

**SLIDE 1 TITLE**

**SLIDE 2**

Hello, my name is Jennifer MacFarquhar, and I am a Centers for Disease Control epidemiologist assigned to the North Carolina Division of Public Health, Epidemiology Section. This presentation is about Healthcare-Associated Infections and initiatives underway to reduce such infections.

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At the end of this presentation, you should be able to:

1. Define and identify common healthcare-associated infections,
2. Discuss state and federal initiatives in response to healthcare-associated infections, and
3. Describe the infection prevention responsibilities of the local health department in response to infection control breaches in adult care homes.

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The Centers for Disease Control has defined healthcare-associated infections, or HAIs, as infections caused by a wide variety of common and unusual bacteria, fungi, and viruses during the course of receiving medical care.

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Common types of HAIs for which the Communicable Disease Branch performs surveillance and publishes reports are central line or catheter-associated bloodstream infections, known as CLABSIs; catheter-associated urinary tract infections, known as CAUTIs; surgical site infections, or SSIs; and Methicillin resistant *Staphylococcus aureus* (MRSA) and *Clostridium difficile* (CDI) laboratory identified events.

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In North Carolina, the pathogens most frequently identified with HAIs are yeast and fungi, *Enterococcus spp.*, *Staphylococcus spp.*, *Escherichia coli spp.*, *Pseudomonas spp.*, *Enterobacter spp.*, and *Klebsiella spp.*

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The public health impact of HAIs is tremendous. Each year in the United States, 1 out of 20 hospitalizations will result in acquisition of an HAI, for a total estimate of 1.7 million

infections. Of these 1.7 million infections, 99,000 individuals will die because of those infections. And in terms of financial costs, the CDC estimates that HAIs add between 28-45 Billion dollars to the cost of healthcare annually. In North Carolina specifically, a recent publication estimates that approximately 100 HAIs occur per year in each hospital. Using conservative estimates, HAIs led to costs between 124-358 Million dollars in North Carolina in 2009. As you can see, HAIs add a significant burden to the healthcare industry, not just in cost, but in lives affected and lost.

#### **SLIDE 8**

Over the course of these next few slides, I will present some basic measures that can be implemented to prevent the development of HAIs. As public health professionals, it is not surprising to learn that the number 1 way to prevent the spread of healthcare-associated infections is proper hand hygiene. Hand hygiene consists of appropriate use of either alcohol-based hand rubs or soap and water.

#### **SLIDE 9**

First we will consider prevention of central-line associated bloodstream infections, or CLABSIs. On the right hand side of your screen you will see a screenshot of a frequently asked question handout developed and disseminated by the CDC. These handouts have been developed for each HAI. Some of the best practices to prevent these infections include: cleaning hands before inserting the catheter; use of maximal sterile barrier precautions during insertion of the catheter to prevent peripheral contamination; and minimizing the number of days a device is in place. Patients can reduce their risk of infection by cleaning their hands often, asking any individual who comes to visit or provides care to them to clean their hands, and informing their healthcare provider if the area around the catheter is sore or red.

#### **SLIDE 10**

Next, we will consider prevention of indwelling catheter-associated urinary tract infections, or CAUTIs. Again, you will see a screenshot of the frequently asked question handout for CAUTIs as developed by the CDC. Some of the best practices to prevent these infections include: cleaning hands before inserting the catheter; maintaining a closed drainage system (not disconnecting the catheter and tubing) so as to limit the introduction of pathogens into the system; minimize the manipulation of the catheter tubing; and minimizing the number of days a device is in place. Patients can reduce their risk of infection by cleaning their hands often and asking visitors and healthcare providers to do the same; not pulling, twisting, or kinking the catheter tubing; and keeping the catheter below the level of the bladder to assure adequate drainage.

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Surgical site infections are what many people think of when they consider healthcare-associated infections. The very nature of surgery makes it prone to the introduction of infectious agents that may cause disease. Over the decades, advances in disinfection, sterilization, surgical technique, and medical technology have dramatically reduced the amount of infections that were commonly associated with surgery. The CDC-developed frequently asked questions handout is displayed on the right side of your screen. Some practices to prevent the acquisition of a SSI is thorough surgical scrub by the surgical team; this includes cleaning the hands and arms up to the elbows immediately prior to entering the operating room. Other recommended practices include the use of maximal sterile barrier precautions during surgery to prevent peripheral contamination, and cleaning the skin with a specific antimicrobial soap at the site where surgery will occur. Patients can reduce their risk of a surgical site infection by not smoking; not shaving the site where you will have surgery (shaving can lead to ‘nicks’ or breaks in the skin making it easier for pathogens to enter and cause infection); asking visitors to not touch their surgical wound or dressing covering their surgical wound; and cleaning their hands often and asking visitors and healthcare providers to do the same.

### **SLIDE 12**

Two laboratory identified healthcare associated events currently under surveillance include Methicillin resistant *Staphylococcus aureus* (MRSA) and *Clostridium difficile* (CDI). The first, MRSA, is a *Staphylococcus aureus* that is resistant to multiple antibiotics. It can be transmitted person to person, and thus specific prevention measures should be taken, in particular while patients are hospitalized. Healthcare providers should clean their hands before and after contact with each patient. In addition, patients identified to be infected or colonized (meaning the bacteria is present but not causing infection), should be placed on Contact Precautions. Patients on Contact Precautions will be placed in a private room (if available), and individuals must wear gowns and gloves when entering the room. Once again, patients should clean their hands often and ask visitors and healthcare providers to do the same.

### **SLIDE 13**

The second laboratory identified healthcare associated event that I will review today is *Clostridium difficile* (CDI). *Clostridium difficile* can be caused by antibiotic use, and results in gastrointestinal illness. It is a spore, and can live for long periods of time on surfaces. Thus, it can be easily transmitted via equipment or on the hands of people. Prevention measures are similar to that of MRSA, and include frequent hand hygiene, use of Contact Precautions, and only prescribing or taking antibiotics as absolutely necessary.

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What has been done on the national level to combat these infections? Recently, the federal government and related agencies have increased their participation in the prevention of healthcare-associated infections. Under the leadership of the US Department of Health and Human Services, public health agencies, national healthcare partners and advocacy groups developed the national HHS action plan to prevent healthcare-associated infections. The Centers for Disease Control and Prevention was identified as the primary agency to lead the national initiative to reduce healthcare-associated infections. As such, the CDC increased their capacity to support states in their individual efforts to reduce healthcare-associated infections. As part of this capacity building, the National Healthcare Safety Network, or NHSN, was expanded and serves as the current national surveillance system used to monitor healthcare-associated infections. In addition, the CDC has provided grants to states to develop and expand existing public health infrastructure to address healthcare-associated infections. Likewise, in August, 2010, the Centers for Medicare and Medicaid Services increased their involvement in surveillance of healthcare-associated infections through a rule requiring acute care hospitals to begin reporting specific healthcare associated infections in order to receive their annual inpatient prospective payment system payment.

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In North Carolina, several steps have been taken to address the concern and rise in healthcare associated infections. In 2009, the healthcare associated infections prevention program was established. The HAI program is housed within the Division of Public Health, and is tasked with promoting awareness, prevention and surveillance, and communication as related to HAIs. Legislators in North Carolina strongly supported the role of public health in surveillance for, and prevention of, healthcare-associated infections and passed legislation to guide these efforts.

In 2011, legislation, specifically House Bill 809, was proposed and in 2012, passed, mandating the reporting of select healthcare-associated infections and the public reporting of hospital-specific numerator and denominator data. The HAIs already discussed are those for which reporting is mandated. Finally, ongoing collaboration with the HAI Advisory Group and external partners assures excellent coordination of activities. The HAI Advisory Group was convened in 2010 and serves as consultants to the HAI Program on the implementation and direction of HAI activities. It is composed of stakeholders from government, healthcare institutions, infection prevention organizations, healthcare quality organizations, and members of the public.

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Once hospitals have reported their infection data and the data review and reconciliation process is complete, the HAI team publishes public reports of HAI data on a quarterly basis in January, April, July, and October. These reports are published electronically to the Division of Public Health website, at the web address listed on this slide. There are no current plans to create hard copies of these reports. Currently, two versions of the reports are published: a more detailed version for healthcare providers, and a broader version for consumers. The quarterly reports are evolving documents, with plans to add trends over time. If you review these reports, we would welcome any feedback to improve their usefulness.

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I am going to move from our discussion about healthcare associated infections to recent infection prevention efforts in adult care homes in North Carolina.

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Over the past few decades, hepatitis B outbreaks occurring in long term care facilities have been increasing. During the years 1996-2011, at least 30 Hepatitis B outbreaks in long term care settings were reported to the CDC. North Carolina was one of those states that reported such an outbreak involving fatalities. When reviewing the causes of these outbreaks, it was identified that over 90% were associated with assisted monitoring of blood glucose, or AMBG. At the bottom of this slide, you see images of fingerstick devices, blood glucose meters, and insulin pens. Transmission of hepatitis B can occur through the use of fingerstick devices for multiple residents, through sharing of blood glucose meters, or through sharing of insulin pens.

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In response to a hepatitis B outbreak that led to six deaths, policy makers in North Carolina passed Bill 474 to protect residents of adult care homes by enhancing infection prevention training and education for staff.

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House Bill 474, otherwise known as an 'Act to Protect Adult Care Home Residents', was signed into law on May 31, 2011. This Bill specifically states that a written infection control policy must be created and made available; annual infection prevention training and competency evaluation be implemented; suspected outbreaks must be reported to their respective local health departments; and an annual inspection for compliance with safe infection control practices will be conducted by our partner agency, the North Carolina Division of Health Services Regulation.

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The Division of Health Services Regulation, or DHSR, conducts inspections of adult care homes on an annual basis, at a minimum. If an infection prevention breach, such as use of a blood glucose monitor on more than one patient, is identified, it is reported to the DHSR central office. The DHSR central office will in turn notify the HAI team, and we notify you, the local health department for appropriate review and follow-up. Following review of the incident by the local health department, a standard form is completed and submitted back to the HAI program.

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In North Carolina, infection prevention breaches have been monitored since 2011. The 3 primary breaches identified are sharing of glucose meters without appropriate disinfection between patients, sharing of lancing devices, and sharing of insulin pens. As you can see, the number of breaches has decreased slightly over the past year.

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If you will recall, if an infection control breach is identified in an adult care home, the HAI team will contact the local health department to follow up with that facility. This public health response consists of 2 primary objectives. The first is to determine if transmission of illness occurred. The second is to provide or reinforce education regarding safe injection practices.

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Finally, the next 2 slides will review the standard form which should be completed following a review of an infection control breach. This is the top of the form to be completed, and simply requests the county, date of report to you, the local health department, by whom you were notified, the facility name and contact person, and the identified breach.

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The bottom of the form is displayed here. This documents the public health actions taken as a result of the notification. Actions taken include a visit to the facility, surveillance for acute hepatitis, review of NC EDSS for reported hepatitis events among the exposed residents, laboratory testing, and education provided. Please note that it is not necessary to perform all of these actions; appropriate actions will vary depending on the nature of the breach.

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A summary of public health actions taken by local health departments in response to 27 infection control breaches for 2011-2012 is enumerated on this slide. Education regarding best practices for injection safety was provided 100% of the time, followed by visits to adult care homes, assessing for evidence of acute hepatitis among exposed residents, reviewing NC EDSS for reported hepatitis among exposed residents, and laboratory testing of exposed residents.