

# Overview of Healthcare Associated Infections

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## **Definition of Healthcare Associated Infections (HAI)**

Healthcare-associated infections, or HAIs, are infections that patients get while receiving medical treatment. They can happen in many places, including hospitals, urgent care and surgical centers, nursing homes and healthcare clinics. At any given time, approximately 1-in-20 patients will develop an HAI while receiving healthcare treatment in the U.S.

## **Risk Factors**

There are many factors that can increase the chance of developing an HAI:

- Longer use and improper maintenance of some types of medical equipment (ex. Catheters, Ventilators).
- Complications after surgery and improper wound care.
- Healthcare workers not adhering to hand hygiene and glove use guidelines and transferring germs between patients.
- Improper syringe and needle use.
- Improper cleaning practices in healthcare facilities.
- Use of antibiotics when they are unnecessary or for long periods of time.

## **Burden of Healthcare Associated Infections (HAI)**

HAIs are the most common complication of hospital care. They often lead to longer illnesses, increased medical costs, longer hospital stays, and greater chance of death from complications.

The Centers for Disease Control and Prevention estimates that 1.7 million HAIs occur in hospitals each year, leading to:

- 99,000 deaths
- Up to \$33 billion in excess medical costs.

Research indicates that by following proven and cost-effective strategies, certain HAIs can be reduced by up to 70%.

## **Illnesses and Complications Associated with Healthcare Associated Infections (HAI)**

### **Surgical Site Infections**

Surgical Site Infections or SSIs occur when germs infect the area of the body where a surgery recently took place. These infections may only involve the skin or may be more serious and impact body tissue, organs, or implanted material. They can develop days or months after a surgery occurs. SSIs are one of the most common types of HAI, accounting for 20% of HAIs in hospitalized patients. Anywhere from 160,000 to 300,000 SSIs occur each year in the United States and up to 60% of those are estimated to be preventable by using evidence based guidelines.

## **Catheter-associated Urinary Tract Infections**

Urinary Tract Infections or UTIs are infections that occur in the urinary system which includes the bladder and kidneys. Germs do not normally live in these areas. However, there are factors that can introduce germs into the urinary tract including the use of a urinary catheter, a thin tube placed in the bladder to drain urine. People with urinary catheters have a much greater chance of developing a urinary tract infection than those who do not, as germs can travel along the catheter and cause a UTI. Of UTIs developed in hospital care, 70-80% of those are attributable to use of a urinary catheter.

## **Central Line Bloodstream Infections**

A “central line” or “central catheter” is a tube that is placed into a patient’s large vein to deliver medicine, give fluids, or draw blood. A central line bloodstream infection or CLABSI can occur when germs travel down the central line and enter the blood. Risk of developing a CLABSI is greater in healthcare facilities where central lines are placed frequently in emergency circumstances, repeatedly accessed each day, or used for long periods of time. To prevent patients from developing CLABSI, healthcare providers follow a group of care practices known as the “Central Line Bundle” that results in significantly better patient care.

Central Line Bundle Components:

- Practicing hand hygiene
- Wearing a gown and gloves during placement of the central line
- Disinfecting the skin
- Choosing the appropriate vein for the central line
- Reviewing the central line each day to see if it is still needed
- Prompt removal of unnecessary lines

## **Methicillin-Resistant *Staphylococcus aureus***

Methicillin-Resistant *Staphylococcus aureus* or MRSA is a type of bacteria that is resistant to many types of antibiotics. MRSA skin infections commonly appear as a bump or infected area on the skin that may be red, swollen, painful, warm to the touch, and full of fluid. MRSA is commonly spread by direct contact with an infected wound or from contaminated hands, usually those of healthcare providers. However, MRSA is also capable of contaminating surfaces. Patients with MRSA are able to transfer the bacteria to their environment, including their clothing and medical equipment. MRSA contributes to a number of infections including surgical site infections, bloodstream infections, and pneumonia.

## ***Clostridium difficile***

When an individual takes an antibiotic, the normal bacterial balance in the intestines can be disrupted for months. In this environment, *Clostridium difficile*, a bacterium that causes life-threatening diarrhea, is able to thrive in the gut. 94% of the time, this occurs in individuals who have experienced recent medical care and antibiotic treatment. *Clostridium difficile* is not yet resistant to the antibiotics used to treat it. However, its spores can survive outside of the human body from weeks to months and are not

killed by typical hospital grade-disinfectants or alcohol based hand rubs making it challenging to control. EPA-registered disinfectants with sporicidal properties, such as bleach, have been used with success for environmental surface disinfection.

*Clostridium difficile* infections lead to over 250,000 infections, 14,000 deaths and \$1 million in excess medical costs each year.

## **Multi-Drug Resistant Organisms**

When bacteria or other microorganisms are exposed to substances like antibiotics that don't kill them, the bacteria are able to adapt and become resistant to their effects. This process occurs naturally, but increased antibiotic use speeds up the process greatly. Microorganisms that have developed a resistance to many different types of medicine are known as multi-drug resistant organisms or MDROs. MDROs often cause illnesses that last longer, are more costly to get rid of, and more likely to result in patient death. Many infections that develop as a result of hospital care require the use of antibiotics to treat, leading to increased antibiotic-use for illnesses that could have been prevented in the first place. It is estimated that over 2 million illnesses and 23,000 deaths occur each year as a result of MDROs.

Risk factors for colonization (the presence of bacteria without disease) and infection of healthcare-associated MDROs include:

- Previous exposure to antibiotics or antimicrobial medicine
- Underlying disease/conditions (ex. Immunodeficiency, chronic renal disease)
- Over 65 years old
- Previous colonization with MDRO
- Repeated hospital admissions or healthcare system services
- Wounds, dermatitis, or skin lesions
- Invasive procedures (ex. dialysis and urinary catheters)
- Decline in functional status

The CDC estimates that up to 50% of antibiotic use is inappropriate and the misuse and overuse of antibiotics has led to a widespread reduction in treatment options for many illnesses. Some bacteria have even grown so resistant that there are very few antibiotics left to treat them. The development of new antibiotics can take years. Therefore it is of utmost importance to conserve the antibiotics that we have available by using them only when absolutely necessary and by following treatment guidelines.

## New Hampshire Division of Public Health Services: Healthcare-Associated Infections Program

The Healthcare-Associated Infections Program can serve as a technical resource for healthcare facilities throughout the state of New Hampshire. Assistance may be provided regarding HAI surveillance, the National Healthcare Safety Network (NHSN), general HAI questions, infection control breaches and drug diversion investigations.

The screenshot shows the DHHS website with the following content:

- Header:** "dhhs New Hampshire Department of HEALTH AND HUMAN SERVICES" with navigation tabs for Families & Children, Women, Teens, Adults, Seniors, and People with Disabilities.
- Left Sidebar:** "Translate this page" and a list of links: Home, About DHHS, Divisions/Offices, Media, Statistics, Online Tools, Vendors / RFP, Job Opportunities, Topics A to Z, and Contact.
- Main Content:**
  - Healthcare-Associated Infections:** Text stating the program has been active since 2007.
  - 2006 Legislation:** Text about the 2006 legislative season and the passage of [NH RSA 151:32-35](#), which requires hospitals to identify, track, and report HAI to NH DHHS effective July 1, 2007.
  - Image:** A photograph of hands being washed in a sink.
  - Link:** [Current list of HAI Reporting Requirements](#)
  - HAI Recovery Act Funding:** Text stating that in August 2009, NH DHHS received \$737,551 in federal funding to further develop and support NH's Healthcare-Associated Infections Program, available through December 31, 2011.
- Right Sidebar:**
  - Program Information:** Links to Communicable Disease Control & Surveillance, Disease Reporting Forms, Publications, and Contact Communicable Disease Control & Surveillance.
  - Related Resources:** Links to CDC HAI Information, CDC HAI Recovery Act, CDC National Healthcare Safety Network, High 5 for a Healthy NH Campaign, NH Health Care Quality Assurance Commission, NH Health Facilities Licensing, and NH Office of Emergency Services.

To access the NH DHHS HAI Annual Reports, visit:

<http://www.dhhs.nh.gov/dphs/cdcs/hai/publications.htm>

For more information, contact:

**NH Healthcare-Associated Infections Program**  
**Infectious Disease Surveillance Section**  
**Division of Public Health Services**  
**NH Department of Health and Human Services**  
29 Hazen Drive, Concord, NH 03301-6504  
Phone: (603) 271-4496  
Email: [haiprogram@dhhs.state.nh.us](mailto:haiprogram@dhhs.state.nh.us)

Website: <http://www.dhhs.nh.gov/dphs/cdcs/hai/index.htm>

## Centers for Disease Control and Prevention Info (CDC\_INFO) on Demand

CDC\_Info allows individuals and organizations to order or download books, fact sheets, pamphlets and educational materials. To find HAI-related resources, select any of the following categories from the programs tab:

- Get Smart: Know When Antibiotics Work
- Hand Hygiene in Healthcare Settings
- Healthcare-Associated Infections
- Injection Safety – One & Only Campaign
- MRSA

CDC will provide small quantities of these materials free of charge through CDC\_Info.

Website: <http://wwwn.cdc.gov/pubs/CDCInfoOnDemand.aspx>

The screenshot shows the CDC-INFO on Demand website interface. At the top, there is a search bar and a navigation menu with letters A-Z. The main heading is "CDC-INFO on Demand - Publications". Below this, there is a sidebar with "CDC-INFO" links and "Top 10 Orders". The main content area features a search filter section with dropdown menus for "Programs" (set to "Healthcare-Associated Infections"), "Languages" (set to "All Languages"), and "Material Type" (set to "All Material Types"). A search box contains the text "Search for Text". Below the filters, it states "Found 1 Publications that match your search (viewing 1 - 1)". A "Publications Per Page" dropdown is set to "10". The search results table shows one entry: "Guide to Infection Prevention for Outpatient Settings: Minimum Expectations for Safe Care" with a "Pub ID" of 221770, "Program" of "Healthcare-Associated Infections", "Description" of "30 page booklet, each page 8 1/2 by 11", "Language" of "English", and "Material Type" of "Booklet". The "Order Amount" is 0 and the "Limit" is 1. There is an "Add to Cart" button and a "Download" link with a note: "Please consider downloading instead of ordering." On the right side, there are utility links like "Email page link", "Print page", "Get email updates", "Subscribe to RSS", and "Listen to audio/Podcast". Below these is a "Cart" section showing "Limit 18 separate publications" and "Cart is Empty". At the bottom right, there is a "Search Order Status" section and "Contact Us" information for the Centers for Disease Control and Prevention, including the address, phone number (800-CDC-INFO), and TTY number.

This symbol means you are leaving the CDC.gov Web site. For more information, please see CDC's Exit Notification and Disclaimer policy.

## Additional Information

For more information on healthcare-associated infections, see the following sites:

- Centers for Disease Control and Prevention  
<http://www.cdc.gov/hai/index.html>
- New Hampshire Department of Health and Human Services  
<http://www.dhhs.nh.gov/dphs/cdcs/hai/>

If you have further questions on healthcare-associated infections, antimicrobial resistance or how to use this toolkit, contact the City of Nashua Division of Public Health and Community Services at 603-589-4560.

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State of New Hampshire. Recommendations for the Prevention and Control of Multidrug-resistant organisms for healthcare Agencies and Community Settings. (2008) Retrieved Oct 2014 from <http://www.dhhs.nh.gov/dphs/cdcs/hai/documents/mdro.pdf>.