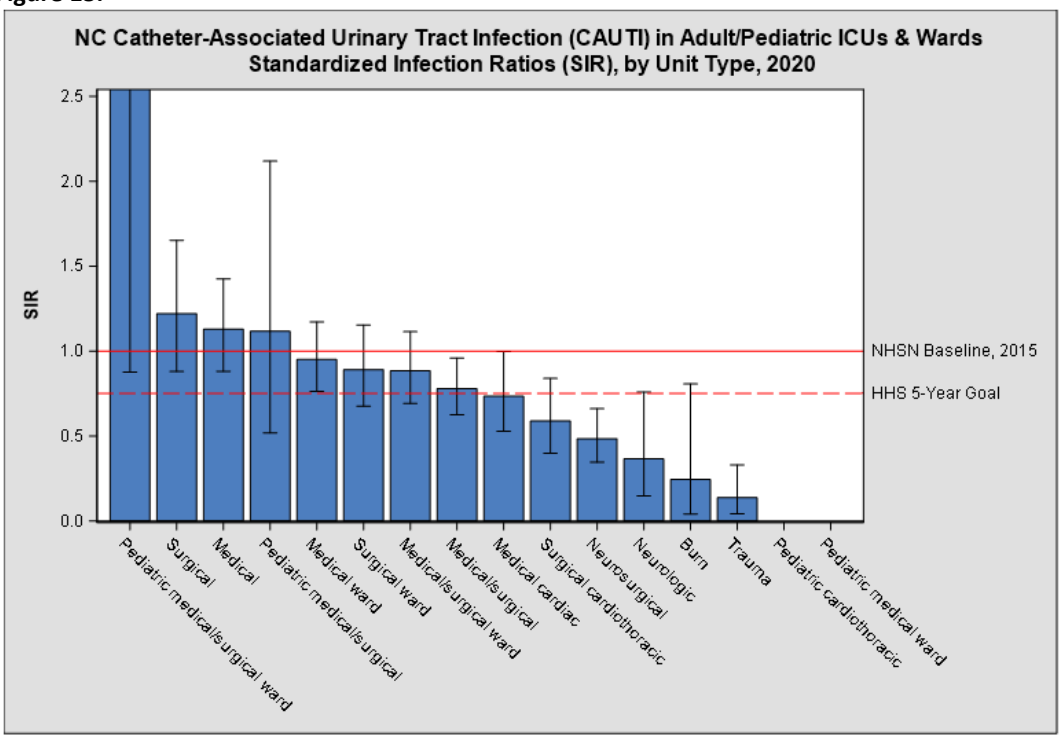
North Carolina 2020 CAUTI Highlights

- In 2020, North Carolina hospitals reported 522 CAUTI infections, compared to the 663 infections that were predicted. This was better than the 2015 national experience.
- In 2020, North Carolina met the U.S. Department of Health and Human Services 2020 goal to reduce CAUTIs by 25% from the 2015 national baseline experience.
- The most commonly identified organisms were *Escherichia coli* and *Pseudomonas*.

Table 5. NC Catheter-Associated Urinary Tract Infections (CAUTI) in ICUs and wards, 2020

Year	# Observed Infections	# Predicted Infections	How Does North Carolina Compare to the National Experience?
2020	**522**	**663.5**	**★BETTER: Fewer infections than were predicted (better than the national experience)**

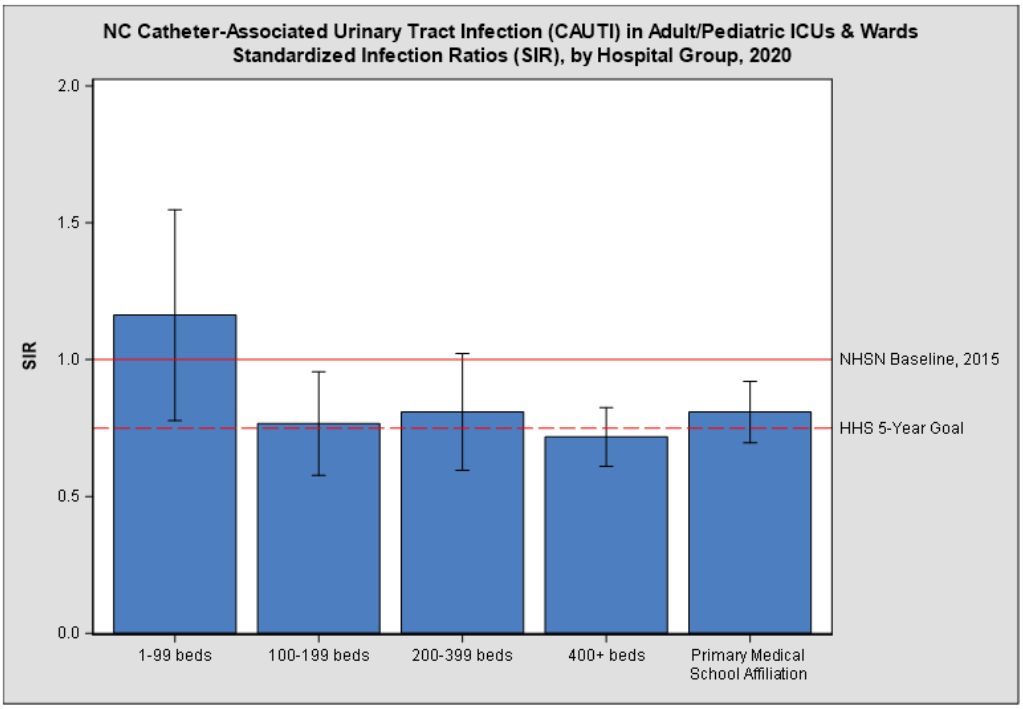
Figure 15.



Interpreting Figure 15:

- Burn, medical cardiac, medical/surgical, neurologic, neurosurgical, surgical cardiothoracic and trauama units had fewer CAUTIs than predicted, performing BETTER than the national experience
- All other locations reported the same number of CAUTIs as predicted, performing the SAME as the 2015 national experience
- The pediatric cardiothoracic and pediatric medical units reported 0 CAUTI events

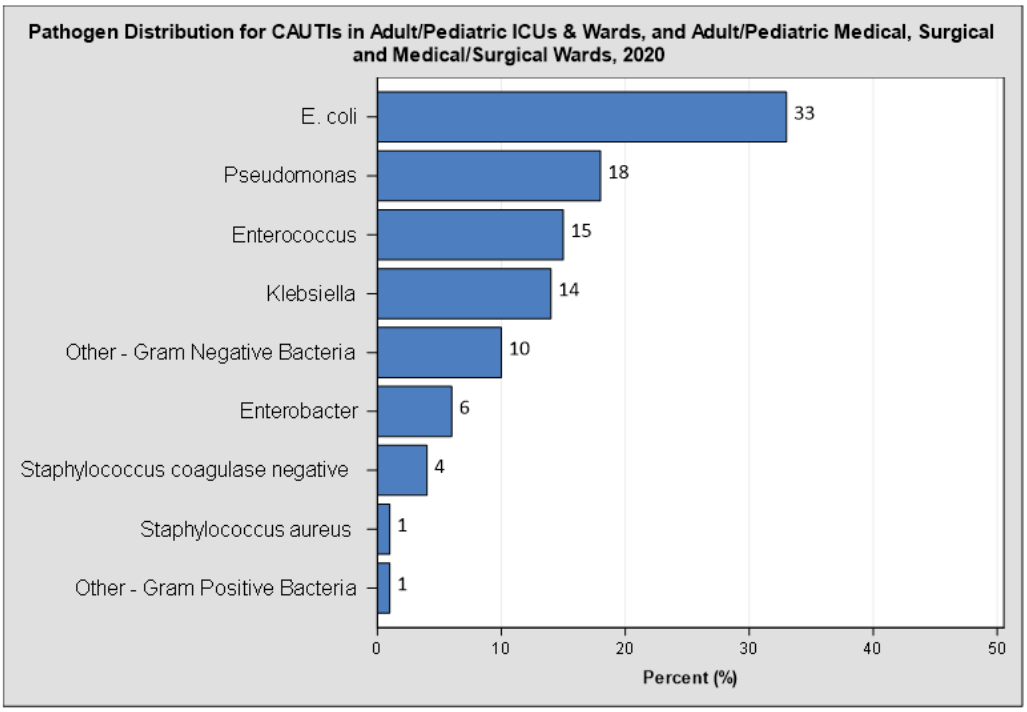
Figure 16.



Interpreting Figure 16:

- Hospitals with 100-199 beds, 400+ beds and primary medical school affiliations had fewer CAUTIs than predicted performing BETTER than the national experience
- All other hospital sized groups reported about the same number of infections as predicted, performing the SAME as the 2015 national experience

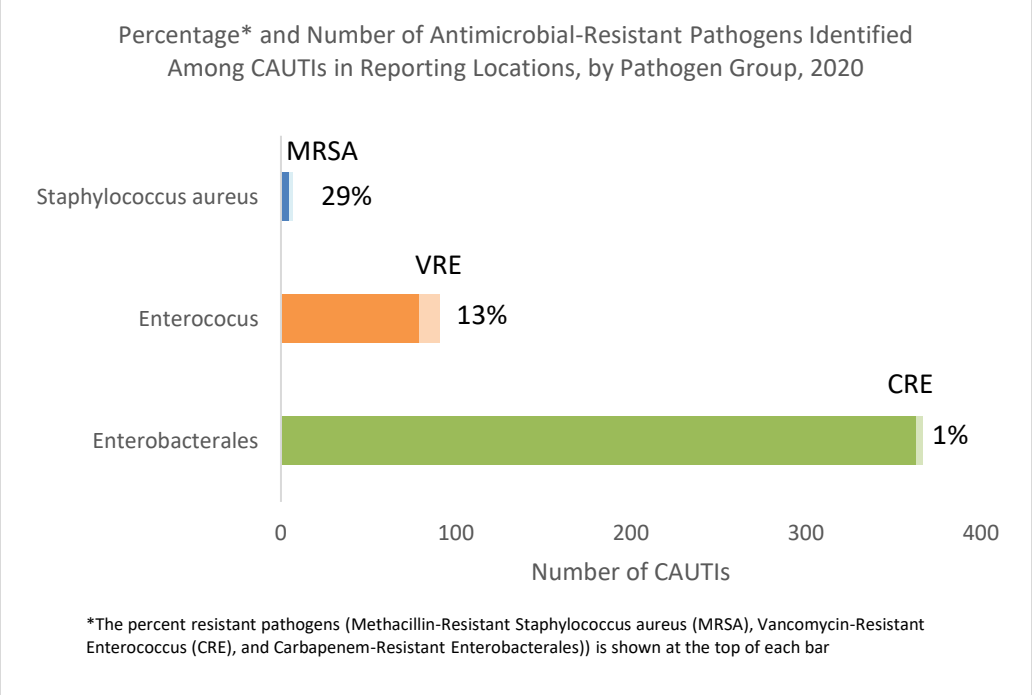
Figure 17.



Interpreting Figure 17:

- *E. coli* (33%) and *Pseudomonas* (18%) were the most commonly identified pathogens among reported CAUTI infections in 2018
- *Candida* species and other yeasts are considered excluded organisms and cannot be used to meet the CAUTI definition

Figure 18.



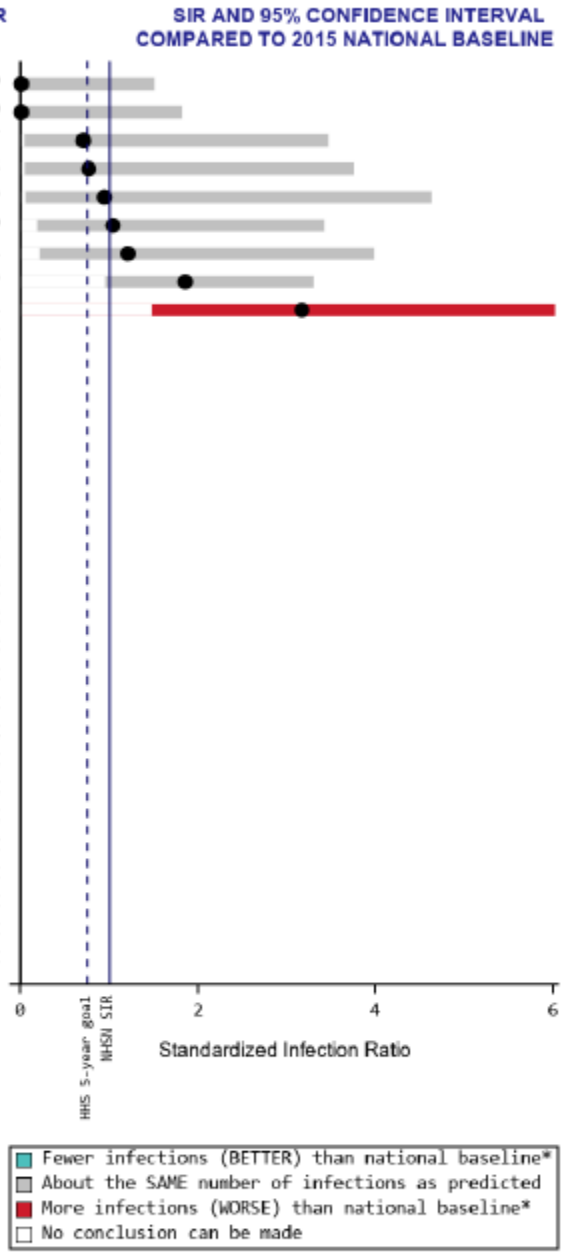
Interpreting Figure 18:

- Two of seven (29%) *Staphylococcus aureus* identified among reported CAUTIs were resistant to methicillin
- 13% of *Enterococcus* identified among reported CAUTIs were resistant to Vancomycin
- 1% of *Enterobacterales* identified among reported CAUTIs were resistant to carbapenems

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, 2020
Hospital Group: Hospitals with less than 100 Beds

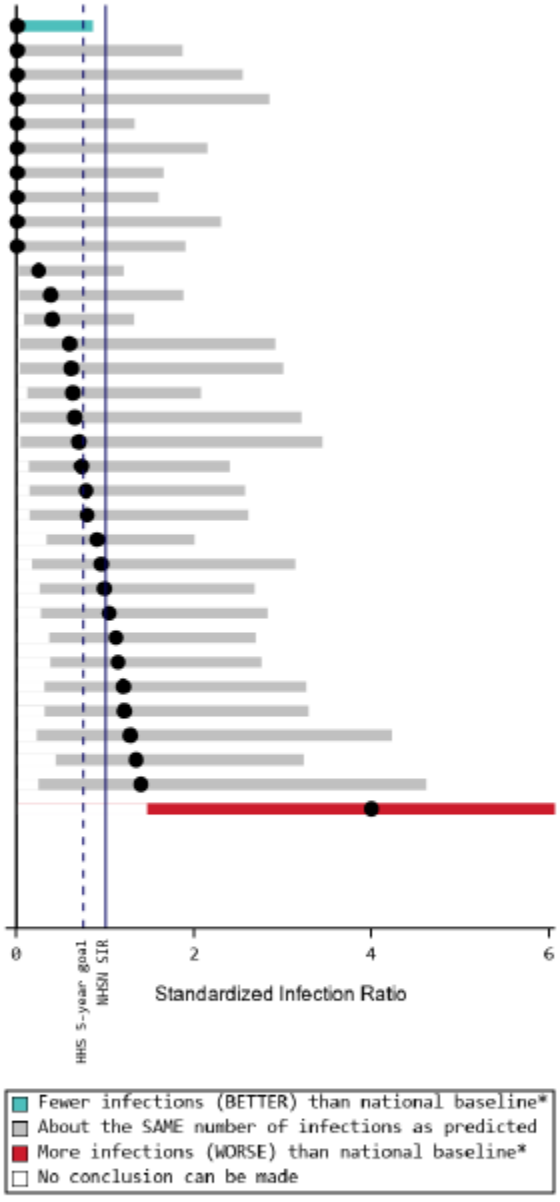
HOSPITAL	OBS	PRED	UCD	SIR
Maria Parham Medical Center	0	2.0	2813	0.0
Wake Forest Baptist Health-Lexington	0	1.7	2181	0.0
Dlp - Harris Regional Hospital	1	1.4	2609	0.7
Novant Health Medical Park Hospital	1	1.3	1846	0.8
Vidant Beaufort Hospital	1	1.1	2019	0.9
Vidant Duplin Hospital	2	1.9	1828	1.0
Central Carolina Hospital	2	1.7	2346	1.2
Catawba Valley Medical Center	10	5.4	7606	1.9
Betsy Johnson Hospital	8	2.5	3246	3.2
McDowell Hospital	0	0.5	968	NC
Cherokee Indian Hospital	0	0.1	178	NC
Columbus Regional Healthcare System	1	0.9	1860	NC
Martin General Hospital	2	0.6	1102	NC
Randolph Hospital Dba Randolph Health	0	0.5	943	NC
Granville Medical Center	0	0.9	1719	NC
Carteret General Hospital	0	0.7	1384	NC
Novant Health Brunswick Medical Center	0	0.5	1082	NC
Kings Mountain Hospital	0	0.1	185	NC
Person Memorial Hospital	0	0.5	926	NC
Carolinas Healthcare System Anson	0	0.0	91	NC
Annie Penn Hospital	2	0.7	1332	NC
North Carolina Specialty Hospital	0	0.1	215	NC
Wake Forest Baptist Health-Davie Medical	1	0.3	584	NC
Johnston Health Clayton	0	0.3	523	NC
Firsthealth Moore Regional-Hoke	0	0.1	127	NC
Firsthealth Moore Regional-Richmond	1	0.5	1034	NC
Cape Fear Valley Hoke Hospital	1	0.1	168	NC
Novant Health Kernersville Medical Cente	0	0.7	1033	NC
Wakemed North Family Health & Women's Ho	0	0.3	530	NC
Central Harnett Hospital	2	0.9	1504	NC
Novant Health Clemmons Medical Center	0	0.1	131	NC
Novant Health Mint Hill Medical Center	0	0.2	461	NC



Data reported as of May 3, 2020 .
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
N = < 50 Urinary Catheter Days reported
*Significantly different than 2015 national baseline

CAUTI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 100 to 199 Beds

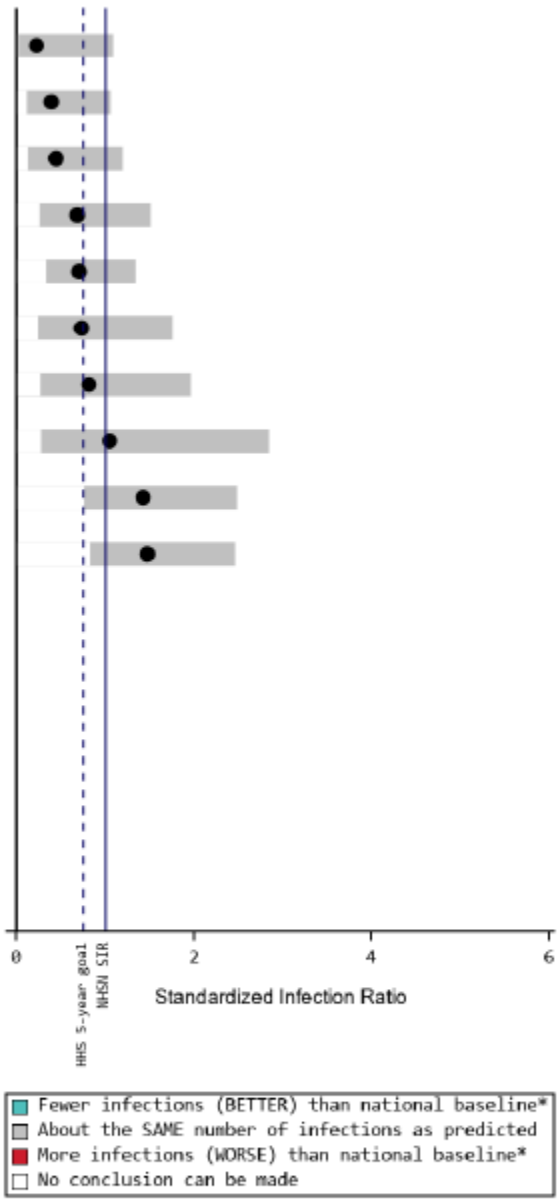
HOSPITAL	OBS	PRED	UCD	SIR
Iredell Memorial Hospital	0	3.5	5011	0.0
Atrium Health University City	0	1.6	2033	0.0
ARHS-Watauga Medical Center	0	1.2	1200	0.0
Sentara Albemarle Medical Center	0	1.1	1473	0.0
Lenoir Memorial Hospital	0	2.3	3224	0.0
Northern Regional Hospital	0	1.4	2053	0.0
Johnston Health	0	1.8	2288	0.0
Atrium Health Lincoln	0	1.9	2643	0.0
Unc Rockingham Health	0	1.3	1808	0.0
Wake Forest Baptist Health Wilkes Medica	0	1.6	2209	0.0
Caldwell Memorial Hospital	1	4.1	5895	0.2
Carolinas Healthcare System Blue Ridge	1	2.6	2609	0.4
Frye Regional Medical Center	2	5.0	5019	0.4
Wesley Long Hospital	1	1.7	2377	0.6
Sampson Regional Medical Center	1	1.6	2107	0.6
Pardee Hospital	2	3.2	4079	0.6
Scotland Memorial Hospital	1	1.5	2215	0.6
Atrium Health Stanly	1	1.4	2051	0.7
Atrium-Union	2	2.8	3909	0.7
Halifax Regional Medical Center	2	2.6	3830	0.8
Novant Health Huntersville	2	2.5	2601	0.8
Duke Raleigh Hospital	5	5.6	5423	0.9
Lake Norman Regional Medical Center	2	2.1	2938	0.9
WakeMed Cary Hospital	3	3.0	4389	1.0
Novant Health Matthews Medical Center	3	2.9	4197	1.0
Nash Health Care Systems	4	3.6	4966	1.1
Atrium-Mercy	4	3.5	4397	1.1
Haywood Regional Medical Center	3	2.5	2432	1.2
Vidant Roanoke Chowan Hospital	3	2.5	2413	1.2
Onslow Memorial Hospital	2	1.6	2143	1.3
Vidant Edgecombe Hospital	4	3.0	2820	1.3
Advent Health Hendersonville	2	1.4	2084	1.4
Rutherford Regional Medical Center	5	1.3	1812	4.0
Davis Regional Medical Center	0	0.7	863	NC
Novant Health Thomasville Medical Center	0	0.5	554	NC
Wilson Medical Center	2	0.4	676	NC
Cone Green Valley	5	0.8	1084	NC



Data reported as of May 3, 2020 .
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
N = < 50 Urinary Catheter Days reported
*Significantly different than 2015 national baseline

CAUTI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 200 to 399 Beds

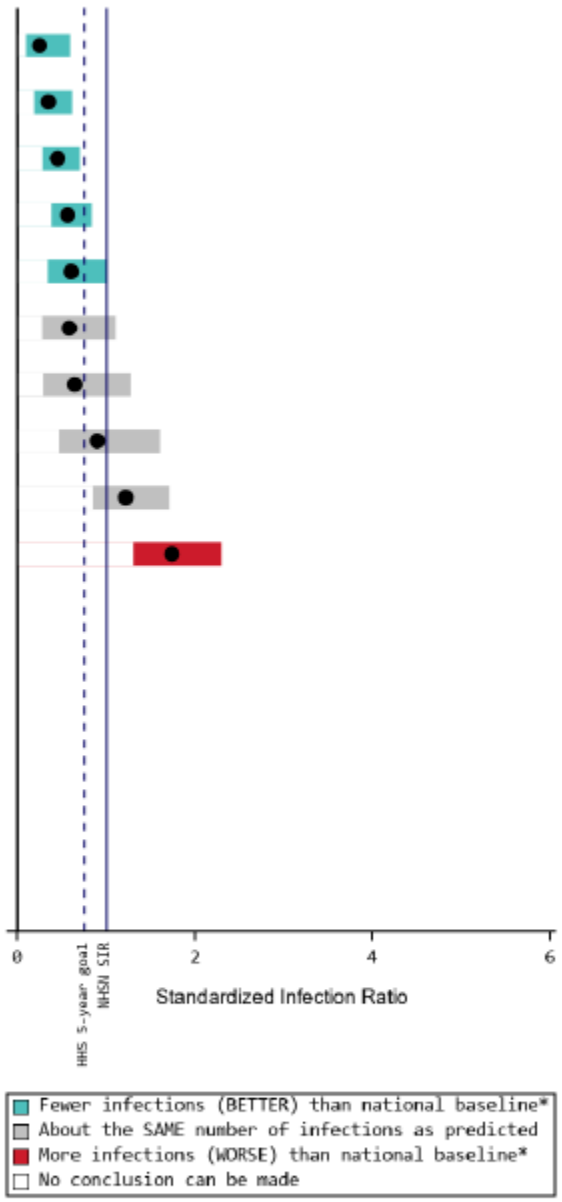
HOSPITAL	OBS	PRED	UCD	SIR
CarolinaEast Medical Center	1	4.6	5395	0.2
Duke Regional Hospital	3	7.8	6070	0.4
FirstHealth Moore Regional Hospital	3	6.9	7737	0.4
Wayne Memorial Hospital	5	7.4	7421	0.7
High Point Regional Health System	8	11.4	8970	0.7
Carolinas Healthcare System Cleveland	4	5.5	6313	0.7
Alamance Regional Medical Center	4	4.9	3887	0.8
Novant Health Rowan Medical Center	3	2.9	3310	1.0
Atrium-Pineville	11	7.7	7826	1.4
Southeastern Regional Medical Center	13	8.9	9127	1.5



Data reported as of May 3, 2020 .
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
N = < 50 Urinary Catheter Days reported
*Significantly different than 2015 national baseline

CAUTI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 400 or More Beds

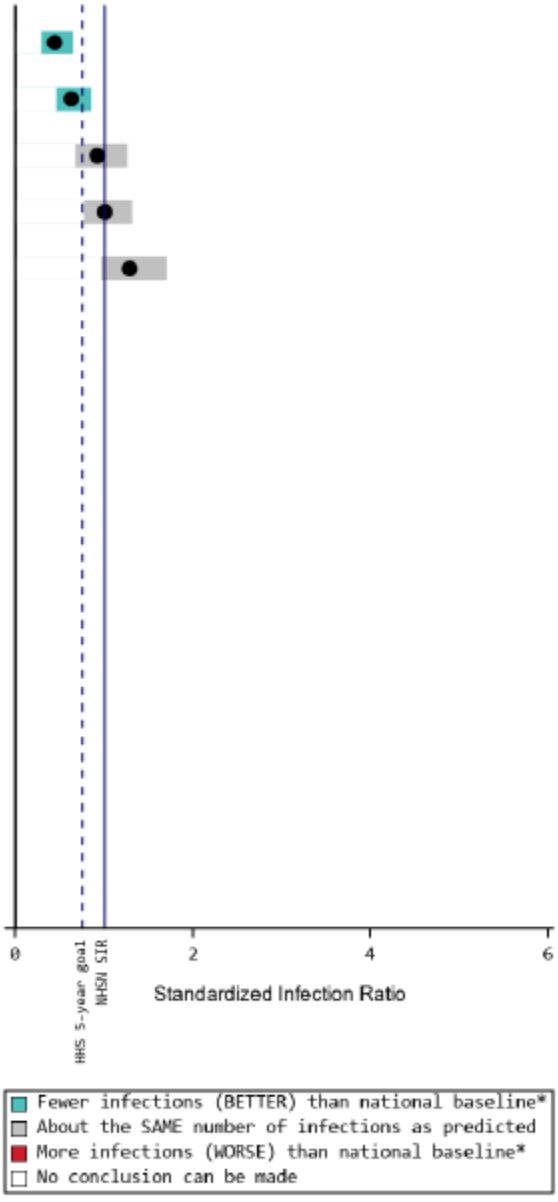
HOSPITAL	OBS	PRED	UCD	SIR
Gaston Memorial Hospital	4	16.5	12113	0.2
WakeMed	10	29.4	18503	0.3
Mission Hospital	18	40.7	24111	0.4
Rex Healthcare	23	41.2	27892	0.6
Moses Cone Hospital	13	21.8	12928	0.6
Atrium Health Cabarrus	8	13.9	14010	0.6
Novant Health Presbyterian Medical	7	11.0	6896	0.6
Cape Fear Valley Health System	10	11.2	8885	0.9
Novant Health Forsyth Medical Center	31	25.6	16054	1.2
New Hanover Regional Medical Center	47	27.1	19179	1.7



Data reported as of May 3, 2020 .
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
N = < 50 Urinary Catheter Days reported
*Significantly different than 2015 national baseline

CAUTI in Adult/Pediatric Medical, Surgical, and Medical/Surgical Wards and ICUs
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with Primary Medical School Affiliation

HOSPITAL	OBS	PRED	UCD	SIR
Wake Forest University Baptist Medical	23	53.2	33173	0.4
Duke University Hospital	38	61.3	38384	0.6
Carolinas Medical Center	38	41.6	28799	0.9
UNC Health Care	53	53.0	31035	1.0
Vidant Medical Center	46	35.9	21214	1.3



Data reported as of May 3, 2020 .
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
N = < 50 Urinary Catheter Days reported
*Significantly different than 2015 national baseline

C. Surgical Site Infections (SSI)

1. Abdominal Hysterectomies

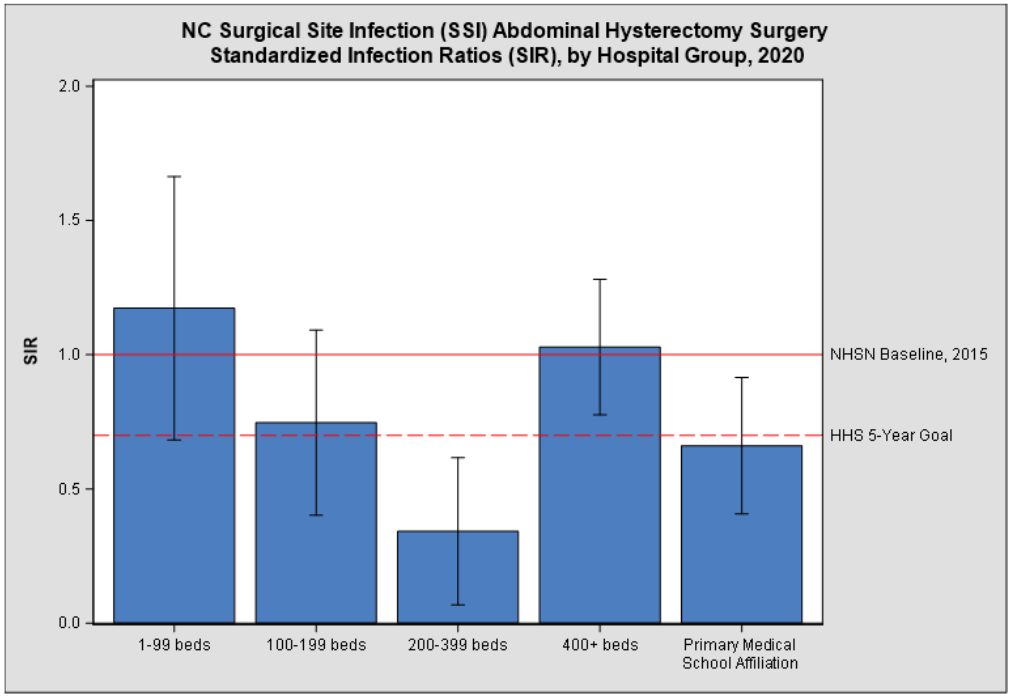
North Carolina 2020 SSI Highlights Post Abdominal Hysterectomy

- North Carolina reported 70 surgical site infections after inpatient abdominal hysterectomies performed on adults ≥ 18 years in North Carolina acute care hospitals, compared to the 83 infections predicted. This was the same as the 2015 national experience.
- NC did not meet the U.S. Department of Health and Human Services 2020 goal to reduce SSIs nationally by 30% from the 2015 baseline experience
- In 2020, the most commonly identified organism from adult patients with SSI following inpatient abdominal hysterectomies was *Escherichia coli*

Table 4. NC Surgical Site Infections following Abdominal Hysterectomies, 2020

Year	# Observed Infections	# Predicted Infections	How Does North Carolina Compare to the National Experience?
2020	70	83.38	= SAME: about the same number of infections as were predicted (same as the national experience)

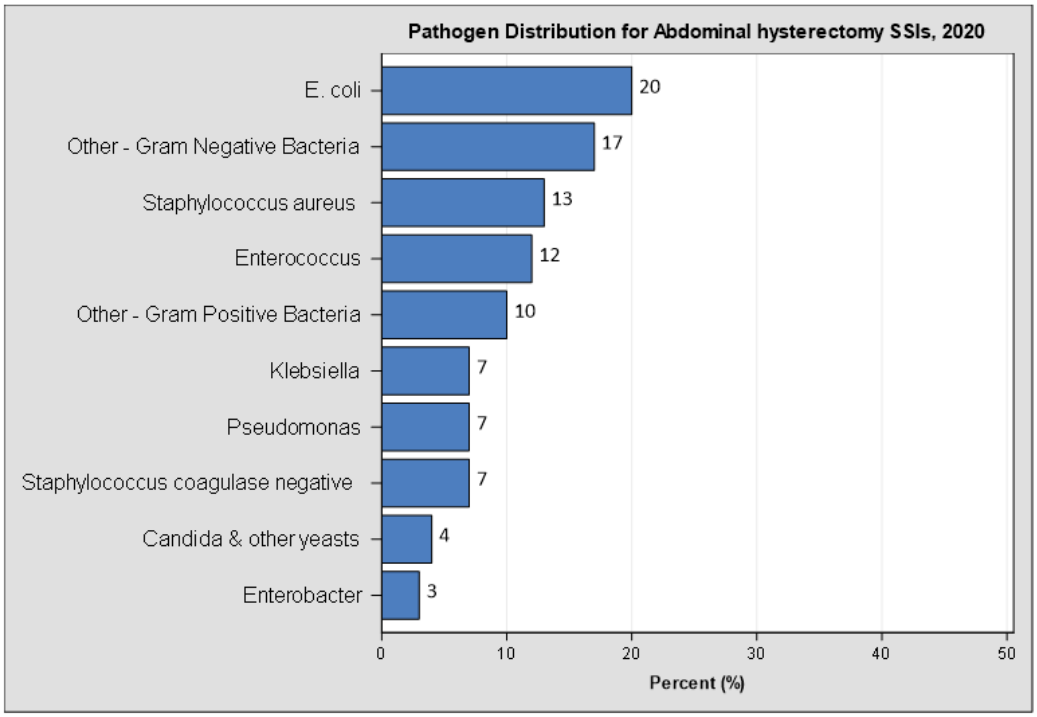
Figure 19.



Interpreting Figure 19:

- Hospitals with 200-399 beds, and hospitals with primary medical school affiliations saw fewer SSIs following abdominal hysterectomies than predicted, performing BETTER than the 2015 national experience
- All other hospital size groups reported the same number of SSIs following abdominal hysterectomies as predicted, performing the SAME as the 2015 national experience

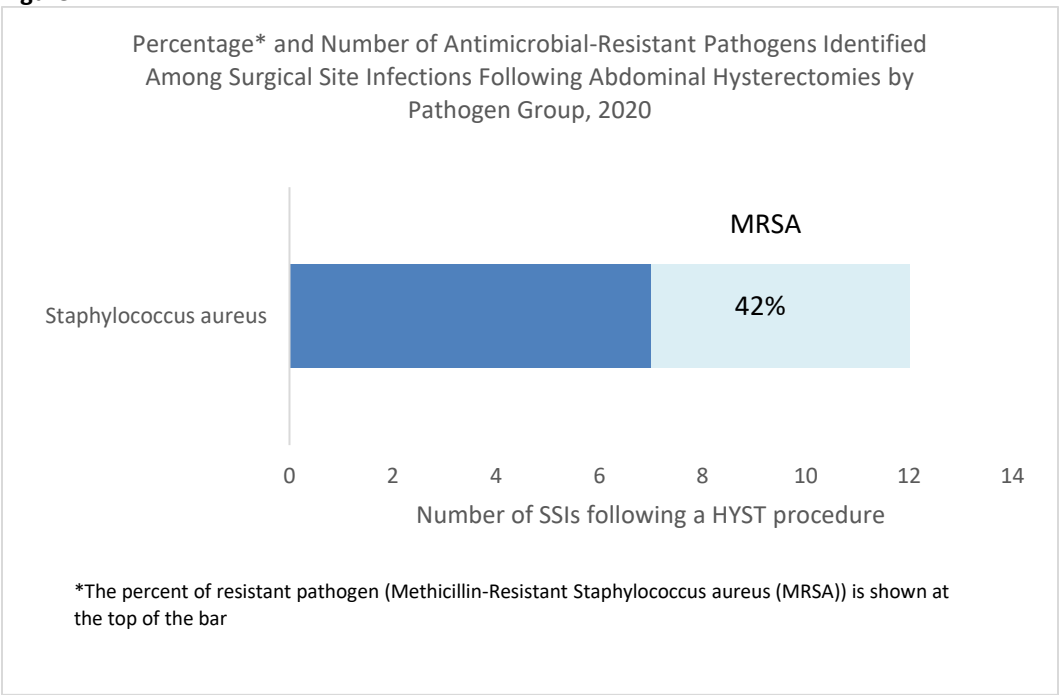
Figure 20.



Interpreting Figure 20:

- *Escherichia coli* (20%) was the most commonly reported pathogen among SSIs following abdominal hysterectomies

Figure 21.

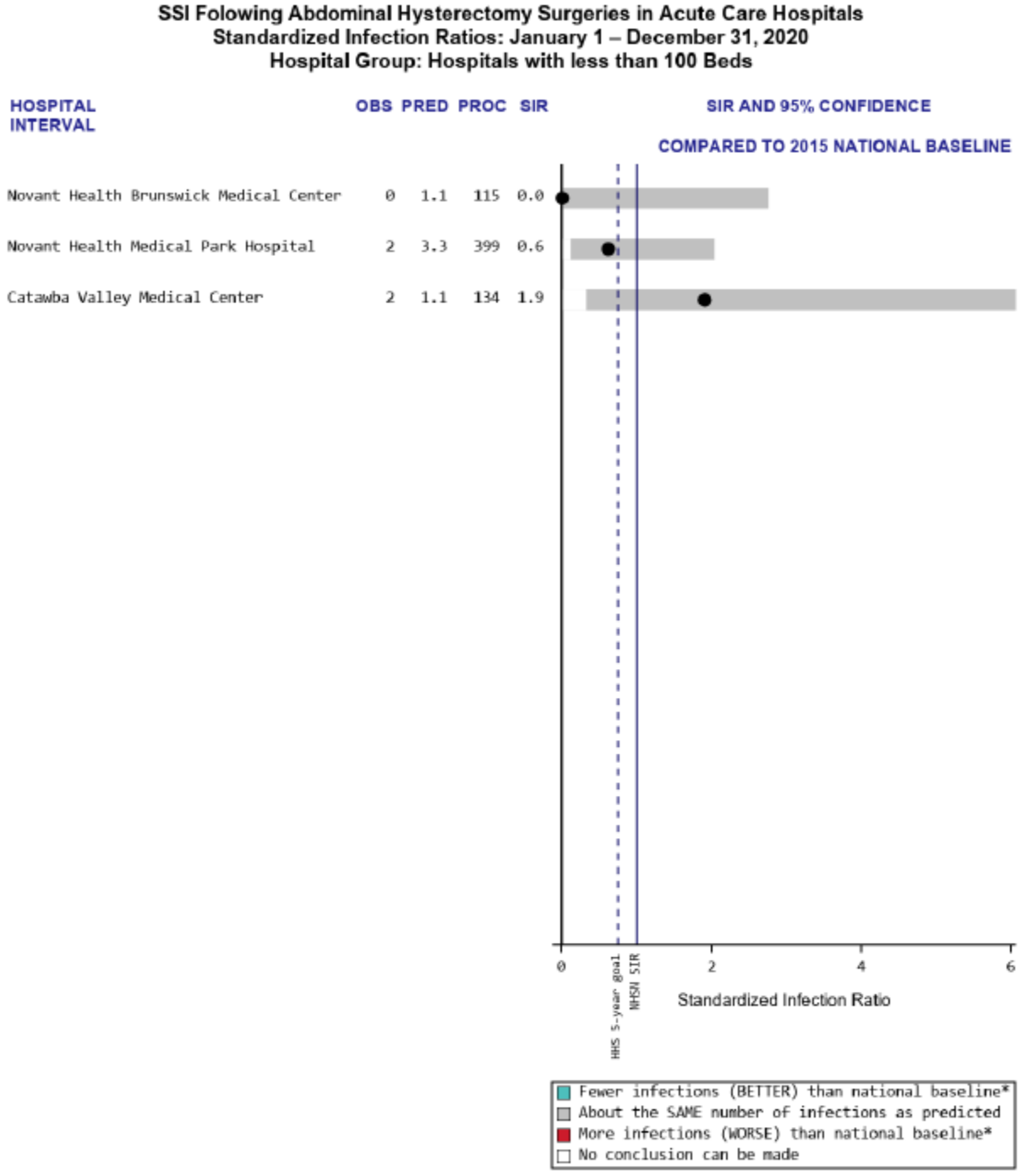


*The percent of resistant pathogen (Methicillin-Resistant Staphylococcus aureus (MRSA)) is shown at the top of the bar

Interpreting Figure 21:

- In 2020, 42% of *Staphylococcus aureus* identified among SSIs following abdominal hysterectomies surgeries were resistant to methicillin

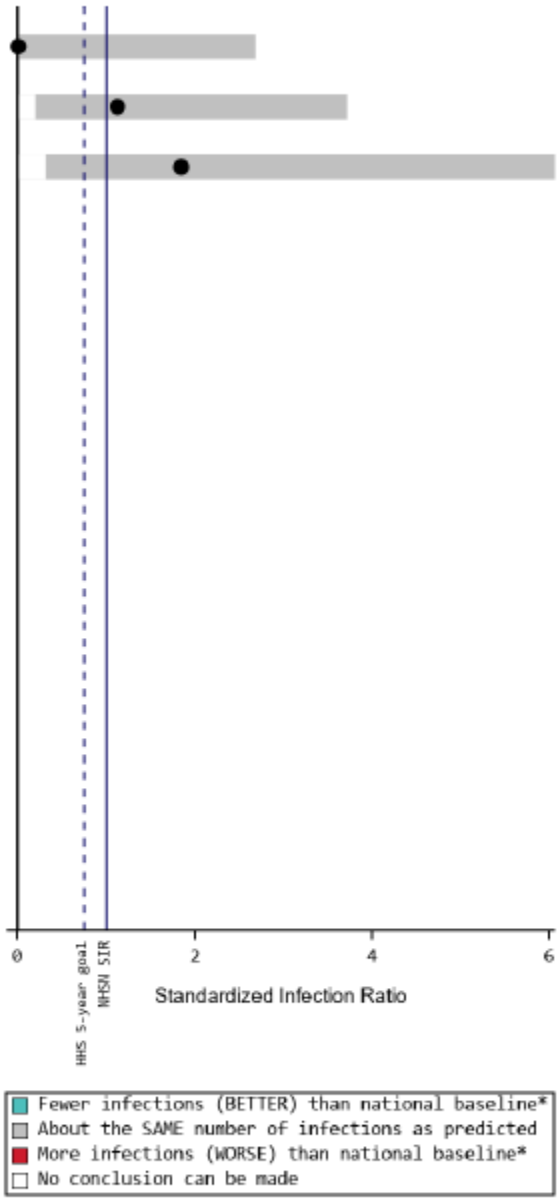
The following SIR plots summarize SSI HYST infection data for North Carolina hospitals by hospital groups (Appendix E).



Data reported from adult/pediatric units as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PROC = # of Procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <20 procedures
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2015 national baseline

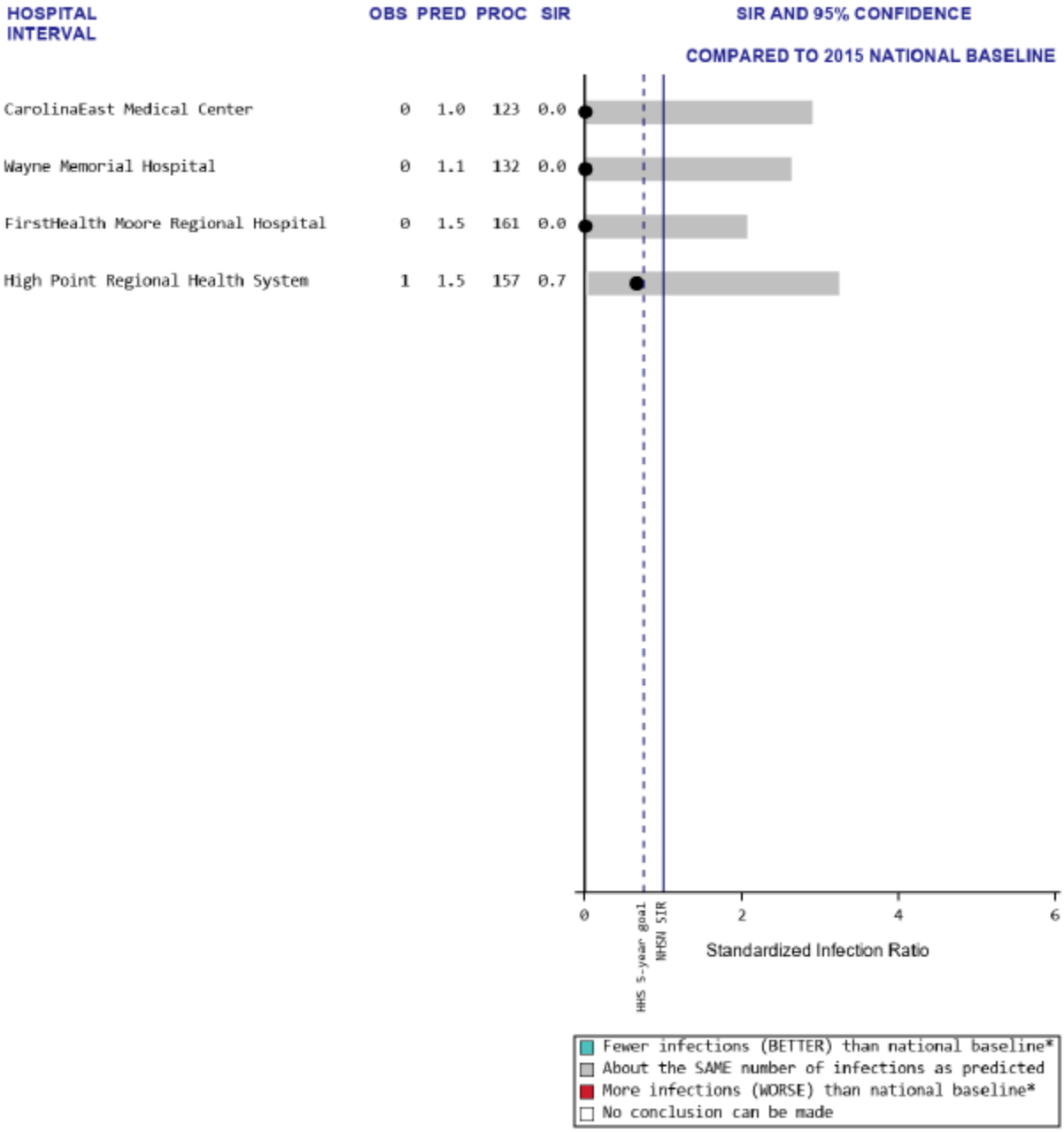
SSI Folowing Abdominal Hysterectomy Surgeries in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 100 to 199 Beds

HOSPITAL INTERVAL	OBS	PRED	PROC	SIR
Novant Health Huntersville	0	1.1	131	0.0
Novant Health Matthews Medical Center	2	1.8	213	1.1
WakeMed Cary Hospital	2	1.1	128	1.8



Data reported from adult/pediatric units as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PROC = # of Procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <20 procedures
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2015 national baseline

SSI Folowing Abdominal Hysterectomy Surgeries in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 200 to 399 Beds

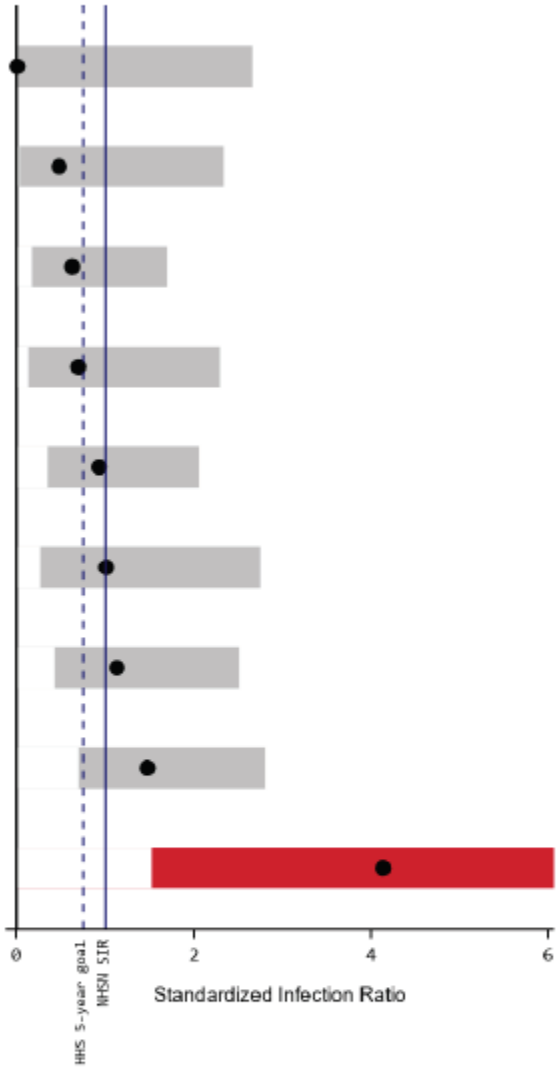


Data reported from adult/pediatric units as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PROC = # of Procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <20 procedures
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2015 national baseline

SSI Folowing Abdominal Hysterectomy Surgeries in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 400 or More Beds

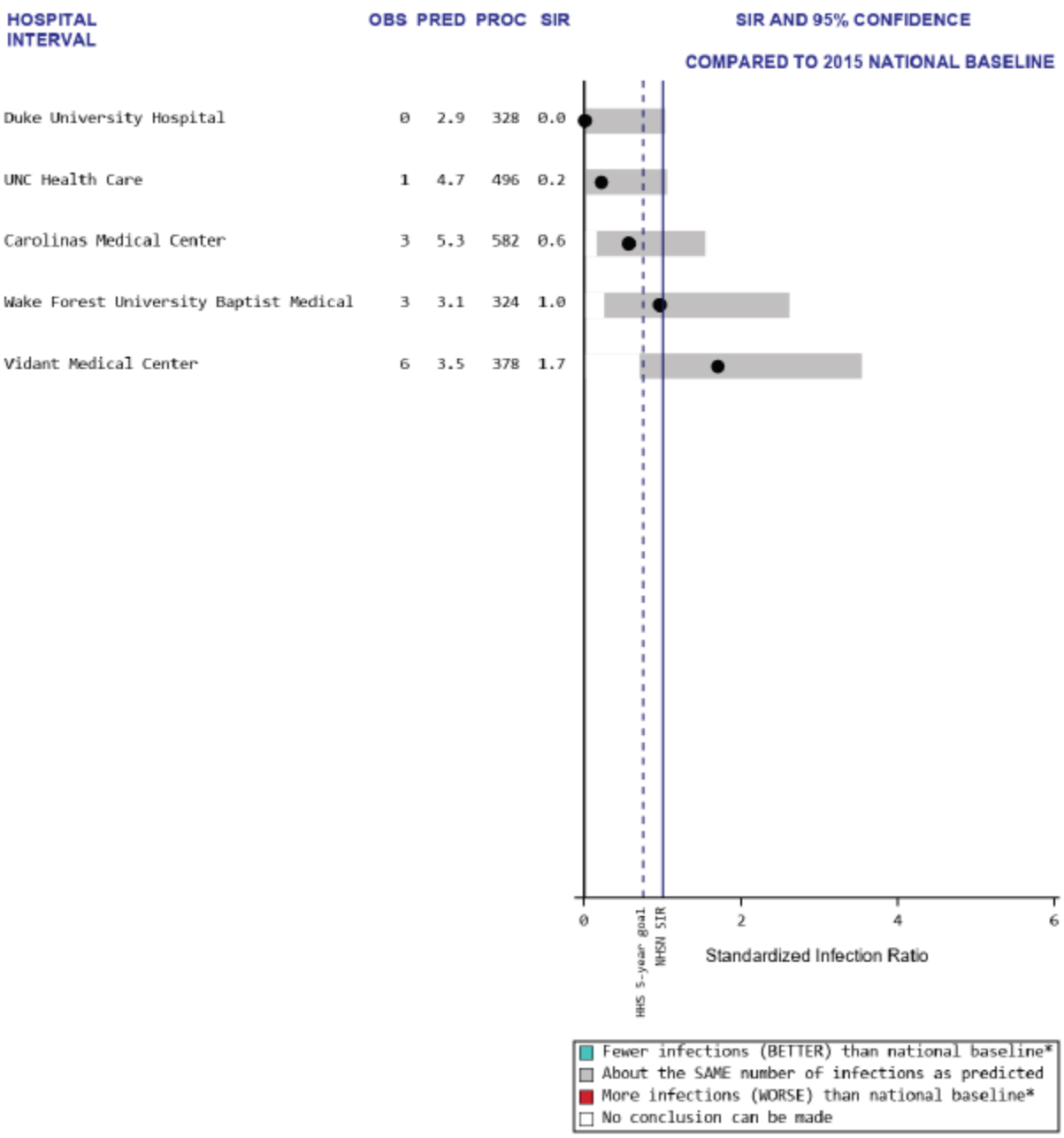
HOSPITAL INTERVAL	OBS	PRED	PROC	SIR
WakeMed	0	1.1	119	0.0
Atrium Health Cabarrus	1	2.1	257	0.5
Rex Healthcare	3	4.8	591	0.6
Cape Fear Valley Health System	2	2.9	300	0.7
New Hanover Regional Medical Center	5	5.4	642	0.9
Novant Health Forsyth Medical Center	3	3.0	350	1.0
Novant Health Presbyterian Medical	5	4.4	509	1.1
Mission Hospital	8	5.4	632	1.5
Gaston Memorial Hospital	5	1.2	131	4.1

SIR AND 95% CONFIDENCE
COMPARED TO 2015 NATIONAL BASELINE



Data reported from adult/pediatric units as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PROC = # of Procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <20 procedures
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2015 national baseline

SSI Folowing Abdominal Hysterectomy Surgeries in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with Primary Medical School Affiliation



Data reported from adult/pediatric units as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PROC = # of Procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <20 procedures
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2015 national baseline

2. Colon Surgeries

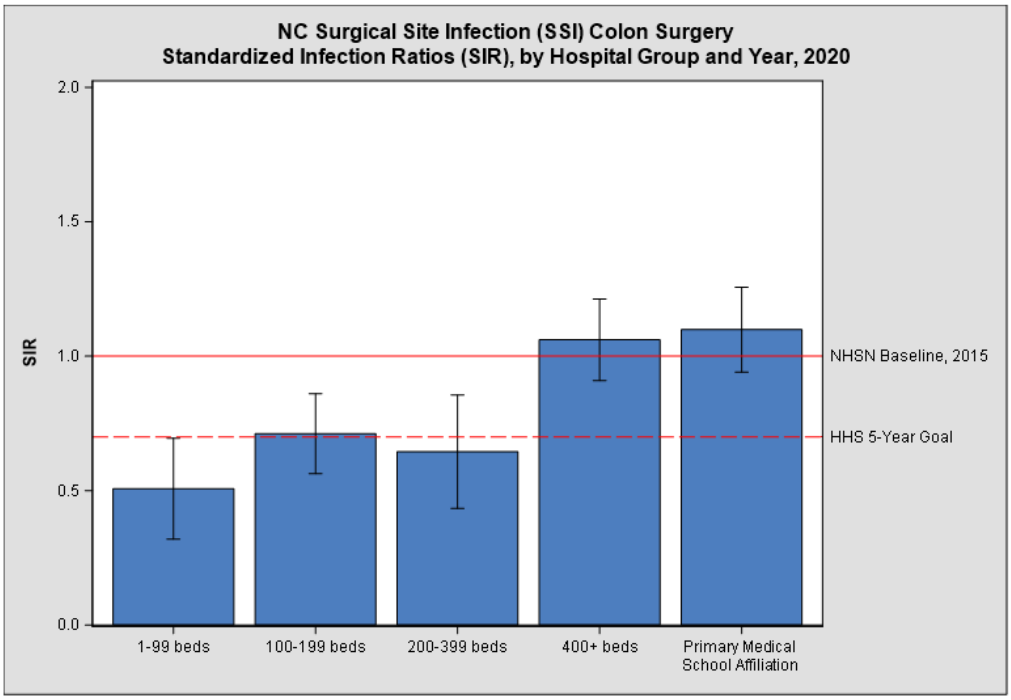
North Carolina 2020 SSI Highlights Post Colon Surgery

- Among inpatient colon surgeries performed on adults ≥ 18 years, North Carolina hospitals reported 264 infections, compared to the 296 infections which were predicted.
- There were fewer COLO SSIs than predicted by the 2015 national experience.
- The U.S. Department of Health and Human Services set a goal to reduce SSIs nationally by 30% from the baseline experience in 2015 by 2020; North Carolina has not met this goal for SSIs following colon surgeries.
- The most commonly identified organisms isolated from colon surgery SSI patients were and *Escherichia coli* and *Enterococcus*

Table 5. NC Surgical Site Infections following colon surgeries, 2020

Year	# Observed Infections	# Predicted Infections	How Does North Carolina Compare to the National Experience?
2020	**264**	**296.4**	**= SAME: about the same number of infections as were predicted (same as the national experience)**

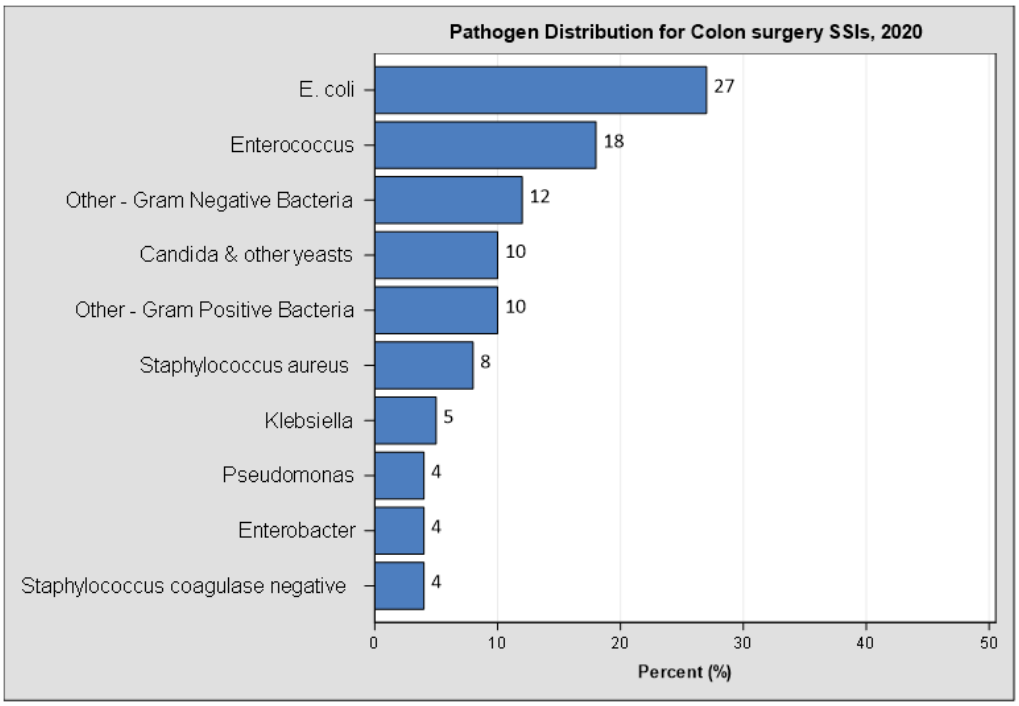
Figure 22.



Interpreting Figure 22:

- In 2020, hospitals with 1-99, 100-199, and 200-399 beds experienced fewer SSIs following COLO procedures than predicted, performing BETTER than the national experience
- All other hospitals experienced the same number of SSIs following COLO procedures as predicted, performing the SAME as the national experience

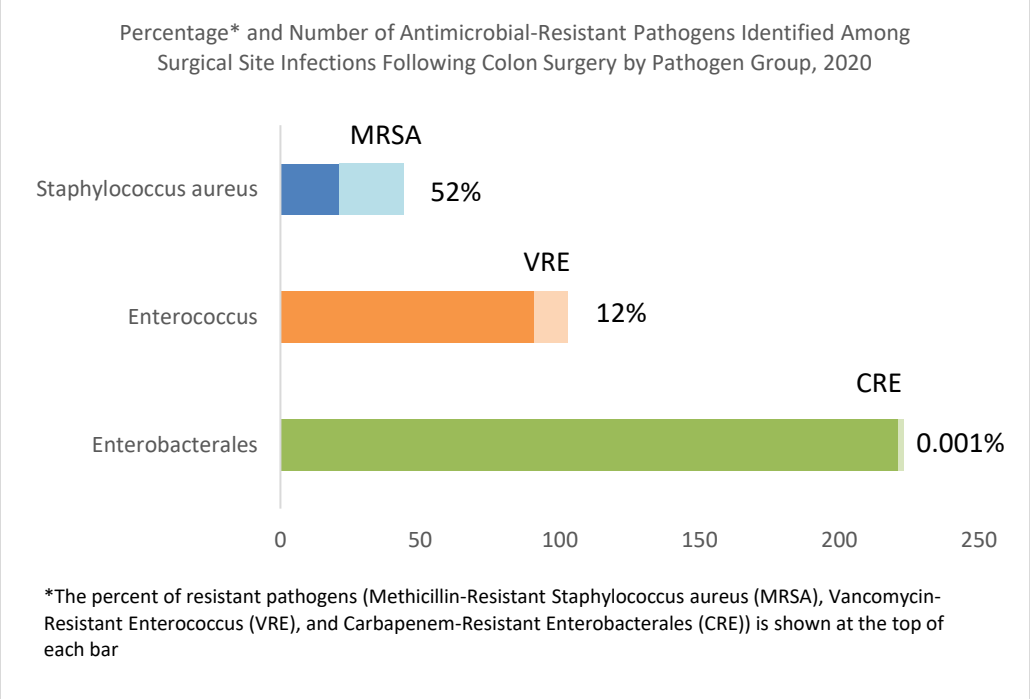
Figure 23.



Interpreting Figure 23:

- *Escherichia coli* (27%) followed by *Enterococcus* (18%) were the most commonly reported pathogens isolated from patients with surgical site infections following colon surgeries

Figure 24.

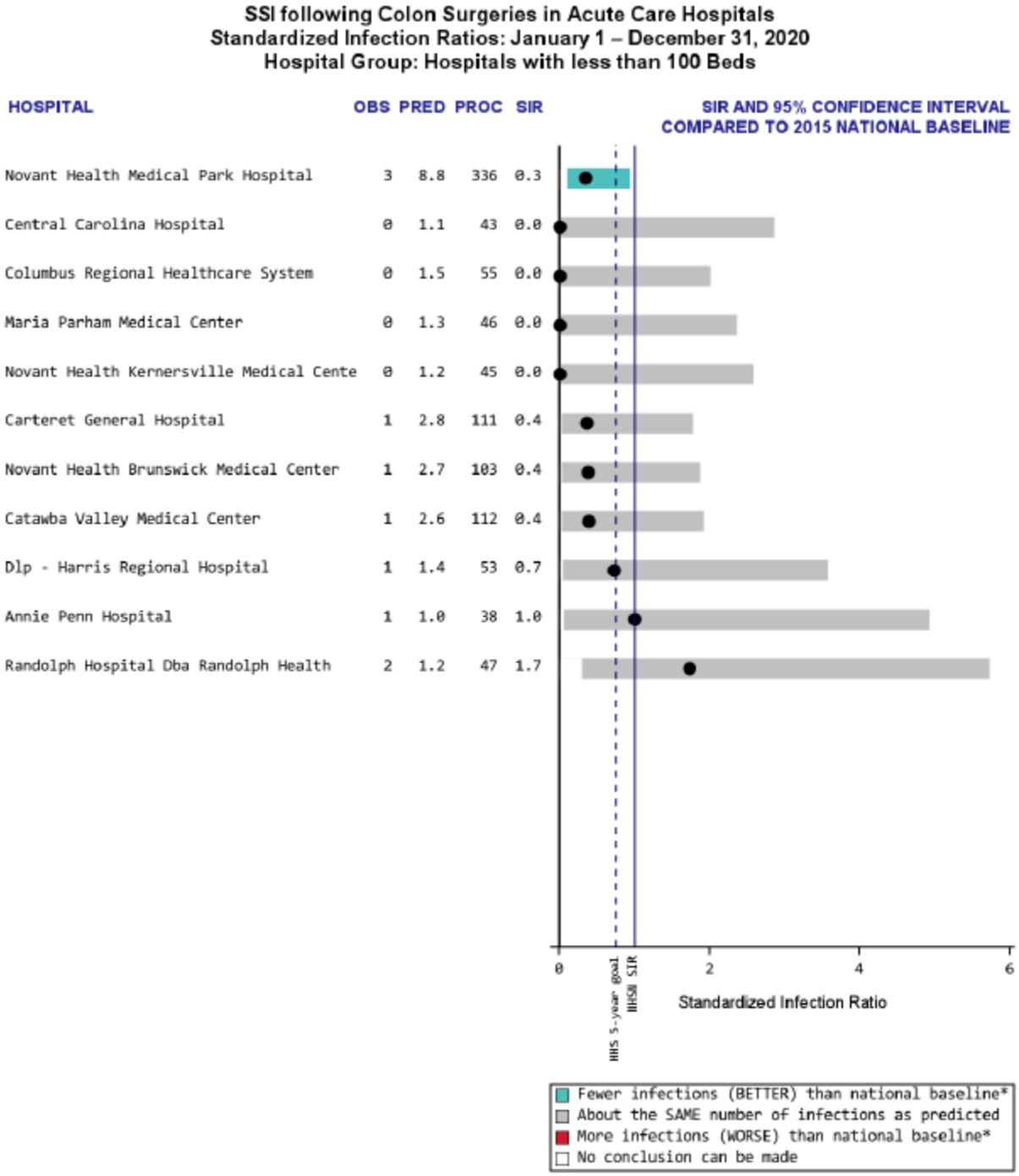


*The percent of resistant pathogens (Methicillin-Resistant Staphylococcus aureus (MRSA), Vancomycin-Resistant Enterococcus (VRE), and Carbapenem-Resistant Enterobacterales (CRE)) is shown at the top of each bar

Interpreting Figure 24:

- In 2020, 52% of *Staphylococcus aureus* identified among SSIs following colon surgeries were resistant to methicillin
- 12% of *Enterococcus* identified among SSIs following colon surgeries were Vancomycin resistant
- Only 0.001% of *Enterobacterales* identified among SSIs following colon surgeries were resistant to carbapenems

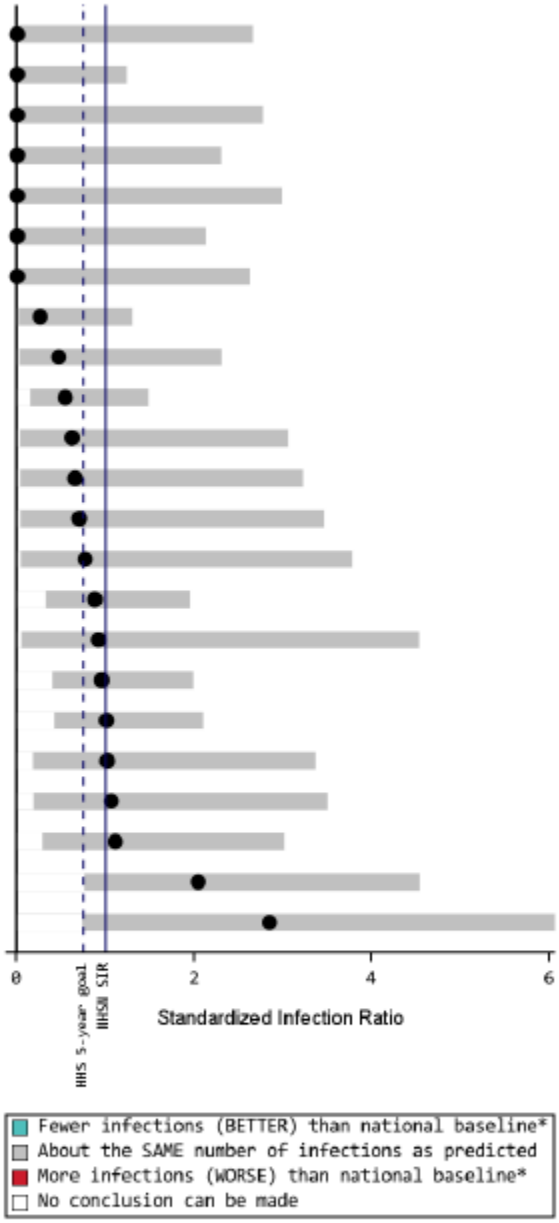
The following SIR plots summarize colon surgery SSI infection data for North Carolina hospitals by hospital groups (Appendix E).



Data reported from adult/pediatric units as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PROC = # of Procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <20 procedures
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2015 national baseline

SSI following Colon Surgeries in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 100 to 199 Beds

HOSPITAL	OBS	PRED	PROC	SIR
Advent Health Hendersonville	0	1.1	42	0.0
Carolinas Healthcare System Blue Ridge	0	2.4	90	0.0
Haywood Regional Medical Center	0	1.1	41	0.0
Johnston Health	0	1.3	49	0.0
Novant Health Thomasville Medical Center	0	1.0	38	0.0
Onslow Memorial Hospital	0	1.4	53	0.0
Rutherford Regional Medical Center	0	1.1	40	0.0
Duke Raleigh Hospital	1	3.8	141	0.3
Iredell Memorial Hospital	1	2.1	80	0.5
Wesley Long Hospital	3	5.5	209	0.5
Frye Regional Medical Center	1	1.6	61	0.6
Wilson Medical Center	1	1.5	54	0.7
Sentara Albemarle Medical Center	1	1.4	52	0.7
Nash Health Care Systems	1	1.3	53	0.8
Novant Health Huntersville	5	5.7	220	0.9
Caldwell Memorial Hospital	1	1.1	42	0.9
Novant Health Matthews Medical Center	6	6.3	236	1.0
WakeMed Cary Hospital	6	6.0	223	1.0
Lenoir Memorial Hospital	2	2.0	70	1.0
Atrium Health University City	2	1.9	68	1.1
Pardee Hospital	3	2.7	99	1.1
Atrium-Union	5	2.4	86	2.0
Northern Regional Hospital	3	1.1	41	2.8

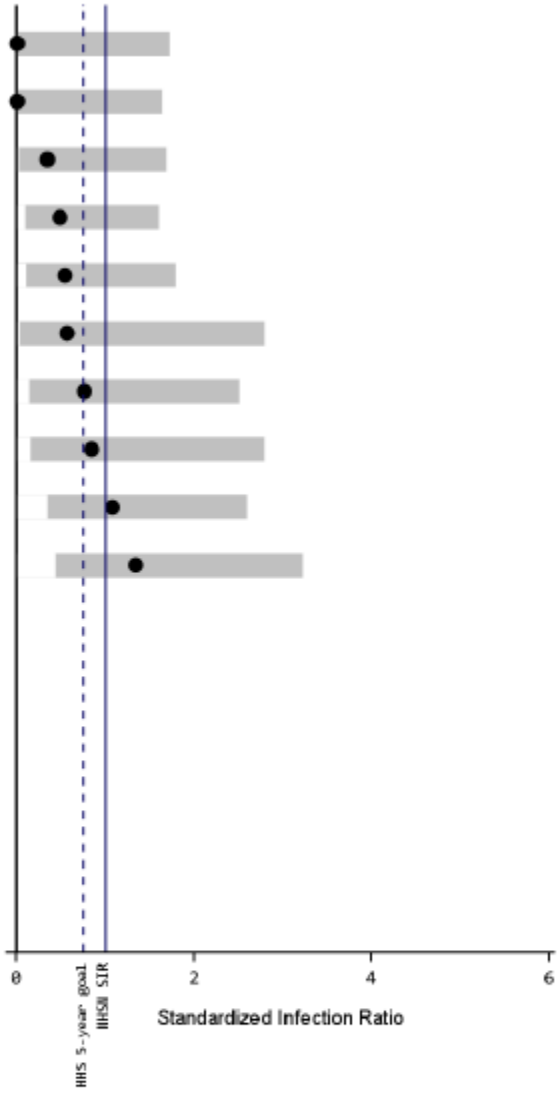


Data reported from adult/pediatric units as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PROC = # of Procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <20 procedures
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2015 national baseline

SSI following Colon Surgeries in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 200 to 399 Beds

HOSPITAL	OBS	PRED	PROC	SIR
Southeastern Regional Medical Center	0	1.7	60	0.0
Wayne Memorial Hospital	0	1.8	63	0.0
Duke Regional Hospital	1	2.9	105	0.3
Atrium-Pineville	2	4.2	156	0.5
FirstHealth Moore Regional Hospital	2	3.7	140	0.5
Carolinas Healthcare System Cleveland	1	1.8	65	0.6
Alamance Regional Medical Center	2	2.6	95	0.8
CarolinaEast Medical Center	2	2.4	87	0.8
High Point Regional Health System	4	3.7	135	1.1
Novant Health Rowan Medical Center	4	3.0	108	1.3

SIR AND 95% CONFIDENCE INTERVAL
COMPARED TO 2015 NATIONAL BASELINE

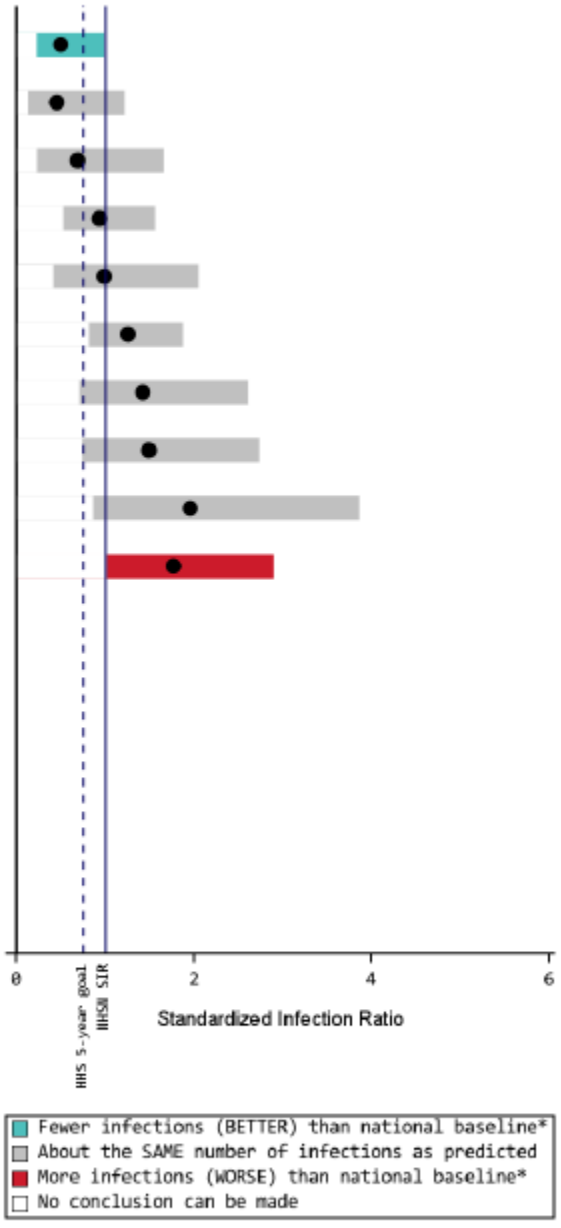


Data reported from adult/pediatric units as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PROC = # of Procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <20 procedures
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2015 national baseline

SSI following Colon Surgeries in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 400 or More Beds

HOSPITAL	OBS	PRED	PROC	SIR
New Hanover Regional Medical Center	7	14.3	507	0.5
Cape Fear Valley Health System	3	6.7	229	0.4
Gaston Memorial Hospital	4	5.9	212	0.7
Mission Hospital	13	14.0	501	0.9
Novant Health Forsyth Medical Center	6	6.1	210	1.0
Rex Healthcare	22	17.6	637	1.2
Atrium Health Cabarrus	9	6.4	232	1.4
Novant Health Presbyterian Medical	9	6.1	221	1.5
Moses Cone Hospital	7	3.6	113	2.0
WakeMed	14	7.9	257	1.8

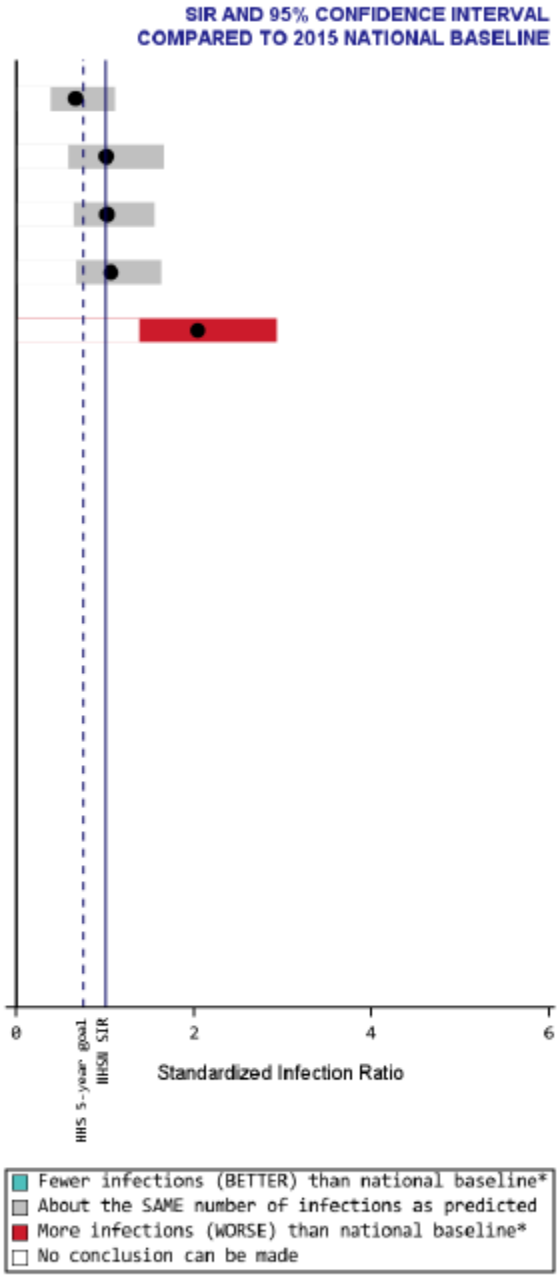
SIR AND 95% CONFIDENCE INTERVAL
COMPARED TO 2015 NATIONAL BASELINE



Data reported from adult/pediatric units as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PROC = # of Procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <20 procedures
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2015 national baseline

SSI following Colon Surgeries in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with Primary Medical School Affiliation

HOSPITAL	OBS	PRED	PROC	SIR
Carolinas Medical Center	13	19.7	633	0.7
Wake Forest University Baptist Medical	14	13.9	457	1.0
Duke University Hospital	20	19.7	658	1.0
UNC Health Care	19	18.0	565	1.1
Vidant Medical Center	27	13.2	425	2.0



Data reported from adult/pediatric units as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PROC = # of Procedures
SIR = Standardized infection ratio (OBS/PRED # of infections)
NA = Data not shown for hospitals with <20 procedures
NC = SIR not calculated for hospitals with <1 predicted infection
*Significantly different than 2015 national baseline

D. Laboratory-Identified Events

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

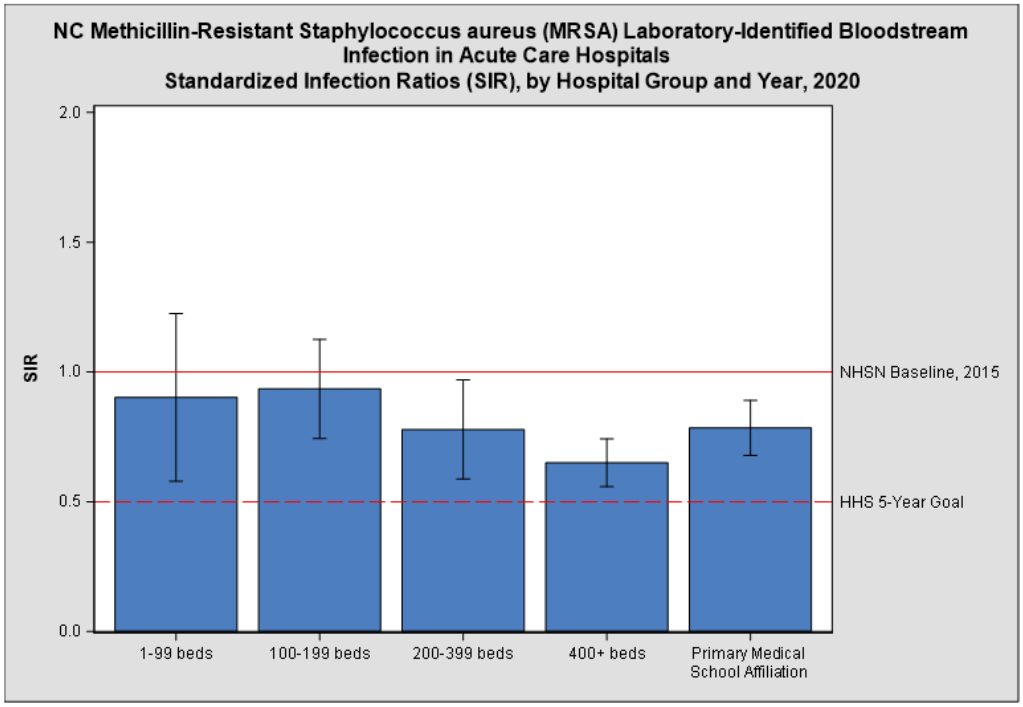
North Carolina 2020 MRSA LabID Highlights

- In 2020 North Carolina hospitals reported 294 MRSA LabID events, compared to the 388 MRSA LabID events which were predicted. This is better than predicted by the 2015 national experience.
- The U.S. Department of Health and Human Services set a goal to reduce MRSA nationally by 50% from the baseline experience by 2020; North Carolina has not yet met this goal.

Table 6. NC Methicillin-Resistant Staphylococcus Aureus Laboratory-Identified events, 2020

Year	# Observed Events	# Predicted Events	How Does North Carolina Compare to the National Experience?
2020	294	388.4	★BETTER: Fewer infections than were predicted (better than the national experience)

Figure 25.



Interpreting Figure 25:

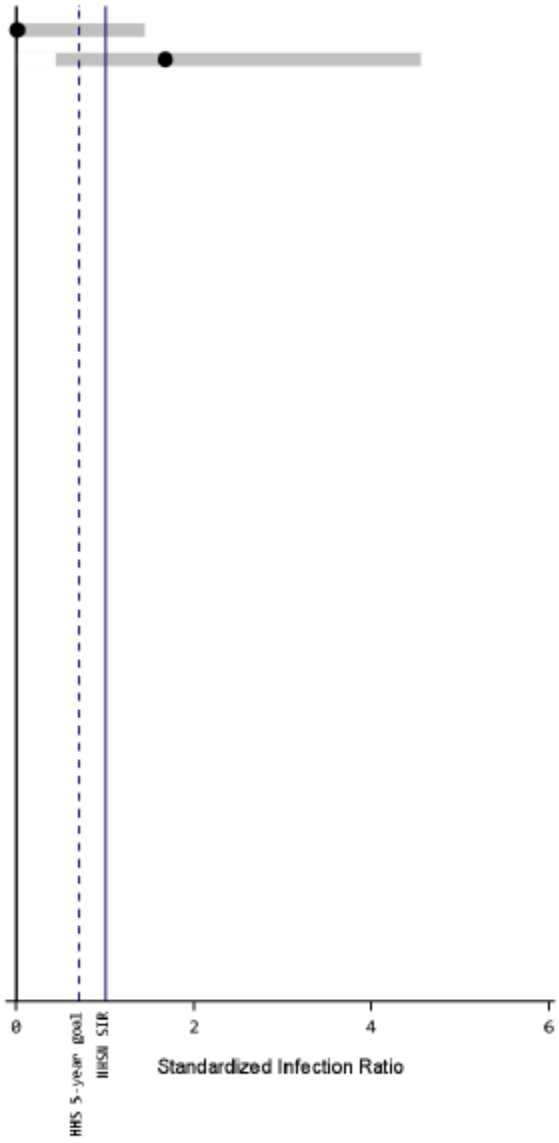
- Hospitals with 1-99 and 100-199 beds performed the SAME as the national experience, with about the same number of MRSA LabID events as predicted
- All other hospital size groups reported a lower number of events as predicted, performing BETTER as the 2015 national experience

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

MRSA in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with less than 100 Beds

HOSPITAL	OBS	PRED	PD	SIR
Annie Penn Hospital	0	2.1	53439	0.0
Catawba Valley Medical Center	3	1.8	52935	1.7
Betsy Johnson Hospital	0	0.5	15427	NC
Cape Fear Valley Hoke Hospital	0	0.1	3878	NC
Carolinas Healthcare System Anson	0	0.0	1309	NC
Carteret General Hospital	1	0.9	25251	NC
Central Carolina Hospital	1	0.7	14429	NC
Central Harnett Hospital	0	0.3	6936	NC
Cherokee Indian Hospital	0	0.1	2721	NC
Columbus Regional Healthcare System	0	0.9	18981	NC
Dlp - Harris Regional Hospital	0	0.3	12228	NC
Firsthealth Moore Regional-Hoke	0	0.0	1606	NC
Firsthealth Moore Regional-Richmond	0	0.4	8967	NC
Granville Medical Center	0	0.2	8755	NC
Johnston Health Clayton	0	0.4	12553	NC
Kings Mountain Hospital	0	0.2	4379	NC
Maria Parham Medical Center	2	0.9	16595	NC
Martin General Hospital	0	0.1	4278	NC
McDowell Hospital	0	0.3	8213	NC
North Carolina Specialty Hospital	0	0.1	3370	NC
Novant Health Brunswick Medical Center	2	0.5	19963	NC
Novant Health Charlotte Orthopedic Hosp	0	0.2	13460	NC
Novant Health Clemmons Medical Center	0	0.2	6105	NC
Novant Health Kernersville Medical Cent	0	0.4	14266	NC
Novant Health Medical Park Hospital	0	0.1	4739	NC
Novant Health Mint Hill Medical Center	0	0.5	11045	NC
Person Memorial Hospital	0	0.1	4607	NC
Randolph Hospital Dba Randolph Health	1	0.8	15507	NC
Vidant Beaufort Hospital	0	0.7	17449	NC
Vidant Duplin Hospital	2	0.9	12605	NC
Wake Forest Baptist Health-Davie Medica	3	0.2	7186	NC
Wake Forest Baptist Health-Lexington	0	0.7	14950	NC
Wakemed North Family Health & Women's H	0	0.4	15887	NC

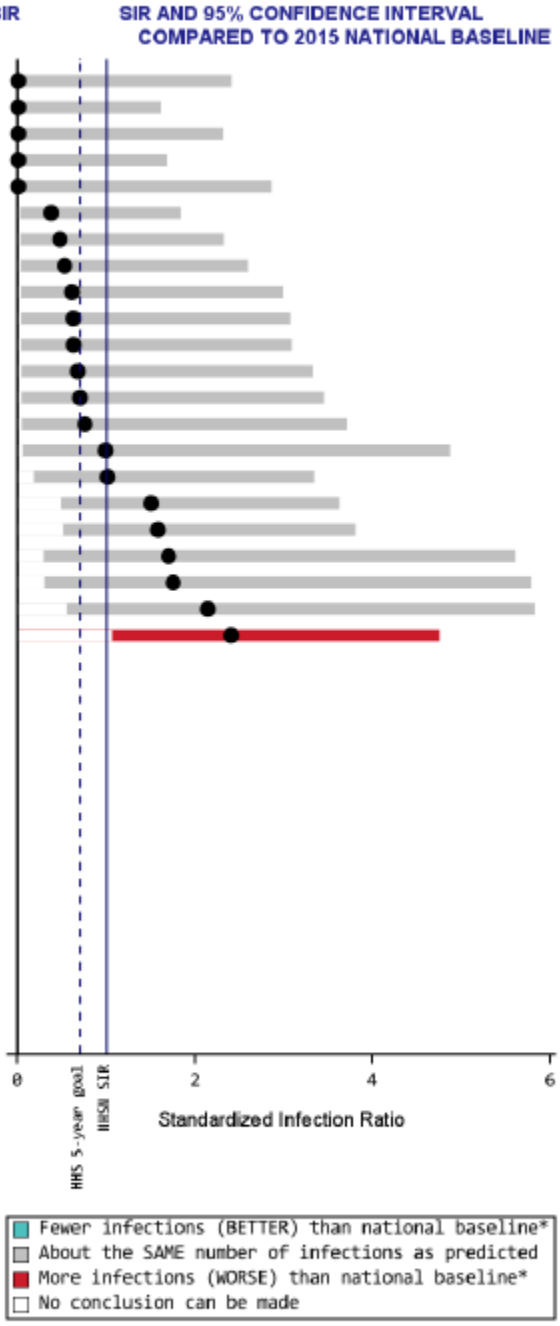
SIR AND 95% CONFIDENCE INTERVAL COMPARED TO 2015 NATIONAL BASELINE



Data reported as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NC = SIR not calculated for hospitals with <1 predicted infection

MRSA in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 100 to 199 Beds

HOSPITAL	OBS	PRED	PD	SIR
Atrium Health Lincoln	0	1.2	20249	0.0
Carolinas Healthcare System Blue Ridge	0	1.9	25138	0.0
Haywood Regional Medical Center	0	1.3	18669	0.0
Novant Health Matthews Medical Center	0	1.8	50348	0.0
Pardee Hospital	0	1.1	31299	0.0
Johnston Health	1	2.7	38913	0.4
Atrium-Union	1	2.1	37822	0.5
WakeMed Cary Hospital	1	1.9	53759	0.5
Wesley Long Hospital	1	1.7	39490	0.6
Atrium Health University City	1	1.6	32367	0.6
Lenoir Memorial Hospital	1	1.6	27922	0.6
Novant Health Huntersville	1	1.5	37834	0.7
Iredell Memorial Hospital	1	1.4	36303	0.7
Vidant Roanoke Chowan Hospital	1	1.3	19261	0.8
Halifax Regional Medical Center	1	1.0	22532	1.0
Frye Regional Medical Center	2	2.0	29616	1.0
Atrium-Mercy	4	2.7	48063	1.5
Nash Health Care Systems	4	2.5	47887	1.6
Scotland Memorial Hospital	2	1.2	28324	1.7
Vidant Edgecombe Hospital	2	1.1	14666	1.8
Onslow Memorial Hospital	3	1.4	30014	2.1
Duke Raleigh Hospital	7	2.9	52824	2.4
ARHS-Watauga Medical Center	3	0.9	17152	NC
Advent Health Hendersonville	1	0.2	8860	NC
Atrium Health Stanly	0	0.7	13325	NC
Caldwell Memorial Hospital	1	0.9	20147	NC
Cone Green Valley	3	0.8	19455	NC
Davis Regional Medical Center	0	0.7	12307	NC
Lake Norman Regional Medical Center	1	0.7	20612	NC
Northern Regional Hospital	0	0.8	17892	NC
Novant Health Thomasville Medical Cente	1	0.9	15780	NC
Rutherford Regional Medical Center	1	0.5	11045	NC
Sampson Regional Medical Center	0	0.5	10869	NC
Sentara Albemarle Medical Center	1	0.9	17000	NC
UNC Rockingham Health	0	0.6	11619	NC
Wake Forest Baptist Health Wilkes Medic	0	0.9	15909	NC
Wilson Medical Center	0	0.9	31729	NC



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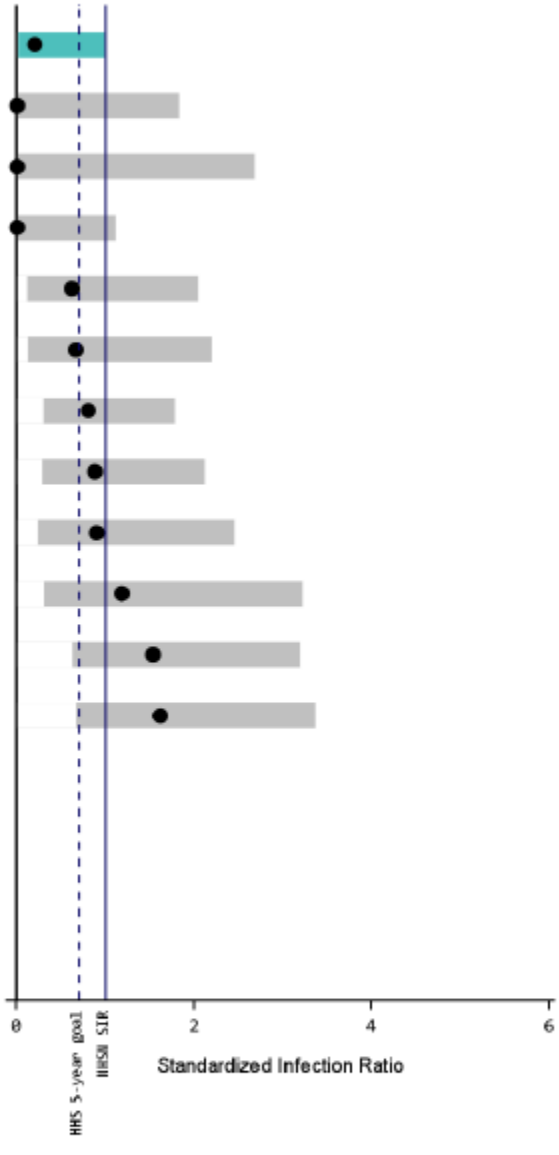
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NC = SIR not calculated for hospitals with <1 predicted infection

MRSA in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 200 to 399 Beds

HOSPITAL	OBS	PRED	PD	SIR
Duke Regional Hospital	1	5.1	74099	0.2
Broughton Hospital	0	1.6	83531	0.0
Cherry Hospital	0	1.1	73845	0.0
Novant Health Rowan Medical Center	0	2.7	47487	0.0
Carolinas Healthcare System Cleveland	2	3.2	46993	0.6
Southeastern Regional Medical Center	2	3.0	60006	0.7
FirstHealth Moore Regional Hospital	5	6.2	92832	0.8
Atrium-Pineville	4	4.6	70897	0.9
CarolinaEast Medical Center	3	3.3	62710	0.9
Alamance Regional Medical Center	3	2.5	42755	1.2
High Point Regional Health System	6	3.9	62899	1.5
Wayne Memorial Hospital	6	3.7	49366	1.6

SIR AND 95% CONFIDENCE INTERVAL COMPARED TO 2015 NATIONAL BASELINE



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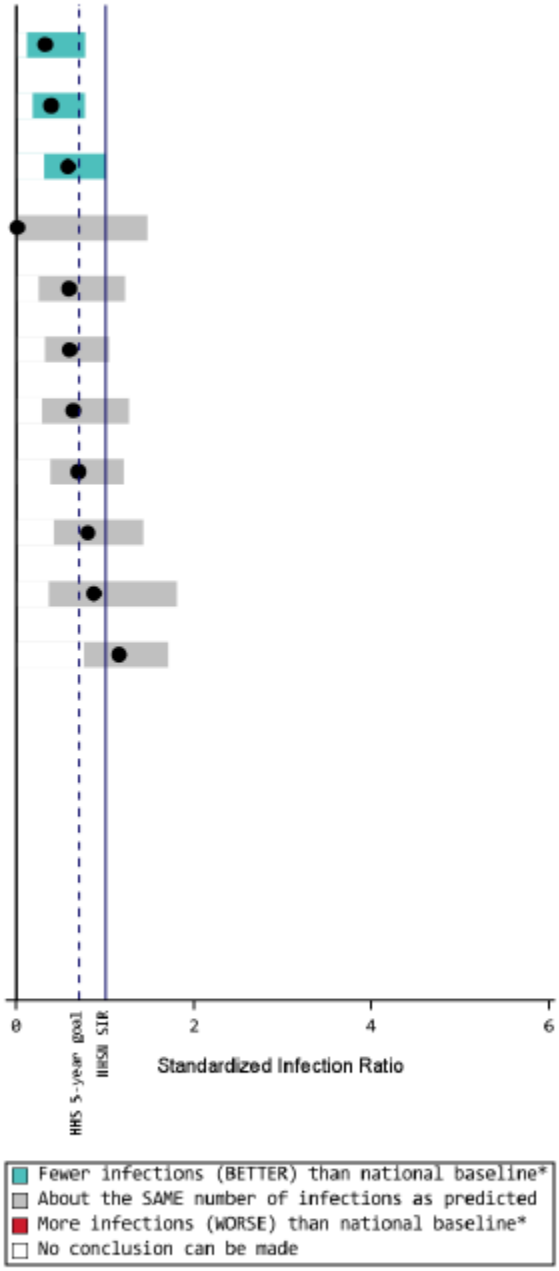
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NC = SIR not calculated for hospitals with <1 predicted infection

MRSA in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 400 or More Beds

HOSPITAL	OBS	PRED	PD	SIR
Moses Cone Hospital	4	12.7	152806	0.3
Novant Health Forsyth Medical Center	7	18.3	168041	0.4
Mission Hospital	11	19.2	211959	0.6
Central Regional Hospital	0	2.0	119881	0.0
Novant Health Presbyterian Medical	6	10.3	126433	0.6
WakeMed	11	18.6	183199	0.6
Atrium Health Cabarrus	7	11.1	117309	0.6
Rex Healthcare	11	15.9	146245	0.7
Cape Fear Valley Health System	10	12.6	162470	0.8
Gaston Memorial Hospital	6	6.9	112003	0.9
New Hanover Regional Medical Center	23	20.0	183828	1.2



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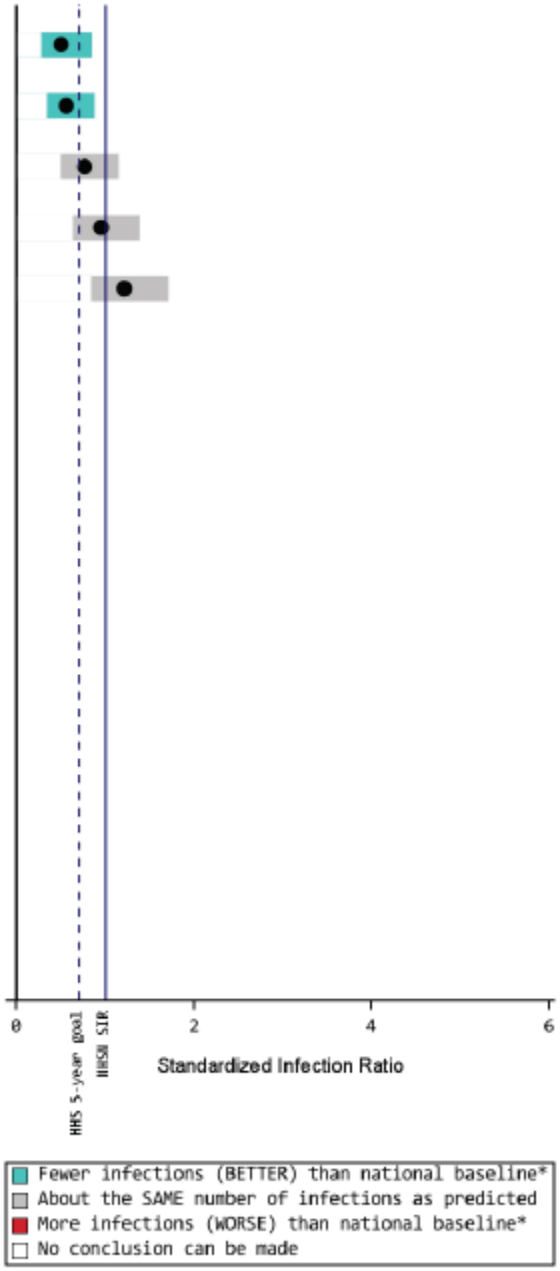
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NC = SIR not calculated for hospitals with <1 predicted infection

MRSA in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with Primary Medical School Affiliation

HOSPITAL	OBS	PRED	PD	SIR
Vidant Medical Center	12	24.3	239346	0.5
Duke University Hospital	17	30.7	305372	0.6
UNC Health Care	21	27.6	253961	0.8
Carolinas Medical Center	25	26.4	296372	0.9
Wake Forest University Baptist Medical	30	24.9	228318	1.2

SIR AND 95% CONFIDENCE INTERVAL
COMPARED TO 2015 NATIONAL BASELINE



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PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NC = SIR not calculated for hospitals with <1 predicted infection

3. *Clostridioides difficile* Laboratory-Identified Events (CDI LabID)

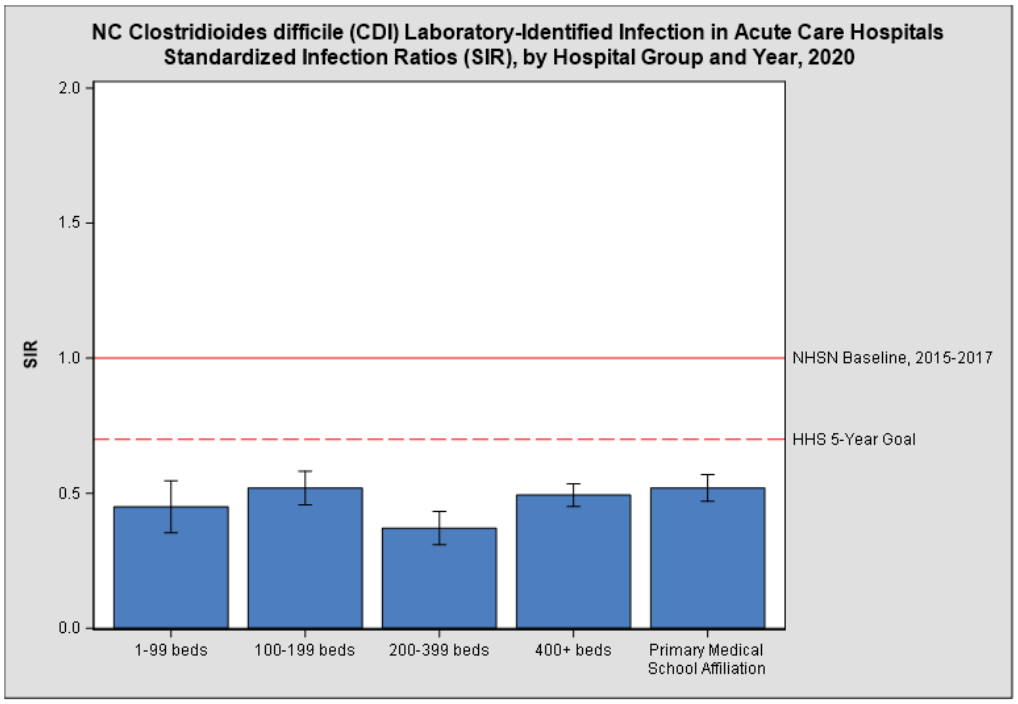
North Carolina 2020 CDI LabID Highlights

- In 2020, North Carolina hospitals reported 1430 CDI LabID events, compared to the 2938 CDI LabID events which were predicted. This was better than the 2015 national experience.
- The U.S. Department of Health and Human Services set a goal to reduce CDI nationally by 30% from the baseline experience by 2020; North Carolina has met this goal.

Table 7. NC Clostridioides difficile laboratory-identified events, 2020

Year	# Observed Infections	# Predicted Infections	How Does North Carolina Compare to the National Experience?
2020	**1430**	**2938**	**★BETTER: Fewer infections than were predicted (better than the national experience)**

Figure 26.



Interpreting Figure 26:

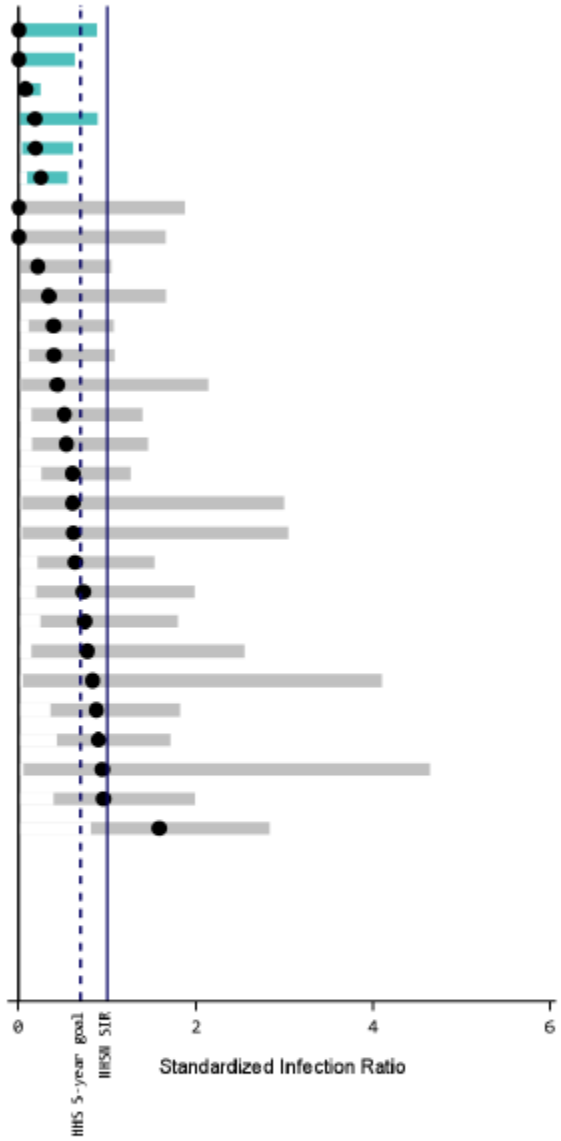
- All hospital sized groups performed BETTER than the national experience, with fewer LabID CDI events than predicted
- All hospital sized groups met or exceeded the DHHS 5-Year goal for reduction of LabID CDI events by 30%

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

C Difficile in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with less than 100 Beds

HOSPITAL	OBS	PRED	PD	SIR
Central Harnett Hospital	0	3.4	6936	0.0
Firsthealth Moore Regional-Richmond	0	4.8	8967	0.0
Annie Penn Hospital	2	27.9	53439	0.1
Novant Health Mint Hill Medical Center	1	5.6	10084	0.2
Novant Health Brunswick Medical Center	2	10.9	19136	0.2
Catawba Valley Medical Center	5	20.3	50529	0.2
Martin General Hospital	0	1.6	4278	0.0
Novant Health Clemmons Medical Center	0	1.8	6105	0.0
Vidant Duplin Hospital	1	4.8	11642	0.2
Wakemed North Family Health & Women's H	1	3.0	11513	0.3
Maria Parham Medical Center	3	7.7	15899	0.4
Randolph Hospital Dba Randolph Health	3	7.6	14286	0.4
Novant Health Charlotte Orthopedic Hosp	1	2.3	13460	0.4
Wake Forest Baptist Health-Lexington	3	5.9	14833	0.5
Novant Health Kernersville Medical Cent	3	5.6	14266	0.5
Columbus Regional Healthcare System	6	9.9	18406	0.6
Person Memorial Hospital	1	1.6	4607	0.6
Wake Forest Baptist Health-Davie Medica	1	1.6	7186	0.6
Central Carolina Hospital	4	6.3	13479	0.6
Johnston Health Clayton	3	4.1	10698	0.7
Granville Medical Center	4	5.4	8326	0.7
McDowell Hospital	2	2.6	7661	0.8
Kings Mountain Hospital	1	1.2	4379	0.8
Carteret General Hospital	6	6.9	23745	0.9
Betsy Johnson Hospital	8	8.9	14221	0.9
Novant Health Medical Park Hospital	1	1.1	4739	0.9
Vidant Beaufort Hospital	6	6.3	17024	1.0
Dlp - Harris Regional Hospital	10	6.3	12228	1.6
Cape Fear Valley Hoke Hospital	1	0.8	3878	NC
Carolinas Healthcare System Anson	0	0.3	1309	NC
Cherokee Indian Hospital	1	0.5	2721	NC
Firsthealth Moore Regional-Hoke	1	0.5	1606	NC
North Carolina Specialty Hospital	0	0.6	3370	NC

SIR AND 95% CONFIDENCE INTERVAL COMPARED TO 2015 NATIONAL BASELINE



Data reported as of May 3, 2020 .
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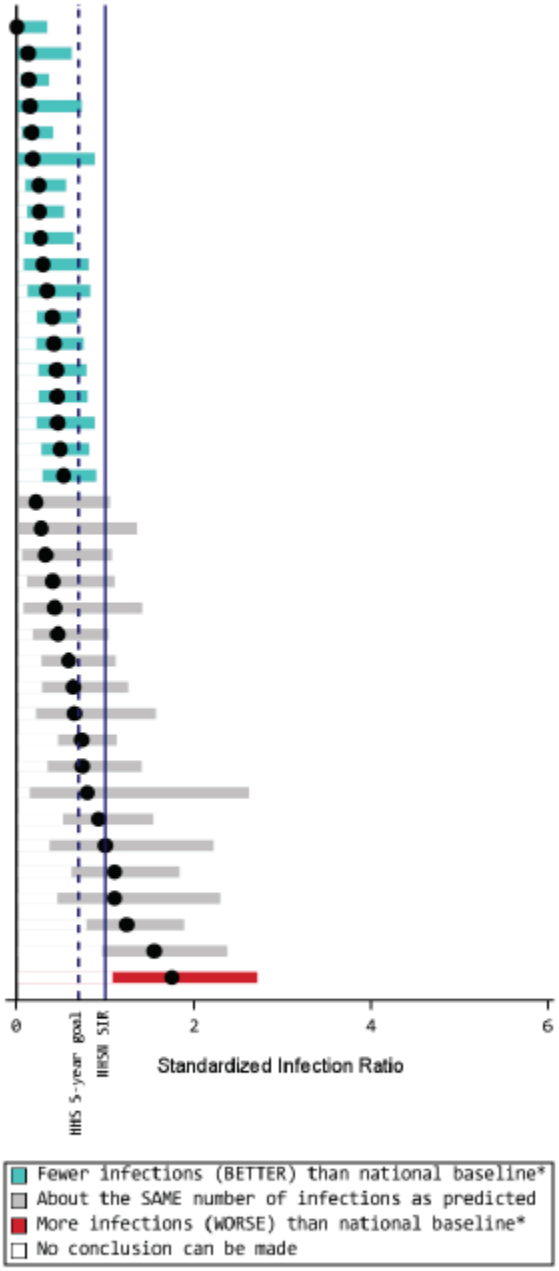
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NC = SIR not calculated for hospitals with <1 predicted infection

C Difficile in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 100 to 199 Beds

HOSPITAL	OBS	PRED	PD	SIR
Novant Health Thomasville Medical Cente	0	8.8	14526	0.0
Atrium Health Stanly	1	8.0	12485	0.1
Duke Raleigh Hospital	3	22.8	52824	0.1
ARHS-Watauga Medical Center	1	6.8	17088	0.1
Novant Health Huntersville	4	24.3	34109	0.2
Cone Green Valley	1	5.6	11937	0.2
Atrium-Union	5	20.2	35423	0.2
WakeMed Cary Hospital	6	23.8	46221	0.3
Atrium Health University City	4	15.1	27766	0.3
Lenoir Memorial Hospital	3	10.2	27024	0.3
Atrium Health Lincoln	4	11.8	19335	0.3
Atrium-Mercy	12	30.0	48063	0.4
Nash Health Care Systems	10	24.0	44403	0.4
Wesley Long Hospital	11	24.6	39490	0.4
Frye Regional Medical Center	11	24.2	29056	0.5
Scotland Memorial Hospital	8	17.4	25984	0.5
Novant Health Matthews Medical Center	13	26.8	44585	0.5
Johnston Health	12	22.9	37459	0.5
Rutherford Regional Medical Center	1	4.7	10597	0.2
Sampson Regional Medical Center	1	3.7	10089	0.3
Davis Regional Medical Center	2	6.2	12307	0.3
Vidant Roanoke Chowan Hospital	3	7.4	18632	0.4
Vidant Edgecombe Hospital	2	4.7	13681	0.4
Pardee Hospital	5	10.8	31299	0.5
Sentara Albemarle Medical Center	8	13.7	16499	0.6
Caldwell Memorial Hospital	7	11.0	19655	0.6
Wilson Medical Center	4	6.2	30188	0.6
Iredell Memorial Hospital	19	26.0	34942	0.7
Lake Norman Regional Medical Center	8	10.8	19962	0.7
Advent Health Hendersonville	2	2.5	7574	0.8
Onslow Memorial Hospital	13	14.1	26515	0.9
Wake Forest Baptist Health Wilkes Medic	5	5.0	15280	1.0
Halifax Regional Medical Center	13	11.8	21736	1.1
Unc Rockingham Health	6	5.4	10864	1.1
Carolinas Healthcare System Blue Ridge	20	16.2	20707	1.2
Haywood Regional Medical Center	19	12.3	18168	1.5
Northern Regional Hospital	18	10.3	17296	1.8

SIR AND 95% CONFIDENCE INTERVAL COMPARED TO 2015 NATIONAL BASELINE

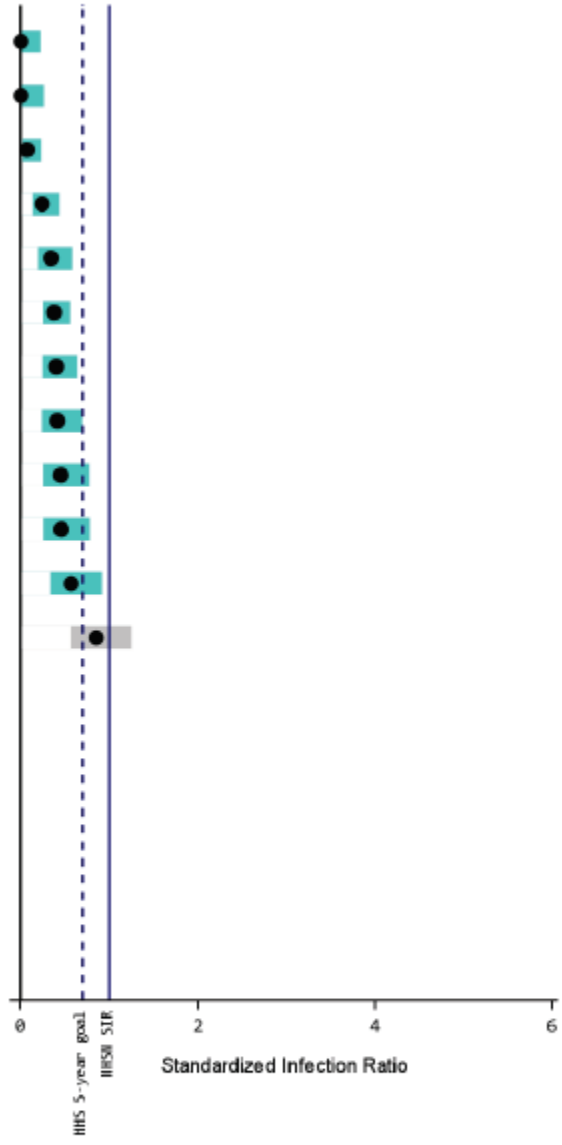


Data reported as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NC = SIR not calculated for hospitals with <1 predicted infection

C Difficile in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 200 to 399 Beds

HOSPITAL	OBS	PRED	PD	SIR
Broughton Hospital	0	14.0	83531	0.0
Cherry Hospital	0	11.8	73845	0.0
Novant Health Rowan Medical Center	2	29.9	45789	0.1
Atrium-Pineville	10	42.2	64773	0.2
CarolinaEast Medical Center	12	35.5	60177	0.3
FirstHealth Moore Regional Hospital	23	61.7	86761	0.4
Southeastern Regional Medical Center	16	40.2	56670	0.4
Duke Regional Hospital	13	31.7	64907	0.4
Carolinas Healthcare System Cleveland	12	26.7	44374	0.4
High Point Regional Health System	12	26.5	60354	0.5
Alamance Regional Medical Center	15	26.5	38752	0.6
Wayne Memorial Hospital	24	28.2	46733	0.9

SIR AND 95% CONFIDENCE INTERVAL
COMPARED TO 2015 NATIONAL BASELINE

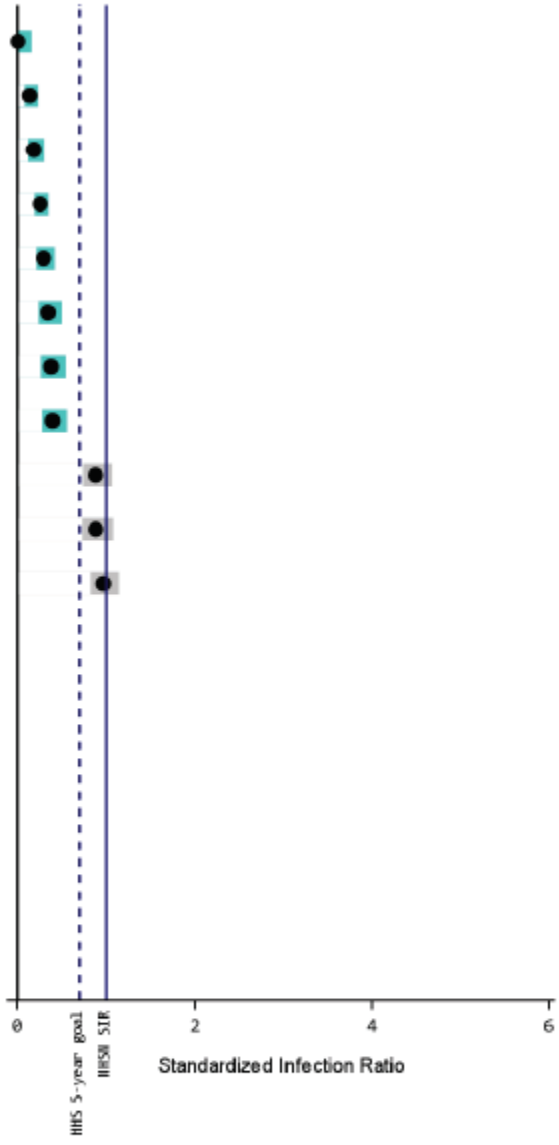


Data reported as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NC = SIR not calculated for hospitals with <1 predicted infection

C Difficile in Acute Care Hospitals
Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with 400 or More Beds

HOSPITAL	OBS	PRED	PD	SIR
Central Regional Hospital	0	20.8	119881	0.0
Moses Cone Hospital	13	98.7	152806	0.1
Gaston Memorial Hospital	14	78.9	106420	0.2
Novant Health Forsyth Medical Center	36	144	156557	0.3
WakeMed	31	107	161141	0.3
Novant Health Presbyterian Medical	26	77.0	103306	0.3
Atrium Health Cabarrus	27	72.5	107346	0.4
Cape Fear Valley Health System	30	77.2	143018	0.4
Rex Healthcare	108	123	131496	0.9
Mission Hospital	97	110	192565	0.9
New Hanover Regional Medical Center	137	142	173793	1.0

SIR AND 95% CONFIDENCE INTERVAL
COMPARED TO 2015 NATIONAL BASELINE



- Fewer infections (BETTER) than national baseline*
- About the SAME number of infections as predicted
- More infections (WORSE) than national baseline*
- No conclusion can be made

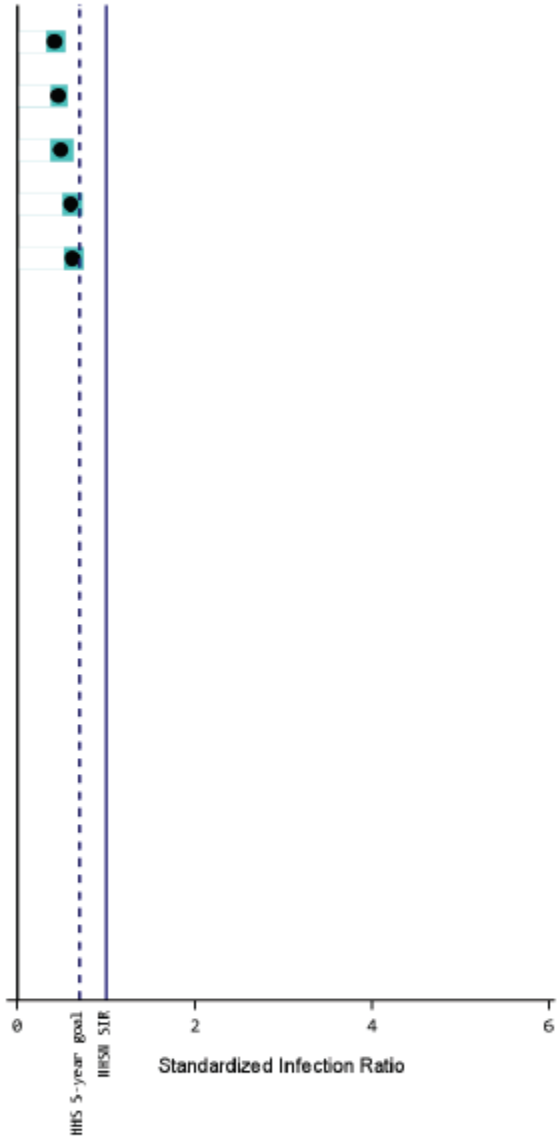
Data reported as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NC = SIR not calculated for hospitals with <1 predicted infection

C Difficile in Acute Care Hospitals

Standardized Infection Ratios: January 1 – December 31, 2020
Hospital Group: Hospitals with Primary Medical School Affiliation

HOSPITAL	OBS	PRED	PD	SIR
Vidant Medical Center	57	138	223108	0.4
Carolinas Medical Center	89	196	257862	0.5
Wake Forest University Baptist Medical	52	108	203001	0.5
Duke University Hospital	106	177	282008	0.6
UNC Health Care	119	194	230773	0.6

SIR AND 95% CONFIDENCE INTERVAL
COMPARED TO 2015 NATIONAL BASELINE



Data reported as of May 3, 2020 .
OBS = # infections observed
PRED = # infections statistically 'predicted' by national baseline
PD = # Patient days
SIR = Standardized infection ratio (OBS/PRED # of infections)
NC = SIR not calculated for hospitals with <1 predicted infection

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.

- ***Clostridioides 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, and 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) reported by the facility.

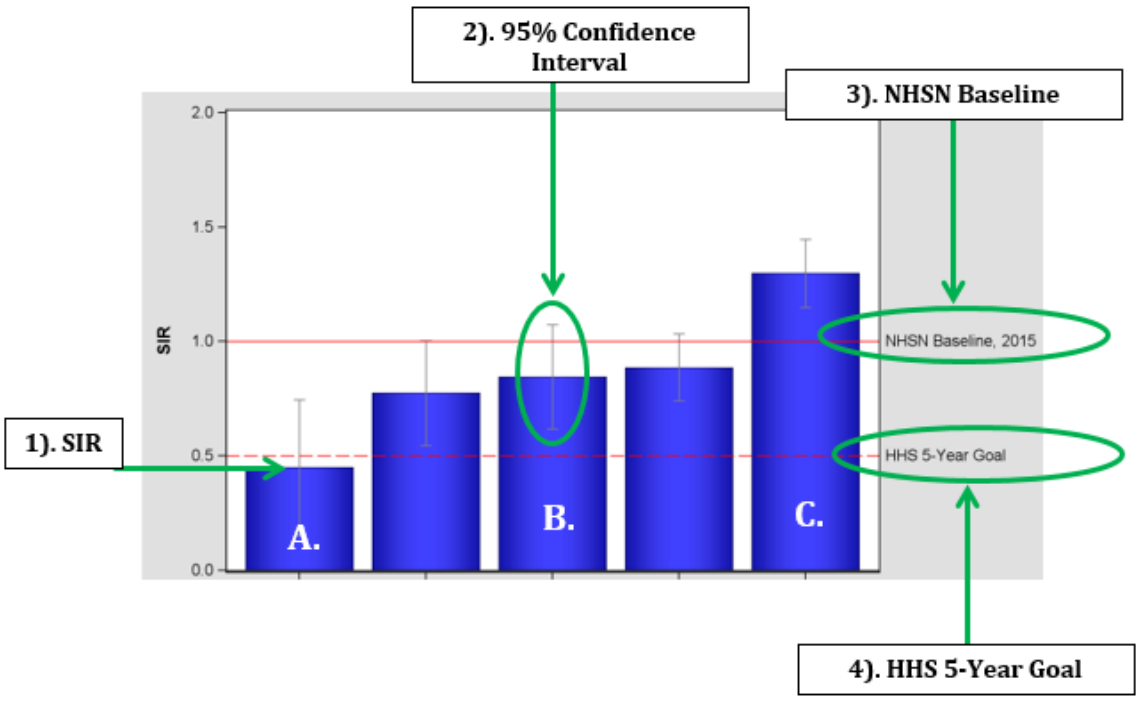
- **Predicted Infections (or Predicted Events):** This is a calculated value that reflects the number of infections (or events, for LabID measures) that we have "predicted" to occur in this facility, based on the national experience.

- **"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 the time period presented.

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.

Interpreting 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.

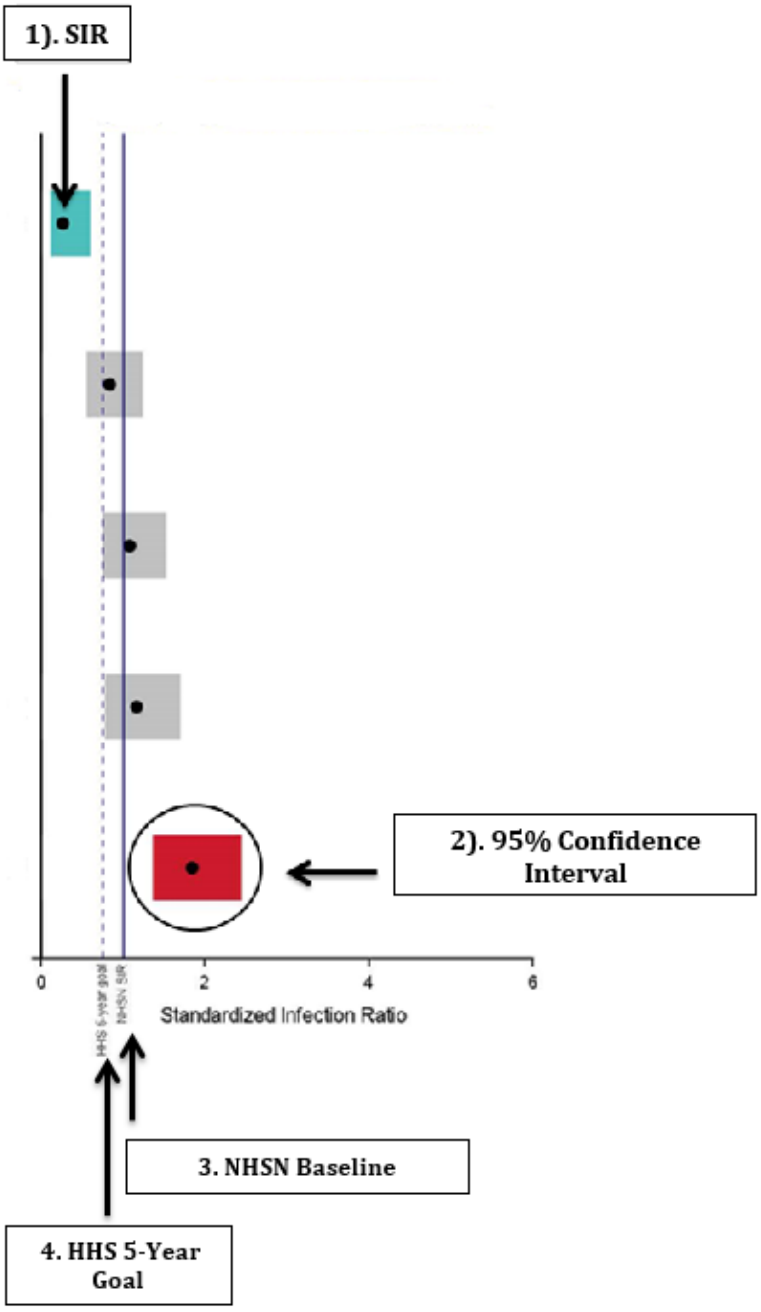
- The NHSN baseline is the number of predicted infections based on the national experience.
- The NHSN baseline year for all HAIs use data from 2015.

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.
- For CLABSI the 5-year goal is a 50% reduction from the 2015 baseline experience by 2020, 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 (the NHSN baseline), 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

- SIR = number of *observed* infections / number of *predicted* infections based on the national baseline experience.
- SIR is calculated for each facility.
- The SIR is considered a "best guess" or estimate of observed infections compared to those predicted during time period displayed.

2). 95% confidence intervals for the SIR – Represented by the red, grey, and green bands surrounding the SIR dot. These bands represent a lower and a higher limit around the SIR. It means we are 95% confident the SIR estimate falls within this interval. Wider bands indicate less confidence in the SIR estimate.

Interpreting 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. Facilities with about the same number observed infections as predicted will have a grey confidence interval.
- If the upper confidence limit is less than 1.0, there were FEWER observed infections than predicted by the national experience. Facilities with fewer observed infections than predicted will have a green confidence interval.
- If the lower confidence limit is greater than 1.0, there were MORE observed infections than predicted by the national experience. 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.

- The NHSN baseline is the number of predicted infections based on the national experience.
- The NHSN baseline year is 2015.

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

- Health and Human Services established a 5-year goal to reduce each HAI by a certain percentage from the 2015 baseline.
- If the upper confidence limit is below this dotted line, the facility has met the HHS 5-year goal.
- If the confidence interval crosses the dotted line, the number of infections at that facility does not differ from the 5-year goal.
- If the lower confidence limit is above this dotted line the facility has not met the 5-year goal.

APPENDICES

APPENDIX A. Definitions

Term	Definition
Aggregate data	Sum or total data. For example, aggregate NC HAI data refers to the sum, or total, of all hospital HAI data in NC
Beds	The number of staffed beds in a facility or patient care location. This may be different from the number of licensed beds.
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.
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: *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. *Graduate* – Hospital used by the medical school for graduate training programs only (i.e., residency and/or fellowships). *Limited* – Hospital used in the medical school's teaching program to a limited extent. *No* – Hospital not affiliated with a medical school.
Standardized infection ratio	A ratio of observed to expected (or predicted) numbers of infection 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.
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

APIC-NC	Association for Professionals in Infection Control and Epidemiology, NC Chapter
BSI	Bloodstream infection
CAUTI	Catheter-associated urinary tract infection
CDC	Centers for Disease Control and Prevention
C. diff	*Clostridioides difficile*
CDI	*Clostridioides difficile* infection
CI	Confidence interval
CMS	Centers for Medicare & Medicaid Services
CLABSI	Central line-associated bloodstream infections
CRE	Carbapenem-resistant Enterobacterales
DHHS	Department of Health and Human Services
DHSR	Division of Health Service Regulation
DPH	Division of Public Health
HAI	Healthcare-associated Infections
ICU	Intensive care unit
IP	Infection preventionist
MRSA	Methicillin resistant *Staphylococcus aureus*
NCHA	North Carolina Healthcare Association
NC SPICE	North Carolina Statewide Program for Infection Control and Epidemiology
NHLC	Nursing Home Licensure and Certification
NHSN	National Healthcare Safety Network
NICU	Neonatal intensive (critical) care unit
SIR	Standardized infection ratio
SSI	Surgical site infection
VRE	Vancomycin-resistant *Enterococcus*

Appendix C Surveillance for Healthcare-Associated and Resistant Pathogens Patient Safety (SHARPPS) Program Advisory Group

Surveillance for Healthcare-Associated and Resistant Pathogens Patient Safety (SHARPPS) Program Advisory Board

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Nurse Consultant
N.C Division of Public Health

Appendix D. Healthcare Facility Groupings, 2020 National Healthcare Safety Network Annual Hospital Survey

Hospital Group	Hospital Name	Number of Beds
1-99 beds	FirstHealth Moore Regional Hospital - Hoke Campus	8
	Carolinas Healthcare System Anson	15
	Cherokee Indian Hospital	18
	North Carolina Specialty Hospital	18
	Novant Health Medical Park Hospital	22
	Cape Fear Valley Hoke Hospital	29
	Murphy Medical Center	32
	McDowell Hospital	34
	Novant Health Clemmons Medical Center	36
	Person Memorial Hospital	38
	WakeMed North Family Health & Women's Hospital	44
	Novant Health Charlotte Orthopedic Hospital	48
	Martin General Hospital	49
	Wake Forest Baptist Health-Davie Medical Center	50
	Johnston Health Clayton	50
	Novant Health Kernersville Medical Center	50
	Central Harnett Hospital	50
	Annie Penn Hospital	53
	Granville Medical Center	62
	Columbus Regional Healthcare System	70
	Carteret General Hospital	72
	Kings Mountain Hospital	72
	Novant Health Brunswick Medical Center	74
	FirstHealth Moore Regional Hospital - Richmond Campus	79
	Vidant Duplin Hospital	80
	Hugh Chatham Memorial Hospital	81
	Randolph Hospital DBA Randolph Health	85
	Caldwell Memorial Hospital	85
	Wake Forest Baptist Health-Lexington Medical Center	85
	DLP - Harris Regional Hospital	86
	Vidant Beaufort Hospital	88
	Halifax Regional Medical Center	90
	Novant Health Huntersville Medical Center	91
	Sentara Albemarle Medical Center	97
	Park Ridge Health	98
100-199 beds	Carolinas Medical Center- University	100
	Haywood Regional Medical Center	100
	Northern Hospital of Surry County	100
	Maria Parham Medical Center	101

	Carolinas HealthCare System Lincoln	101
	Betsy Johnson Hospital	101
	Scotland Memorial Hospital	104
	UNC Rockingham Health	108
	Stanly Regional Medical Center	109
	Vidant Roanoke Chowan Hospital	114
	Sampson Regional Medical Center	116
	Central Carolina Hospital	116
	ARHS-Watauga Medical Center	117
	Vidant Edgecombe Hospital	117
	Lake Norman Regional Medical Center	123
	Rutherford Regional Medical Center	125
	Wake Forest Baptist Health Wilkes Medical Center	130
	Women's Hospital	134
	Pardee Hospital	138
	Carolinas Healthcare System Blue Ridge	139
	Davis Regional Medical Center	144
	Wilson Medical Center	145
	Novant Health Matthews Medical Center	146
	Novant Health Thomasville Medical Center	149
	Wesley Long Hospital	150
	Nash Health Care Systems	155
	Onslow Memorial Hospital	162
	Lenoir Memorial Hospital, Inc	167
	Frye Regional Medical Center	170
	Johnston Health	172
	Duke Raleigh Hospital	177
	WakeMed Cary Hospital	180
	Carolinas Medical Center - Union	182
	Catawba Valley Medical Center	190
	Iredell Memorial Hospital	199
200-399 beds	Carolinas Medical Center- Pineville	206
	Carolinas Medical Center- Mercy	213
	Duke Regional Hospital	214
	Alamance Regional Medical Center	238
	Carolinas Healthcare System Cleveland	241
	Wayne Memorial Hospital	242
	Cherry Hospital	243
	Southeastern Regional Medical Center	246
	Novant Health Rowan Medical Center	268
	Broughton Hospital	297
	High Point Regional Health System	300

	CarolinaEast Medical Center	**350**
	FirstHealth Moore Regional Hospital	**376**
400+ beds	**Central Regional Hospital**	**405**
	Gaston Memorial Hospital	**435**
	Moses Cone Hospital	**443**
	Carolinas Healthcare System - NorthEast	**457**
	Rex Healthcare	**665**
	Novant Health Presbyterian Medical Center	**699**
	New Hanover Regional Medical Center	**711**
	WakeMed	**716**
	Cape Fear Valley Health System	**775**
	Mission Hospital	**791**
	Novant Health Forsyth Medical Center	**879**
Primary Medical School Affiliation	**Wake Forest University Baptist Medical Center**	**885**
	Carolinas Medical Center	**898**
	Vidant Medical Center	**909**
	UNC Health Care	**914**
	Duke University Hospital	**952**