

## *Clostridium difficile* Web Resource Manual

*Clostridium difficile* (*C. difficile*) bacteria live in the intestinal tract of humans and other animals. People usually do not have symptoms of illness; however, *C. difficile* infection (CDI)\* can result if the bacteria overgrow in the intestinal tract. Symptoms of infection are usually watery diarrhea and abdominal cramps, but serious complications can result that require hospitalization and on rare occasions cause death. Some people carry the bacteria without having symptoms.

*C. difficile* is the most frequent cause of health-care associated diarrhea. Antibiotic use is the primary risk factor for CDI because it disrupts normal bowel bacteria and allows *C. difficile* bacteria to overgrow. In recent years, an increase has been seen in the number of people with CDI who have no recent history of antibiotic use or hospitalization. This is considered to be community acquired CDI. Most people who develop CDI are elderly, have had a recent history of antibiotic use, and/or had been recently hospitalized. CDI is not a new disease, nor specific to any geographic location. Recently, a new strain of *C. difficile* has been identified that can cause more severe symptoms.

Proper prevention at all times is extremely important to prevent the spread of CDI. The following resource material includes information from the Indiana State Department of Health (ISDH), the Centers for Disease Control and Prevention (CDC), and other sources. This information may be helpful in reducing your risk of infection and providing health care personnel with the most current information on CDI.

\* CDI is the terminology currently used for *C. difficile* infection. CDAD (*C. difficile* associated diarrhea) is an older term that may be found in earlier documents.

This manual is divided into five categories as indicated below. Click on the category of interest, and you will be directed to the resources available for that specific topic.

- General Information about *Clostridium difficile*
- *Clostridium difficile* Information for Those Who Work in Healthcare Settings
- Antibiotic Facts and Resources
- Hand washing Facts and Resources
- Journal Articles and Slide Presentations on CDI

## **General Information About *Clostridium difficile***

### ISDH FACT SHEET ON *CLOSTRIDIUM DIFFICILE*

This ISDH Quick Fact Sheet on *C. difficile* includes basic information on the disease, transmission, and prevention.

<http://www.in.gov/isdh/24295.htm>

### GENERAL INFORMATION ABOUT *CLOSTRIDIUM DIFFICILE* INFECTIONS

This CDC fact sheet includes general CDI information, such as symptoms, treatment, and how to prevent the spread of CDI.

[http://www.cdc.gov/ncidod/dhqp/id\\_CdiffFAQ\\_general.html](http://www.cdc.gov/ncidod/dhqp/id_CdiffFAQ_general.html)

### INFORMATION ABOUT A NEW STRAIN OF *CLOSTRIDIUM DIFFICILE*

This CDC fact sheet includes information about the new, more dangerous strain of *C. difficile* that has been recognized in the last 5-10 years.

[http://www.cdc.gov/ncidod/dhqp/id\\_CdiffFAQ\\_newstrain.html](http://www.cdc.gov/ncidod/dhqp/id_CdiffFAQ_newstrain.html)

### *CLOSTRIDIUM DIFFICILE* (*C. DIFF*) PATIENT INFORMATION SHEET

This University of Virginia Patient Information Sheet includes the precautions that the hospital and staff can take to protect themselves, others, and the hospital environment. A Spanish version is also available (see below).

<http://www.virginia.edu/uvaprint/HSC/pdf/08005.pdf>

### *CLOSTRIDIUM DIFFICILE* (*C. DIFF*) PATIENT INFORMATION SHEET-SPANISH

<http://www.virginia.edu/uvaprint/HSC/pdf/08005S.pdf>

### CDI *CLOSTRIDIUM DIFFICILE* INFECTION PATIENT EDUCATION INFECTION PREVENTION AND CONTROL

This Infection Control Professionals of Southern New England patient education brochure includes information on patient and family education.

<http://www.icpsne.org/documents/2008%20Pamphlet%20C%20diffinal.pdf>

## ***Clostridium difficile* Information for Those Who Work in Healthcare Settings**

### GUIDE TO THE ELIMINATION OF *CLOSTRIDIUM DIFFICILE* IN HEALTHCARE SETTINGS – APIC

This Association for Professionals in Infection Control and Epidemiology (APIC) document entitled "Guide to the Elimination of *Clostridium difficile* in Healthcare Settings" is available only from APIC. These guidelines, published in 2008, include the changing epidemiology of CDI, modes of transmission, diagnosis, surveillance,

prevention (including contact precautions, hand hygiene, and environmental control), and antimicrobial stewardship. Also discussed is the tiered response of prevention activities during routine and heightened infection prevention and control responses. These guidelines can be purchased from APIC by visiting their website at [www.apic.org](http://www.apic.org), clicking on APIC Store and then downloading the APIC product order form.

#### INFORMATION FOR HEALTHCARE PROVIDERS

This CDC Fact Sheet includes information on the common laboratory tests used to diagnose CDI, as well as what procedures hospitals need to take to prevent the spread of CDI.

[http://www.cdc.gov/ncidod/dhqp/id\\_CdiffFAQ\\_HCP.html](http://www.cdc.gov/ncidod/dhqp/id_CdiffFAQ_HCP.html)

#### STRATEGIES TO PREVENT CLOSTRIDIUM DIFFICILE INFECTIONS IN ACUTE CARE HOSPITALS

This Society for Hospital Epidemiology of America/Infectious Diseases Society of America practice recommendation supplement includes practical recommendations in a concise format designed to assist acute care hospitals in implementing and prioritizing their *Clostridium difficile* infection (CDI) prevention efforts.

<http://www.journals.uchicago.edu/doi/pdf/10.1086/591065>

#### CLOSTRIDIUM DIFFICILE AND CLOSTRIDIUM DIFFICILE ASSOCIATED DISEASE- INFECTION GUIDELINES FOR LONG-TERM CARE FACILITIES

The Massachusetts Department of Public Health Infection Control Guidelines are intended for long-term care facilities. They contain general information on CDI, as well as hand washing, room cleaning, and patient isolation procedures.

[http://www.mass.gov/Eeohhs2/docs/dph/cdc/infection\\_control/clostridium\\_guide.pdf](http://www.mass.gov/Eeohhs2/docs/dph/cdc/infection_control/clostridium_guide.pdf)

#### CDI: BEST PRACTICES FOR PREVENTION AND TREATMENT IN LONG-TERM CARE FACILITIES

This complimentary educational virtual lecture is derived from a symposium presented June 23, 2008 during the National Conference of The National Association Directors of Nursing Administration in Long Term Care (NADONA/LTC). As the title indicates this lecture provides information on prevention and treatment recommendations for long-term care facilities. The inclusion of this lecture in this CDI resource manual does not constitute an endorsement of any product or company by the ISDH.

[www.RMEI.com/LTCCDI059](http://www.RMEI.com/LTCCDI059).

#### BEST PRACTICES DOCUMENT FOR THE MANAGEMENT OF CLOSTRIDIUM DIFFICILE IN ALL HEALTH CARE SETTINGS

This Ontario Ministry of Health and Long-Term Care “Best Practices Document for the Management of *Clostridium difficile* in all Healthcare Settings” includes information for acute and long term care facilities on risk factors, testing, surveillance, infection control, and treatment.

[http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best\\_prac/bp\\_cdif.pdf](http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_cdif.pdf)

### ENVIRONMENTAL CONTROL OF *CLOSTRIDIUM DIFFICILE* FACT SHEET

This fact sheet includes CDC, Society for Healthcare Epidemiology of America (SHEA), and Infectious Diseases Society of America (IDSA) recommendations for surface and hand cleaning to prevent the spread of CDI. The inclusion of this document in this CDI resource manual does not constitute an endorsement of any product or company by the Indiana State Department of Health.

<http://multimedia.mmm.com/mws/mediawebserver.dyn?6666660Zjcf6IVs6EVs66S3SJCOrrrrQ->

### OHIO STATE DEPARTMENT OF HEALTH REPORTING OF CDI -2006

This Ohio Department of Health document includes summary of the one year (2006) reporting of confirmed CDI in hospitals and long term care facilities. It also includes recommendations for prevention, management of cases and infection control practices.

<http://www.odh.ohio.gov/pdf/idcm/clostdif.pdf>

### PREVENTION & CONTROL OF *CLOSTRIDIUM DIFFICILE* INFECTIONS

This CDC Web site includes various links to posters, brochures, hand hygiene, environmental control, and other prevention/control items.

[http://www.cdc.gov/ncidod/dhqp/id\\_Cdiff\\_prevent.html](http://www.cdc.gov/ncidod/dhqp/id_Cdiff_prevent.html)

### DATA & STATISTICS ABOUT *CLOSTRIDIUM DIFFICILE* INFECTIONS

This CDC Web site includes CDI data, some of which is conveyed through journal articles. Also available at this Web site are other resources and publications.

[www.cdc.gov/ncidod/dhqp/id\\_Cdiff\\_data.html](http://www.cdc.gov/ncidod/dhqp/id_Cdiff_data.html).

## **Antibiotic Facts and Resources**

### ANTIBIOTIC SAFETY

This APIC brochure on Antibiotic Safety includes information on the types of germs that cause infections, how to properly communicate with doctors, and potential side effects of antibiotics.

<http://www.preventinfection.org/AM/AMTemplate.cfm?template=/CM/ContentDisplay.cfm&ContentID=8686>

### GET SMART: KNOW WHEN ANTIBIOTICS WORK

This CDC campaign includes educational information to reduce the rate of antibiotic resistance. Educational brochures, posters, fact sheets for patients and providers are available.

<http://www.cdc.gov/drugresistance/community/>

### C. *DIFF* INFECTIONS: WHAT YOU SHOULD KNOW WHEN TAKING ANTIBIOTICS

This Pennsylvania Patient Safety Authority tip sheet, explains the role antibiotics play in many cases of CDI and what patients can do to protect themselves.

[http://www.psa.state.pa.us/psa/lib/psa/tips\\_for\\_consumers/c\\_diff\\_consumer\\_article\\_\(2\).pdf](http://www.psa.state.pa.us/psa/lib/psa/tips_for_consumers/c_diff_consumer_article_(2).pdf)

#### ANTIBIOTIC RESISTANCE IN INDIANA

The Indiana Coalition for Antibiotic Resistance Education Strategies (ICARES) is a group of health care organizations that have collaborated to educate individuals about the harm caused by unnecessary antibiotic use and to reduce the incidence in Indiana. A variety of brochures, fact sheets, posters, and stickers are available.

<http://www.icares.org/>

#### ANTI-B'S COLORING SHEET

This Texas Department of State Health Services coloring book provides educational materials related to antibiotic resistance for children.

[http://www.dshs.state.tx.us/idcu/health/antibiotic\\_resistance/educational/antibio\\_edu\\_coloring\\_sheet.pdf](http://www.dshs.state.tx.us/idcu/health/antibiotic_resistance/educational/antibio_edu_coloring_sheet.pdf)

### **Handwashing Facts and Resources**

#### WHO GUIDELINES ON HAND HYGIENE IN HEALTH CARE

This World Health Organization document provides health-care workers (HCWs), hospital administrators and health authorities with a thorough and comprehensive review of evidence on hand hygiene in health care and specific recommendations to improve practices and reduce transmission of pathogenic microorganisms to patients and HCWs.

[http://whqlibdoc.who.int/publications/2009/9789241597906\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf)

#### C. THE DIFFERENCE HANDWASHING CAN MAKE

This New York State Department of Health brochure, explains what CDI is, who is at the greatest risk of developing CDI, and why hand washing is important.

<http://www.health.state.ny.us/publications/signature/1495.pdf>

#### ABOUT...HAND WASHING

This ISDH Quick Fact Sheet includes information why hand washing is important to protect against many diseases including CDI.

<http://www.in.gov/isdh/21926.htm>

#### CDC FEATURES -WASH YOUR HANDS

This CDC Web site describes the correct way to wash hands and emphasizes the importance of hand washing in home and health care settings.

<http://www.cdc.gov/Features/HandWashing/>

#### THE "OUNCE OF PREVENTION" CAMPAIGN

This CDC Web site provides resources (brochures, posters, etc.) about hand washing, cleaning and disinfection, and other easy-to-follow steps in an effort to develop and maintain successful hand hygiene and cleaning practices. The Ounce

of Prevention Campaign is aimed at educating a broad consumer and professional audience.

<http://www.cdc.gov/ounceofprevention/>

### Journal Articles and Slide Presentations

#### CLOSTRIDIUM DIFFICILE-ASSOCIATED DISEASE: NEW CHALLENGES FROM AN ESTABLISHED PATHOGEN

This Cleveland Clinic Journal of Medicine review article describes the current state of knowledge concerning the epidemiology, pathogenesis, clinical presentation, diagnosis, treatment, and prevention of CDI. [Cleveland Clinic Journal of Medicine; February, 2006 / Volume 73, No. 2, 187-197] Rebecca H. Sunenshine, MD and L. Clifford McDonald, MD; Centers for Disease Control and Prevention, Atlanta, Georgia, USA

[http://www.cdc.gov/ncidod/dhqp/pdf/infDis/Cdiff\\_CCJM02\\_06.pdf](http://www.cdc.gov/ncidod/dhqp/pdf/infDis/Cdiff_CCJM02_06.pdf)

#### CLOSTRIDIUM DIFFICILE INFECTION IN PATIENTS DISCHARGED FROM U.S. SHORT-STAY HOSPITALS, 1996–2003

This Emerging Infectious Disease (EID) article is a retrospective study of patients discharged from short-stay hospitals which describes the increase in incidence and severity of CDI in hospitalized patients. [EID; March, 2006 / Volume 12, No. 3, 409-415] L. Clifford McDonald, Maria Owings, and Daniel B. Jernigan; Centers for Disease Control and Prevention, Atlanta, Georgia, USA

<http://www.cdc.gov/ncidod/EID/vol12no03/05-1064.htm>

#### SURVEILLANCE FOR COMMUNITY-ASSOCIATED CLOSTRIDIUM DIFFICILE --- CONNECTICUT, 2006

This 2008 MMWR article discusses surveillance of community-associated *C. difficile* in Connecticut. Community-associated CDI became a reportable condition in Connecticut in 2006. [MMWR; April 4, 2008 / 57(13); 340-343.]

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5713a3.htm>

#### SEVERE CLOSTRIDIUM DIFFICILE--ASSOCIATED DISEASE IN POPULATIONS PREVIOUSLY AT LOW RISK – FOUR STATES, 2005

This 2005 MMWR article describes case reports of serious CDI in otherwise healthy patients with minimal or no exposure to a health-care setting. [MMWR; December 2, 2005 / 54(47); 1201-1205.]

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5447a1.htm>

#### CLOSTRIDIUM DIFFICILE: AN EMERGING THREAT

This CDC PowerPoint presentation provides background information, surveillance data, recommendations for healthcare facilities and information on community acquired CDI.

<http://www.cdc.gov/ncidod/dhqp/ppt/ME%202006%20McDonald%20C%20diff%20re.ppt>

# MRSA Infection Control: Best Practices

By Aruna Vadgama, RN, MPA, CSP, CPHQ, CPE, COHN-S, SRN, CHRM

Until recently, most people had never heard of staphylococcus aureus. Now methicillin-resistant staphylococcus aureus (MRSA) seems to be a topic of discussion for most households, workplaces and water coolers. Although there was fear among the general population, healthcare organizations, public health officials and the medical community remained calm. These groups knew about MRSA—it has existed in the healthcare industry for nearly four decades. MRSA was first discovered in the 1960s and it became a focal point in the 1970s with increasing cases in the U.S.

Stories about MRSA have made headlines and news reports worldwide. While this attention raised the alert for infection control practice, it also raised concerns in communities and workplaces. Although MRSA has traditionally been seen as a hospital-associated infection, community-acquired MRSA strains have begun to appear in recent years, notably in the U.S. and Australia. The abbreviations CA-MRSA (community-associated MRSA) and HA-MRSA (hospital-associated MRSA) are now commonly seen in medical literature.

The news coverage of disinfection of schools raised fears as workers who conducted the decontamination used gowns and self-contained breathing apparatus, while students, teachers and others were not provided with PPE. The fear of contracting this so-called “superbug” was so acute that public health officials and healthcare providers received voluminous inquiries. A bank consulted the author to help design an infection control plan for its workplace. Who would have believed that the financial industry would need an infection control plan? But it is a reality and reflects what safety, health, security, environmental professionals and administrators should be thinking about with respect to emergency response planning.

Public officials and the medical community were concerned about media coverage that made it sound as though people would die from MRSA because no antibiotics were available to treat it. Public

health officials and the medical community tried to calm fears by stressing the fact that getting an MRSA infection is not a death sentence. While MRSA is strongly resistant to methicillin and to some other modern antibiotics, it can be treated effectively with several other readily available antibiotics.



Public health officials and doctors also stressed that MRSA infections are serious. Good hygiene, particularly regular and thorough handwashing, offers the best protection. A skin infection that resembles a spider bite and gets worse should be seen by a doctor immediately because the infection could be MRSA, which requires prompt treatment with the proper antibiotics. The key to treating any disease and/or illness is early detection, early diagnosis, proper treatment and follow up.

## A Teacher's Story

The breaking news stories had many people in a panic. My daughter, a kindergarten teacher, called me to discuss MRSA because parents had asked whether the “superbug” was present in their school. One of her students asked, “Teacher, are we all going to die?”

The MRSA story was emerging at the same time as the southern California wildfires. With these stories circulating throughout the media, the students could not compartmentalize these two issues as separate stories.

She calmed the children by differentiating the two issues. I reviewed the CDC MRSA fact sheet with her. Teachers in the school implemented strict hand wash-

ing practices for students. My daughter had the children monitor each other to ensure that they washed their hands after using the restroom and before eating.

How powerful is this lesson? Setting the infection control standard for self-preservation at a young age may sustain this practice throughout their lives. Kudos to my daughter and to her school for implementing an infection control practice. Although some academic institutions have executed full-blown disinfection of classrooms, cafeterias, gyms and locker rooms, setting infection control practice establishes a continuum of excellent health hygiene practice that is essential in preventing not only MRSA, but other infections such as common colds, flu, foodborne illness and others.

## Understanding MRSA

MRSA is not a new disease. The treatment for staphylococcus aureus with methicillin was established in the U.K. in 1959. The first case of MRSA was discovered in the U.K. in 1961. In the U.S., the multi-drug-resistant form of staphylococcus aureus was first diagnosed around 1975. Since then, it has become a growing concern for hospitals and other healthcare institutions such as nursing homes and long-term facilities. The germ has caused serious illnesses in healthcare organizations before, but the medical community says cases went unnoticed until this recent wave of fear. This is because all infectious diseases are not reportable to public health organizations. Likewise, MRSA is not a reportable disease to a central depository bank that tracks and trends diseases.

The Institute for Healthcare Improvement (IHI) estimates that nearly 15 million events of medical harm occur annually in the U.S., equaling a rate of 40,000 incidents per day. The healthcare industry is acutely aware of these incidents. Most healthcare professionals and physicians believe these incidents may be preventable. In response to the 1999 “To Err is Human” study, the birth of the “100,000 Lives Saved” campaign resulted

*continued on page 4*

## MRSA Infection Control

continued from page 3

in healthcare organizations competing with each other to be the best in reducing medical errors. Reducing infection rates by hand washing was adopted as a Joint Commission National Patient Safety Goals (NPSG) Standard. The organizations that partnered with the "100,000 Lives Campaign" monitored its data for patient care, treatment and outcome and their competence to deliver timely and accurate care and to improve outcome. This resulted in a reduction in medical errors, including reduction in healthcare-acquired infections.

IHI has expanded its campaign to include new initiatives. IHI has challenged healthcare institutions to enroll in a "Five Million Lives Saved Campaign." Of the six new targeted interventions in this campaign, reducing hospital-wide MRSA infections fits as a conduit to reduce not only healthcare-acquired infections, but also community-acquired MRSA.

CDC estimates that more than 126,000 hospitalized patients are infected with MRSA annually, leading to approximately 5,000 deaths. Hospitalized MRSA patients have an increased length of stay up to 9.1 days, with roughly \$30,000 in additional costs per episode.

According to CDC, 70% of hospital-acquired infections are due to bacteria that are resistant to previously effective antibiotics, with MRSA as one of the fastest-growing and most virulent offenders. About 19% of patients with MRSA colonization at admission and 25% who acquire MRSA colonization during hospitalization actually become infected. Many studies have validated the fact that healthcare workers play a major role in spreading resistant strains from patient to patient via contaminated hands and clothing.

While several U.S. healthcare facilities have significantly reduced rates of MRSA transmission and associated infections through deliberate IHI planning, success in transferring best practices and replicating positive change throughout the continuum of hospital services and beyond has been slow and limited. It has been reported that over two decades, MRSA infections have been significantly reduced or even eradicated in several European healthcare systems. Their success was achieved through aggressive implementation of transmission-based control policies that included prevention, early detection and management via active surveillance cultures to identify colonized patients, with strict isolation precautions for those patients identified as colonized or infected with MRSA.

With such significant results, why cannot the U.S. achieve the same success? Initiatives are planned at the national level, but they are not mandated by any government agencies that will require every healthcare organization to implement mandatory best practice systems. IHI has challenged healthcare organizations to participate in 100,000 Lives and Five Million Lives Saved projects, but they are all volunteer partners.

### What Is Five Million Lives?

The side bar below lists IHI's initiative to reduce medical errors (the campaign continues through Dec. 9, 2008). Participating healthcare organizations are required to develop programs to prevent, monitor and reduce incidents related to each initiative. These groups must collect data and submit them to a central depository agency that analyzes and collates the data. Report cards are generated for each participating organization to benchmark best practice guidelines. When reliably implemented, all 12 of these interventions can greatly reduce morbidity and mortality. The campaign also strongly encourages participants to pursue additional interventions to improve care.

### Incentive-Based Model for Infection Control

The Center for Medicare Services (CMS) recently published its Condition of Participation standards and Pay for Performance Standards, which will become effective in 2008. The Pay for Performance Standards require that when a patient acquires an infection in a healthcare organization and/or has an adverse outcome because of medical error, the healthcare organization and the healthcare providers will not get reimbursed for treatment, care and services related to these factors.

This new requirement has raised awareness at the healthcare leadership level to develop systems to manage adverse outcomes and to control infection. Initiatives implemented include screening high-risk patients for MRSA on admission. High-risk patients may be patients transferred from nursing homes or long-term care environments, the homeless, patients with compromised immune systems, cancer patients, dialysis patients and others with chronic illnesses. Before admitting these patients, precautionary isolation placement has been used in certain cases.

## IHI Initiative to Reduce Medical Errors

### *IHI Initiative for Five Million Lives*

- **Prevent pressure ulcers** by reliably using science-based guidelines for prevention of this serious and common complication.

- **Reduce MRSA infection** through basic changes in infection control processes throughout the hospital.

- **Prevent harm from high-alert medications.** Focus on anticoagulants, sedatives, narcotics and insulin.

- **Reduce surgical complications** by reliably implementing changes in care recommended by the Surgical Care Improvement Project.

- **Deliver reliable, evidence-based care for congestive heart failure** to reduce readmission.

- **Get boards on board** by defining and spreading new and leveraged processes for hospital boards of directors so that they can become more effective in accelerating the improvement of care.

### *100,000 Lives Campaign*

- **Deploy rapid-response teams** at the first sign of patient decline.

- **Deliver reliable, evidence-based care for acute myocardial infarction** to prevent deaths from heart attack.

- **Prevent adverse drug events** by implementing medication reconciliation.

- **Prevent central line infections** by implementing a series of interdependent, scientifically grounded steps called the central line bundle.

- **Prevent surgical site infections** by reliably delivering the correct perioperative antibiotics at the proper time.

- **Prevent ventilator-associated pneumonia** by implementing a series of interdependent, scientifically grounded steps, including the ventilator bundle.

IHI offers a variety of campaign and informational products about these initiatives. Learn more at [www.ihio.org](http://www.ihio.org).

## What Is MRSA?

*Staphylococcus aureus* is the most common cause of staph infections. *Staphylococcus aureus* lives on human skin and/or in the nose and can cause a range of illnesses from minor skin infections, such as pimples, impetigo, boils, cellulitis and abscesses to life-threatening diseases [e.g., pneumonia, meningitis, endocarditis, toxic shock syndrome (TSS) and septicemia].

In 1880, Sir Alexander Ogston, a surgeon in Aberdeen, Scotland, discovered *S. aureus* in pus from surgical abscesses. Each year, some 500,000 patients in U.S. hospitals contract a staphylococcal infection. *S. aureus* may occur as a commensal on human skin, particularly the scalp, armpits, penis and vagina; in about 25% of the population, it occurs in the nose and throat. Infrequently, it may be found in the colon and in urine.

The finding of *S. aureus* under these circumstances does not always indicate infection and, therefore, does not always require treatment. It can survive on domesticated animals such as dogs, cats and horses and can cause bacterial inflammatory infection and bumblefoot in chickens. It can survive for up to 6 hours on dry environmental surfaces. The efficacy of environment in the spread of *S. aureus* is currently being researched and debated.

*S. aureus* infections can be spread through contact with pus from an infected wound, skin-to-skin contact with an infected person and contact with objects such as towels, sheets, clothing or athletic equipment used by an infected person. If *S. aureus* is harbored in deep tissues and organs, infections can be severe. Prosthetic joints put a person at particular risk for septic arthritis, staphylococcal endocarditis (infection of the heart valves) and fulminant pneumonia.

## Categories of *Staphylococcus aureus*

Depending on the strain, *S. aureus* is capable of secreting several toxins that are categorized into three groups. Many of these toxins are associated with specific diseases.

1) Pyrogenic toxin superantigens (PTSAgs) have superantigen activities that induce TSS. This group includes the toxin TSST-1, which causes TSS associated with tampon use. The staphylococcal enterotoxins, which cause a form of food poisoning, are included in this group.

2) Exfoliative toxins are implicated in staphylococcal scalded-skin syndrome, which occurs most commonly in infants and in young children. The protease activity of the exfoliative toxins causes peeling of the skin observed with staphylococcal scalded-skin syndrome.

3) Staphylococcal toxins that act on cell membranes include alpha-toxin, beta-toxin, delta-toxin and several bicomponent toxins. The bicomponent toxin Pantone-Valentine leukocidin (PVL) is associated with severe necrotizing pneumonia in children. The genes encoding the components of PVL are encoded on a bacteriophage found in CA-MRSA strains.

## Diagnosis

The key to treating a disease and/or illness is early detection, early diagnosis, proper treatment and follow-up with a doctor. It is essential to obtain a full history and to perform a physical, including checking skin for any infection. Depending on the type of infection present, an appropriate blood specimen is obtained accordingly and sent to the laboratory for definitive identification.

## Prevalence, Morbidity & Mortality

According to the Department of Health and Human Services (DHHS) and CDC, it has been difficult to quantify the degree of morbidity and mortality attributable to MRSA. A 2004 study showed that patients in the U.S. with *S. aureus* infection, on average, had three times the length of hospital stay (14.3 vs. 4.5 days); incurred three times the total cost (\$48,824 vs \$14,141); and experienced five times the risk of in-hospital death (11.2% vs 2.3%) than inpatients without this infection.

A CDC study published in the Oct. 17, 2007, issue of the *Journal of the American Medical Association* estimates that MRSA would have been responsible for 94,360 serious infections and associated with 18,650 hospital-stay-related deaths in the U.S. in 2005. These figures would make MRSA infection responsible for more deaths in the U.S. each year than AIDS.

The U.K. Office for National Statistics reported 1,629 MRSA-related deaths in England and Wales for the same year, indicating a MRSA-related mortality rate half of that in the U.S. for 2005, even though figures from the British source were high because of “improved levels of reporting,

possibly brought about by the continued high public profile of the disease” during the 2005 U.K. general election.

## Clinical Epidemiology

*S. aureus* most commonly colonizes the anterior nares (the nostrils), although the respiratory tract, opened wounds, intravenous catheters and the urinary tract are also potential infection sites. Healthy individuals may carry MRSA asymptotically for periods ranging from a few weeks to many years. Patients with compromised immune systems are at a significantly greater risk of symptomatic secondary infection.

According to infection control experts, MRSA can be detected by swabbing the nostrils of patients and isolating the bacteria found inside. Combined with extra sanitary measures for those in contact with infected patients, screening patients admitted to hospitals has been found to be effective in minimizing the spread of MRSA at the Veterans Affairs Hospital in Pittsburgh, PA, and in hospitals in Denmark, Finland and the Netherlands.

Many people who are symptomatic have pus-filled boils and occasionally rashes. In the U.S., CDC issued guidelines on Oct. 19, 2006, citing the need for additional research but declined to recommend such screening.

It is estimated that 2 billion people carry some form of *S. aureus* worldwide. Of these, up to 53 million (2.7% of carriers) are thought to carry MRSA. In the U.S., 95 million carry *S. aureus* in their noses. Of these, 2.5 million (2.6% of carriers) carry MRSA.

In the U.S., outbreaks of MRSA colonization and infection through skin contact in locker rooms and gymnasiums, even among healthy populations, have been reported. MRSA has also been found in public school systems throughout the country. MRSA is also becoming a problem in pediatric settings, including hospital nurseries. A 2007 study found that 4.6% of patients in U.S. healthcare facilities were infected or colonized with MRSA.

MRSA causes as many as 20% of *S. aureus* infections in populations that use intravenous drugs.

## Author's Story

When I entered nursing school in Rugby, U.K., and prior to the placement

*continued on page 6*

## MRSA Infection Control

continued from page 5

of student nurses as interns in patient care wards, we were all screened for *S. aureus* via nasal swabs. We needed to wait until the laboratory results were sent to the nursing school before we could work in patient care areas. One of the student nurses could not participate in the internship until she was examined by a physician. I do not know what her treatment was, but her internship was delayed until the next rotation. This is an example for prevention, and as I reflect on my experience as a nurse in various states in the U.S., why do we not implement screening of healthcare workers and patients to prevent the spread of *S. aureus* and MRSA?

### Treatment

CA-MRSA often results in abscess formation that requires incision and drainage. Before the spread of MRSA into the community, abscesses were not considered contagious because it was assumed that infection required violation of skin integrity and the introduction of staphylococci from normal skin colonization. However, newly emerging CA-MRSA is transmissible (similar but with very important differences) from hospital-acquired MRSA. CA-MRSA is less likely than other forms of MRSA to cause cellulitis.

Both CA-MRSA and HA-MRSA are resistant to traditional anti-staphylococcal beta-lactam antibiotics, such as cephalixin. CA-MRSA has a greater spectrum of antimicrobial susceptibility, including to sulfa drugs, tetracyclines and clindamycin. HA-MRSA is resistant to these antibiotics and is often susceptible only to vancomycin. Newer drugs, such as linezolid, may be effective against both CA-MRSA and HA-MRSA.

It has also been reported that early infections—characterized by a boil that resembles a spider bite—may be arrested with an

ichthammol salve, which drains the abscess. Care must be taken to keep the infected area clean with 70% alcohol swabs.

### Prevention & Infection-Control Strategies

Seventy-percent alcohol has proven to be an effective topical sanitizer against MRSA. Quaternary ammonium can be used in conjunction with alcohol to increase the duration of the sanitizing action. The prevention of healthcare-acquired infections involves routine and terminal cleaning. Non-flammable Alcohol Vapor in Carbon Dioxide systems (NAV-CO<sub>2</sub> systems) are effective, as they do not damage metals or plastics used in medical environments and do not contribute to antibacterial resistance.

In healthcare environments, MRSA can survive on surfaces and fabrics, including privacy curtains or garments worn by care providers. Complete surface sanitation is necessary to eliminate MRSA in areas where patients are recovering from invasive procedures. Testing patients for MRSA upon admission, isolating MRSA-positive patients, decolonization of MRSA-positive patients and terminal cleaning of patients' rooms and all other clinical areas they occupy is the current best practice protocol for nosocomial MRSA.

### MRSA in the Workplace

At present, no guidelines exist for managing workers with MRSA infections even for healthcare organizations or for general workplaces. Unless directed by a healthcare provider, exclusion from work should be reserved for those with wound drainage that cannot be covered and contained with a clean, dry bandage and for those who cannot maintain good hygiene practices. Workers with active infections should be excluded from activities where skin-to-skin contact is likely until their infections are healed. Healthcare workers should follow CDC's guidelines for infection control among healthcare workers.

To prevent the spread of staph or MRSA in the workplace, employers should ensure the availability of adequate facilities and supplies that encourage workers to practice good hygiene, that routine housekeeping in the workplace is followed and that contaminated equipment and surfaces are cleaned with detergent-based cleaners

or EPA-registered disinfectants. Seventy-percent alcohol is effective in decontaminating and disinfection for MRSA.

### Definition

**Terminal Cleaning:** When patients are hospitalized and identified as having MRSA or infections that can be spread to other patients, best practices isolate these patients in rooms which are subjected to terminal cleaning when the patient is discharged. Methods vary but usually include the removal of all detachable objects in the room, cleaning of lighting and air duct surfaces in the ceiling and everything down to the floor. Items removed from the room are disinfected or sanitized before being returned to the room.

### Conclusion

Over the past 5 years, infection control issues have emerged as a challenge for workplaces outside the healthcare industry. In 2004, we were faced with SARS. Then came the anthrax scares, avian flu and the potential for a flu pandemic. Such developments should cause us to question whether our employers have a plan in place to handle infectious diseases. Infection control is a coalesce issue. We must develop workplace infection control policies and provide tools to control infections in each workplace. We cannot wait to act until there is a news story about an emerging disease. ■

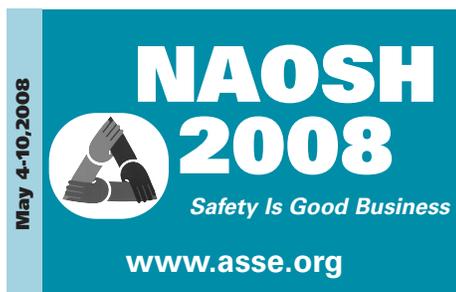
### References

U.S. Centers for Disease Control and Prevention (CDC): Information about community-associated MRSA.

PubMed: A service of the National Library of Medicine and the National Institutes of Health. PubMed search for "Community-Associated MRSA Infection"—questions and answers about methicillin-resistant staphylococcus aureus in Schools.

---

*Aruna Vadgama, RN, MPA, CSP, CPHQ, CPE, COHN-S, SRN, CHRM, is Administrator of ASSE's Healthcare Practice Specialty. She has more than 17 years' experience as a healthcare executive and recently was director of quality and risk management services at South Coast Medical Center in Laguna Beach, CA. Before this she was vice president of the quality resources department at The Menninger Clinic, an affiliate of the Baylor College of Medicine and the Methodist Hospital in Houston, TX. She can be reached at [vadgamaa@worldnet.att.net](mailto:vadgamaa@worldnet.att.net).*



# FAQs

(frequently asked questions)

about

## “Catheter-Associated Bloodstream Infections”

(also known as “Central Line-Associated Bloodstream Infections”)

### *What is a catheter-associated bloodstream infection?*

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

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

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

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

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

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

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

- Ask your doctors and nurses to explain why you need the catheter and how long you will have it.

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

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

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

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

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

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

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

Co-sponsored by:



# FAQs

(frequently asked questions)

## about “Catheter-Associated Urinary Tract Infection”

### *What is “catheter-associated urinary tract infection”?*

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

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

### *What is a urinary catheter?*

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

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

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

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

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

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

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

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

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

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

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

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

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

### **Catheter insertion**

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

### **Catheter care**

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

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

- o Avoid disconnecting the catheter and drain tube. This helps to prevent germs from getting into the catheter tube.
- o The catheter is secured to the leg to prevent pulling on the catheter.
- o Avoid twisting or kinking the catheter.
- o Keep the bag lower than the bladder to prevent urine from backflowing to the bladder.
- o Empty the bag regularly. The drainage spout should not touch anything while emptying the bag.

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

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

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

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

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

Co-sponsored by:



# FAQs

(frequently asked questions)

## about “Clostridium Difficile”

### What is Clostridium difficile infection?

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

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

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

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

### Can C. diff infection be treated?

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

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

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

- Clean their hands with soap and water or an alcohol-based hand rub before and after caring for every patient. This can prevent *C. diff* and other germs from being passed from one patient to another on their hands.
- Carefully clean hospital rooms and medical equipment that have been used for patients with *C. diff*.
- Use Contact Precautions to prevent *C. diff* from spreading to other patients. Contact Precautions mean:
  - o Whenever possible, patients with *C. diff* will have a single room or share a room only with someone else who also has *C. diff*.
  - o Healthcare providers will put on gloves and wear a gown over their clothing while taking care of patients with *C. diff*.
  - o Visitors may also be asked to wear a gown and gloves.
  - o When leaving the room, hospital providers and visitors remove their gown and gloves and clean their hands.

- o Patients on Contact Precautions are asked to stay in their hospital rooms as much as possible. They should not go to common areas, such as the gift shop or cafeteria. They can go to other areas of the hospital for treatments and tests.
- Only give patients antibiotics when it is necessary.

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

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

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

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

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

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

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

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

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

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

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

Co-sponsored by:



# FAQs

(frequently asked questions)

## about "MRSA"

(Methicillin-Resistant *Staphylococcus aureus*)

### What is MRSA?

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

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

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

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

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

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

### How do I get an MRSA infection?

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

### Can MRSA infections be treated?

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

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

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

- **Clean their hands** with soap and water or an alcohol-based hand rub before and after caring for every patient.
- Carefully **clean hospital rooms and medical equipment**.
- Use **Contact Precautions** when caring for patients with MRSA. Contact Precautions mean:
  - o Whenever possible, patients with MRSA will have a single room or will share a room only with someone else who also has MRSA.
  - o Healthcare providers will put on gloves and wear a gown over their clothing while taking care of patients with MRSA.

- o Visitors may also be asked to wear a gown and gloves.
- o When leaving the room, hospital providers and visitors remove their gown and gloves and clean their hands.
- o Patients on Contact Precautions are asked to stay in their hospital rooms as much as possible. They should not go to common areas, such as the gift shop or cafeteria. They may go to other areas of the hospital for treatments and tests.

- **May test** some patients to see if they have MRSA on their skin. This test involves rubbing a cotton-tipped swab in the patient's nostrils or on the skin.

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

#### In the hospital

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

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

#### When you go home

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

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

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

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

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

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

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

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

Co-sponsored by:



# FAQs

(frequently asked questions)

## about “Surgical Site Infections”

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

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

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

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

### *Can SSIs be treated?*

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

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

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

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

### *What can I do to help prevent SSIs?*

#### **Before your surgery:**

- Tell your doctor about other medical problems you may have. Health problems such as allergies, diabetes, and obesity could affect your surgery and your treatment.

- Quit smoking. Patients who smoke get more infections. Talk to your doctor about how you can quit before your surgery.
- Do not shave near where you will have surgery. Shaving with a razor can irritate your skin and make it easier to develop an infection.

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

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

#### **After your surgery:**

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

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

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

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

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

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

Co-sponsored by:

