# Healthcare Associated Infections Toolkit:
## A Caregiver's Guide to Preventing Healthcare Associated Infections (HAIs)

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# WHAT ARE HAIs?

Healthcare-associated infections (HAIs) are infections that patients acquire while receiving treatment for medical or surgical conditions. HAIs occur in all settings of care and are associated with a variety of causes. These infections may occur as a result of medical devices such as catheters and ventilators, complications following surgical procedures, transmission between patients and healthcare workers, or from antibiotic overuse.

HAIs exact a significant toll on human life. They are among the top 10 leading causes of death in the United States, accounting for an estimated 1.7 million infections and 99,000 associated deaths in 2002. In hospitals, they are a significant cause of morbidity and mortality. Hospital stays for Methicillin-resistant *Staphylococcus aureus* (MRSA) infection have more than tripled since 2000 and have increased nearly ten-fold since 1995.

Four categories of infections account for approximately three quarters of HAIs in the acute care hospital setting. The frequency of these infections varies by location. Currently, urinary tract infections comprise the highest percentage (34%) of HAIs followed by surgical site infections (17%), bloodstream infections (14%), and pneumonia (13%).

In addition to the substantial human suffering exacted by HAIs, the financial burden attributable to these infections is staggering. It is estimated that HAIs incur up to $33 billion in excess healthcare costs each year.[1]

For more information, read the U.S. Department of Health and Human Services' Action Plan to Prevent Healthcare Associated Infections.

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[1] U.S. Department of Health and Human Services' Action Plan to Prevent Healthcare Associated Infections

# HAI NATIONAL ACTION PLAN TO PREVENT HAIs

In response to the increasing threat of HAIs and national and international concern, the Department of Health and Human Services (HHS) has developed a National Action Plan toward the prevention and elimination of HAIs. The plan, developed by national leaders comprising the HHS HAI Steering Committee, includes recommended HAI prevention guidelines, research agenda priorities, policy options and more.

The plan was developed with the following priorities in mind:

- Addressing the significant scientific questions and prioritizing key clinical practices for HAI prevention necessary to rapidly move the field forward.
- Identifying and exploring policy options for regulatory oversight of recommended practices in order to provide critical compliance assistance to select hospitals.
- Establishing greater consistency and compatibility of HAI data through development of standardized definitions and measures for HAIs.
- Building on the principles of transparency and consumer choice to create incentives and motivate healthcare organizations and providers to provide better, more efficient care.

For more information on the National Action Plan and resources, please visit the U.S. Department of Health & Human Services' website.

# WHAT IS THE HAI TOOLKIT?

This toolkit is a compilation of evidence-based research and guidelines, recommendations, tools and resources to be used in work on the HAI components of the CMS/QIO 10th Scope of Work (SOW). The four specific HAI focus areas include:

- Central Line Associated Blood Stream Infections (CLABSI)
- Catheter Associated Urinary Tract Infection (CAUTI)
- *Clostridium difficile* Infections (CDI)
- Surgical Site Infections (SSI)

The information and resources provided here come from a number of national organizations, including:

- The U.S. Department of Health and Human Services (HHS)
- Centers for Medicare & Medicaid Services (CMS)
- The Centers for Disease Control and Prevention (CDC)
- Agency for Healthcare Research and Quality (AHRQ)
- Society for Healthcare Epidemiology of America (SHEA)
- Healthcare Infection Control Practices Advisory Committee (HICPAC)
- Office of the National Coordinator for HIT (ONC)
- Institute for Healthcare Improvement (IHI)

This toolkit is an evolving document that may be updated as new information is acquired.

# HOW TO USE THE HAI TOOLKIT

This toolkit should be used by providers and others working on reducing HAIs. Each section contains information and additional online resources that can be used at any stage of provider progress, such as:

- Introductory information
- Tools and guidelines
- Online resources
- Strategies and recommendations

The toolkit starts with a general strategy section outlining successful strategies applicable to all types of HAIs. This includes approaches on communication, hand hygiene, and leadership engagement (not inclusive). For example, successful projects always have leadership engaged at a high level with a planned method of communication. There is not one communication method best for all teams, therefore, overviews of two widely-used approaches are included in the toolkit. All successful HAI projects must also have good hand hygiene and environmental cleaning protocols. Additional strategies focusing on CLABSI, CAUTI, CDI, and SSI follow the general strategy section. Each section ends with a list of resources and tools.

The patient is a crucial part of the healthcare team. Therefore, additional resources include a sample and/or links to patient education document and/or links to patient education information and FAQs.

# GENERAL STRATEGIES- LEADERSHIP

**Board Engagement**

Organizations with engaged executive leadership teams and engaged boards are often identified as successful. It is imperative to have commitment from these leadership teams to achieve great changes. As healthcare facilities try to drive rapid improvement, executive and board leadership teams have an opportunity to make higher quality of care the organization's top priority. According to the Institute of Healthcare Improvement's (IHI) "Boards on Board" and the IHI Framework for Leadership for Improvement, there are six things all boards should do and five for leadership[2]:

1. *Set aims*: set a specific aim to reduce harm this year. Ex. "We will achieve zero central-line infections for the entire facility across all services by December 31, 2112."
2. *Get data and hear stories*: place quality on each board agenda and review quality progress toward safer care at each meeting. Invite patients/families to board meeting to put a face with harm data.
3. *Establish and monitor system-level measures:* identify a small group of organization-wide measures of safety, update them continually, and make them transparent to the entire organization and all of its customers.
4. *Change the environment, policies, and culture*: commit to establish and maintain a respectful, fair, and just environment for all who experience avoidable harm – to include patients/families and staff.
5. *Board education*: Learn about "best in the world" boards and set an expectation for similar education levels for all executives and staff.
6. *Establish executive accountability*: set clear quality improvement targets and hold executives accountable for reaching them.

**Leadership/Executive Engagement**

1. *Beat the drum*: leadership should establish the mission, vision, and strategy as a "relentless drumbeat" for communicating the direction of the organization to all staff and stakeholders.
2. *Build a foundation for an effective leadership system*: bring knowledgeable quality leaders onto board, establish an interdisciplinary Board Quality Committee, develop board education, allocate resources to education of all staff about quality improvement, and build a culture of real, "walk the walk", conversations and actions about improving care at board, committee, physician/nurse leaders, and administration meetings.
3. *Build will*: establish a policy of full transparency on quality/safety data, review both data and stories from patients/families, understand your facility performance in relation to the best organizations, and "show courage – don't flinch."
4. *Ensure access to ideas*: seek ideas from staff, best performers, and many others to develop solutions.
5. *Attend relentlessly to execution*: establish executive accountability, establish an oversight process, review your own data weekly-rather than benchmarks, ask "are we on track?" and know "why?" and "how to" if you are not on track.

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[2] IHI Guide: Governance Leadership

**Strategies to Engage and Support Boards[3]**

- Develop a "door opener"
    - Provide an executive summary overview of issues
    - Ask – "What patients have lost their lives to HAI or HAC?"
    - Ask – "What is the financial cost of HAIs to the organization?"

- Utilize a timely and high-impact patient safety issue for engagement
    - HAIs, HACs, readmissions
    - Ask – "What is our performance and trend on HAIs or HACs?"

- Immediate actions the board should take now
    - Engage with a patient or family who has dealt with a HAI or HAC
    - Engage with a physician, nurse, or other clinician to obtain their views and suggestions
    - Communicate improvement initiatives

- Decide who to use to "open the door" – assume the board wants/needs to know
    - Plan A – use existing relationships, when available, but if not successful – go to
    - Plan B – use the "6 degrees of separation" theory and seek contacts
    - Plan C – cold call on a board member, it is OK
    - Plan D – open to your ideas

- Lead a great discussion in the boardroom
    - Pictures are worth a thousand words
    - Personal stories are priceless
    - Use an 80/20 discussion/presentation format
    - Encourage questions, stimulate dialog
    - Keep in mind that the majority of audience are not clinicians
    - Forward materials in advance – assume boardroom has read
    - Offer follow-up

**Additional Resources**

1. TMIT/Safety Leaders

2. IHI/Board on Boards

3. CMS QualityNet Conference 'Sparking innovation, igniting action, lighting the way to tomorrow's healthcare' videos of presentations, transcripts, and slide sets.

4. The CareBoards

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[3] Safety Leaders Webinar Slides

# GENERAL STRATEGIES- COMMUNICATION

**Team*STEPPS***
TeamSTEPPS is an evidence-based teamwork system to improve communication and teamwork skills among health care professionals that results in improved patient safety. It was developed by the Department of Defense's (DoD) Patient Safety Program in collaboration with the Agency for Healthcare Research and Quality (AHRQ) and is scientifically rooted in more than 20 years of research and lessons from the application of teamwork principles. The three phases of TeamSTEPPS are based on lessons learned, existing master trainer or change agent experience, the literature of quality and patient safety, and culture change. There are three phases of successful TeamSTEPPS delivery: [4]

*Phase I* – Assess the Need: An assessment of the readiness of the organization to undertake a TeamSTEPPS initiative is the first step. A site assessment entails identifying opportunities for improvement; assessing leadership support, identifying potential barriers to implementing change and deciding whether resources are in place to successfully support the initiative. There are also assessments for individual perceptions of the team and the organization. Download the organizational assessment checklist.

*Phase II* – Planning, Training, and Implementation: During this phase, TeamSTEPPS training is tailored to the organization. Tools and strategies can be implemented across the organization or a phased-in approach with specific units or tools, depending on the organization's plans and supports. The training materials are extremely adaptable, whether for a "whole training" over days or "dosing" training done in more focused sessions of hours or minutes. It has been adapted for many healthcare settings.

*Phase III* – Sustainment: The key objective of TeamSTEPPS is to ensure opportunities exist to implement the tools and strategies taught, as well as practice and receive feedback on skills and provide continual reinforcement of the principles within the training unit.

Through TeamSTEPPS training, individuals can learn four primary trainable teamwork skills. These are:
- ✓ Leadership
- ✓ Communication
- ✓ Situation monitoring
- ✓ Mutual support

If a team has tools and strategies it can leverage to build a fundamental level of competency in each of those skills, research has shown that the team can enhance three types of teamwork outcomes:
- ✓ Performance
- ✓ Knowledge
- ✓ Attitudes

TeamSTEPPS curriculum is an easy-to-use comprehensive multimedia kit that contains:
- ✓ Fundamentals modules in text and presentation format.
- ✓ A pocket guide that corresponds with the essentials version of the course.
- ✓ Video vignettes to illustrate key concepts.
- ✓ Workshop materials, including a supporting CD and DVD, on change management, coaching, and implementation.
- ✓ Tools and materials.

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[4] AHRQ- About Team*STEPPS*

**Positive Deviance**

Positive Deviance (PD) is an approach to behavioral and social change based on the observation that in a community, there are people ("positive deviants") whose uncommon, but successful, behaviors or strategies enable them to find better solutions to a problem than their peers, despite having no special resources or knowledge and having access to the same resources. PD is led by people in the community who help identify successes and spread them. Ideas for change are generally accepted better from locals" rather than "outsiders". [5,6,7,8]

The Positive Deviance approach is a strength-based approach that is applied to problems requiring behavior and social change. It is based on the following principles:[9]

- Communities already have solutions and are the best experts to solve their problems.
- Communities self-organize and have the human resources and social assets to solve an agreed-upon problem.
- Intelligence and know-how is not concentrated in the leadership of a community alone or in external experts but is distributed throughout the community. Thus the PD process' aim is to draw out the collective intelligence to apply it to a specific problem requiring behavior or social change.
- Sustainability is the cornerstone of the approach. The PD approach enables the community or organization to seek and discover sustainable solutions to a given problem because the demonstrably successful uncommon behaviors are already practiced in that community within the constraints and challenges of the current situation.
- It is easier to change behavior by practicing it rather than knowing about it. "It is easier to act your way into a new way of thinking than think your way into a new way of acting."

In conjunction with the Plexus Institute, the Centers for Disease Control (CDC) and the Robert Woods Johnson Foundation (RWJ) expanded work to support six hospitals in 2006 to pilot PD in their facilities to develop better strategies to reduce HAIs in their facilities (see RWJ video in resource 5 on page 9). By 2008, the best hospital reported a decrease from 35 infections in a year in 2005 to 2 infections. PD was then expanded to 53 hospitals. Strategies listed by these successful hospitals are[10]:

- While leadership support is essential, engagement of front-line staff is more essential
- Habitual behaviors that Lead to transmissions can change
- Moving beyond doctors and nurses
- Success in preventing hospital-acquired infections is relational and collaborative
- More intensive, early PD coaching and use of process indicators would have speeded PD implementation
- Informal and formal social networks are accelerators

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[5] Plexus Institute Healthcare Articles

[6] Tuhus-Dubrow, R. The Power of Positive Deviants: A promising new tactic for changing communities from the inside. Boston Globe. November 29, 2009.

[7] Sternin, J., & Choo, R. (2000). The power of positive deviancy. Harvard Business Review, January-February 2000: 14-15.

[8] Singhal, Arvind, and Lucia Dura. Protecting Children from Exploitation and Trafficking Using the Positive Deviance Approach in Uganda and Indonesia. Save the Children Federation, Inc., 2010.

[9] Pascale, Sternin, & Sternin. (2010) The Power of Positive Deviance: How Unlikely Innovators Solve the World's Toughest Problems. Harvard Business Press.

[10] RWJF Final Narrative

**Additional Resources**

1. [IHI Improvement Map](#)

2. [Positive Deviance Initiative](#)

3. [Q&A on Positive Deviance, Innovation and Complexity](#)

4. [AHRQ TeamSTEPPS](#)

5. [Robert Wood Johnson Foundation – video featuring CDC and hospitals](#)

# GENERAL STRATEGIES- ANTIBIOTIC STEWARDSHIP PROTOCOL

*Antibiotic Stewardship Program Establishment*[11]

- Enlist physician champions before beginning the program
- Analyze the needs of the healthcare system
- Assess the resistance risk for that system
- Establish clinical pathways and guidelines using IDSA and the CDC examples (See resources)
  - o Enlist the help of Infectious Disease clinicians
  - o Involve pharmacists in the program
- Initiate targeted consultations
  - o Review Cases (positive cultures, specific antibiotic type, duration of antibiotics)
  - o Promote changing prescription habits among clinicians
  - o Advocate timely start of antibiotics, the right antibiotic, and use standing orders
- De-escalation, based on culture
  - o Present both patient and clinician education regarding antimicrobial use and bacterial resistance
  - o Provide printed material regarding appropriate antibiotic use and resistance, targeted to both clinicians and patients.
    - ➢ Treatment Guidelines
- Practice dose optimization
  - o Recommend new dose guidelines for antibiotics as available – Vancomycin – (CID 2009;49:325)
  - o Use weight based dosing, no blood levels, and monitor renal function
  - o Recommend the shortest course of antibiotics possible (guidelines example follow)
    - ➢ Ventilator-associated pneumonia (VAP) 8 vs. 15 days (JAMA 2003; 290:2588)
    - ➢ Community-associated pneumonia (CAP) 3 vs. 8 days (BMJ 2006;332:1355)
    - ➢ Septic Arthritis 10 days vs. 30. (CID 2009;48:1201)
- Restriction of select antibiotics (see guidelines in resources 2 and 3 on page 12)
- Fluoroquinolone restriction has been shown to reduce *Clostridium difficile*
- Partner with other state and national partners to share resources and maximize efforts

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[11] Antimicrobial Stewardship Abstracts

**Additional Resources**

1. [Antimicrobial Stewardship](#)

2. [Minimum Antibiotic Stewardship Measures](#)

3. [SHEA Guideline to Antibiotic Stewardship](#)

4. [AHRQ Guidelines](#)

5. [Shea Online-Antimicrobial Stewardship](#)

6. [Infectious Disease Society of America Guidelines](#)

7. [GetSmart Campaign – Patient Education FAQs](#)

# GENERAL STRATEGIES- HAND HYGIENE

In the United States, hospital patients get nearly 2 million infections each year. That's about 1 infection for every 20 patients. Infections that patients get in the hospital can be life-threatening and hard to treat. Hand hygiene is one of the most important ways to prevent the spread of infections.

According to the CDC, improved adherence to hand hygiene (*i.e.*, hand washing or use of alcohol-based hand rubs) has been shown to terminate infection outbreaks in health care facilities, reduce transmission of antimicrobial resistant organisms (*e.g.*, Methicillin-resistant *staphylococcus aureus*) and reduce overall infection rates.

In addition to traditional hand washing with soap and water, CDC is recommending the use of alcohol-based hand rubs by health care personnel for patient care because they address some of the obstacles that health care professionals face when taking care of patients.

Use of gloves does not eliminate the need for hand hygiene. Likewise, the use of hand hygiene does not eliminate the need for gloves. Gloves reduce hand contamination by 70 to 80 percent, prevent cross-contamination and protect patients and health care personnel from infection. Hand rubs should be used before and after each patient just as gloves should be changed before and after each patient.

Alcohol-based hand rubs take less time to use than traditional hand washing. In an eight-hour shift, an estimated one hour of an ICU nurse's time will be saved by using an alcohol-based hand rub.[12]

**Strategies for Reducing HAIs with Hand Hygiene**
- Discuss with clinical staff the relative advantages and disadvantages of hand washing and use of alcohol-based hand rubs at point of care.
- Emphasize the important role that contaminated hands play in transmission of health-care associated pathogens, including multidrug-resistant pathogens and viruses.
- Define hand hygiene compliance.
- Discuss with staff how to incorporate hand hygiene into their own work flow.
- Conduct live demonstrations of correct techniques for using alcohol-based hand rub and hand washing during educational sessions for healthcare workers.
- Provide videotape presentations of correct hand washing and hand rubbing technique in educational material for healthcare workers.
- Encourage task bundling, resulting in fewer patient visits and fewer opportunities for noncompliance.
- Use fluorescent dye-based training methods to demonstrate correct hand hygiene techniques to clinical staff.
- Periodically monitor the adequacy of hand hygiene technique among clinical staff, giving them feedback regarding their performance. Consider using technology for monitoring hand hygiene compliance.
- Make certain staff wear gloves according to recommendations listed in CDC's Standard Precautions.
- Strongly encourage medical staff compliance.

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[12] CDC-MMWR Guidelines for Hand Hygiene in Health Care Settings, Oct 25, 2002, Vol. 51, No. RR-16

- Ensure convenient access by all staff, visitors and patients to hand hygiene materials such as alcohol hand gel, soap and water.
- Initiate a multi-component publicity campaign (e.g., posters with photos of celebrated hospital doctors/staff members recommending hand hygiene and use of gloves, drawings by children in pediatric hospitals; screen savers with targeted messaging.
- Link hand hygiene compliance to HAI reduction.
- Create a culture where reminders about hand hygiene and use of gloves is encouraged and makes compliance the social norm.
- Set clear aims, quantitative time-specific improvement targets, and post compliance results for staff to see.

**Additional Resources**

1. [CDC-MMWR Guidelines for Hand Hygiene in Health Care Settings, Oct 25, 2002, Vol. 51, No. RR-16](#)

2. [Hand Hygiene Basics-CDC](#)

3. [Hand Hygiene project HRET Six Sigma](#)

4. [WHO Hand Hygiene Guidelines](#)

5. [Hand hygiene guidelines, tools, resources and much more compiled from several national and international initiatives](#)

# GENERAL STRATEGIES- ENVIRONMENT

In addition to the hands of multiple caregivers, the patient care environment can also be a source of contamination. Each contact with a bed, table, doors, and many medical devices can be a major risk to patients. Failure to properly clean the environment can allow the transmission of pathogens, such as *Clostridium difficile.* For more information on *Clostridium difficile*, see the specific section in this toolkit. It has been reported that 75% of surfaces in a patient room are contaminated with Methicillin-resistant *staphylococcus* or Vancomycin-resistant *enterococci.*[13]

A properly cleaned environment takes the dedication of the entire HAI Team. Sterilization is needed for surgical instruments and other devices, but it is not necessary for all items and surfaces. Because sterilization of all patient-care items is not necessary, health-care policies must identify, primarily on the basis of the items' intended use, whether cleaning, disinfection, or sterilization is indicated. Failure to comply with scientifically-based guidelines has led to numerous outbreaks.[14]

**Strategies for Environmental Cleaning**

- Establish barrier precaution guidelines
    - Encourage units to write guidelines for their specific units, even if they are stricter than standards and guidelines
    - Involve unit line staff and housekeeping, as well as leaders
- Eliminate patient use equipment sharing
    - Propose the use of equipment dedicated to one patient for all units
    - Ensure that any equipment that goes from room to room adheres to a strict "cleaning between patients" policy, if single use is not possible
- Institute strict environmental decontamination processes
    - Review current housekeeping policies
    - Review CDC standards[14]
    - Complete a checklist for each cleaning that documents all areas were cleaned, including those that are "high touch"
    - Specify in the checklist the order in which items should be cleaned, starting with areas farthest from the door, so staff does not recontaminate items during the process
    - Educate and encourage staff regarding the importance of cleaning and proper methods of decontamination and cleaning
    - Verify competence in cleaning and disinfection procedures regularly
    - Use immediate feedback mechanisms to assess cleaning and reinforce proper technique

**Additional Resources**

1. SHEA Disinfection Guidelines 2010

2. HICPAC Guidelines

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[13] Boyce, JM. "Environmental contamination due to methicillin-resistant Staphylococcus aureus: possible infection control implications". Infect control Hosp Epidemiol. 1997 Sep;18(9):622-7.

[14] CDC Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008

# CENTRAL LINE ASSOCIATED BLOOD STREAM INFECTIONS (CLABSI)

An estimated 248,000 bloodstream infections occur in U.S. hospitals each year.[15]  It is believed that a large proportion of these are associated with the presence of a central vascular catheter, though this is an area where more study is needed.  For the purposes of National Healthcare Safety Network (NHSN), such infections are termed central line-associated bloodstream infections (CLABSI).  Bloodstream infections are usually serious infections typically causing a prolonged hospital stay and increased cost and risk of mortality.

Many CLABSIs can be prevented through proper management of the central line.  These techniques are addressed in the CDC's Healthcare Infection Control Practices Advisory Committee (CDC/HIPAC) *Guidelines for the Prevention of Intravascular Catheter*.

**Strategies for the Prevention of Blood Stream Infections**

- Routinely educate and assess personnel skills and adherence to guidelines for the insertion and maintenance of peripheral and central intravascular catheters, using only qualified personnel to manage Central Venous Catheters (CVCs)
- Select the insertion site with the least amount of infection risk for the patient
- Perform hand hygiene procedures before and after palpating catheter insertion sites as well as before and after inserting, replacing, accessing, repairing, or dressing an intravascular catheter
- Wear gloves:  clean for peripheral catheters, sterile for the insertion of arterial, central, and midline catheters
- Use sterile barrier precautions including the use of a cap, mask, sterile gown, sterile gloves, and a sterile full body drape for insertion of CVCs, PICCs or guidewire exchange
- Prepare skin with chlorhexidine preparation before CVC insertion and during dressing changes
- Dress site with sterile gauze or sterile, transparent, semipermeable dressing to cover the site.  Do not use topical antibiotic ointment or creams on insertion sites, except dialysis catheters because of fungal infections
- Use a sutureless securement devise
- Do not replace peripheral catheters more than every 72-96 hours.  Do not routinely replace CVCs, PICCs, hemodialysis catheters, or pulmonary artery catheters to prevent infections or on the basis of fever alone
- Clean all access ports before using
- Use a Central Line Insertion Checklist
- Empower nurses to stop a procedure if the CLIP (see next page) guidelines are not followed
- Educate staff by distributing a FACT SHEET and hold in-services for bedside providers
- Reduce complexity by creating and utilizing a line insertion cart
- Ask providers daily whether catheters could be removed

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[15]CDC CLABSI Guide

**What is CUSP?**

CUSP is the Comprehensive Unit-based Safety Program, which has been used to successfully reduce central line-associated blood stream infections. It is based on a system developed by the Johns Hopkins University Quality and Safety Research Group and implemented by the Agency for Healthcare Research and Quality (AHRQ).

CUSP integrates communication, teamwork, and leadership to create and support a "harm-free" patient care culture. It provides a structured strategic framework for safety improvement, yet it is flexible enough to tap into staff wisdom and encourage them to fix hazards that they perceive pose the greatest risks. CUSP is implemented at the unit level and provides a scalable program that can be implemented throughout an organization. The program draws from frontline providers who have the most knowledge about safety hazards and the means to lessen the severity of those hazards, and provides a mechanism to help defend against hazards.[16]

For more information on CUSP and implementation, please visit AHRQ's website.


**What is CLIP?**

Use of CLIP, or Central Line Insertion Practices, can be an important part of a CLABSI prevention strategy. Following are the components of the CLIP process that must be followed[17]:

- Hand hygiene performed
- Appropriate skin prep
    - Chlorhexidene gluconate (CHG) for patients ≥ 2 months old
    - Povidone iodine, alcohol, CHG, or other specified for children < 2 months old
- Skin prep agent has completely dried before insertion
- All 5 maximal sterile barriers used:
    - Sterile gloves
    - Sterile gown
    - Cap
    - Mask worn
    - Large sterile drape

For more information on CLIP, read the "Progress Toward Eliminating Healthcare Associated Infections" document from HHS.

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[16] AHRQ Website

[17] HHS HAI Document

**Additional Resources**

1. [On the CUSP: Stop HAI](#)

2. [CDC guidelines for the prevention of intravascular Catheter-Related Infections, 2011](#)

3. [CDC CLABSI Resource Page](#)

4. [CDC-FAQ Blood Stream Infections](#)

5. [CUSP Resource Page](#)

6. [CUSP Implementation Tool Kit](#)

7. [MMWR-Guidelines for the prevention of catheter related infections](#)

8. [SHEA recommendations for the prevention of Blood Stream Infections](#)

9. [NEJM CUSP article](#)

10. [Patient Education FAQ](#)

# CATHETER ASSOCIATED URINARY TRACT INFECTIONS (CAUTI)

A urinary tract infection (UTI) is an infection involving any part of the urinary system, including urethra, bladder, ureters, and kidney. UTIs are the most common type of healthcare-associated infection reported to the NHSN, with more information available at [National Healthcare Safety Network (NHSN)](). Among UTIs acquired in the hospital, approximately 80% are associated with a urinary catheter, which is a tube inserted into the bladder through the urethra to drain urine. Between 15-25% of hospitalized patients receive urinary catheters during their hospital stay. The most important risk factor for developing a catheter-associated UTI (CAUTI) is prolonged use of the urinary catheter. Therefore, catheters should only be used for appropriate indications and should be removed as soon as they are no longer needed.[18]

**CAUTI-associated Outcomes**

- Urinary tract infections complicated by bacteremia and sepsis
- Nonbacterial urethral inflammation
- Urethral strictures
- Mechanical trauma

**Recommendations for the Prevention of CAUTI**

- Insert catheters only for appropriate indications
- Leave catheters in place only as long as needed
- Ensure that only properly trained persons insert and maintain catheters
- Insert catheters using aseptic technique and sterile equipment
- Following aseptic insertion, maintain a closed drainage system
- Maintain unobstructed urine flow
- Practice hand hygiene and standard (or appropriate isolation) precautions according to CDC HICPAC guidelines

**CAUTI Surveillance and Technology**

Facilities should consider surveillance for CAUTI when indicated by a facility-based risk assessment. Recommended surveillance methodology and metrics can be found in the guidelines, the NHSN Patient Safety Manual, and the U.S. Department of Health & Human Services (HHS) Action Plan to Prevent Healthcare-Associated Infections.

Routine screening for asymptomatic bacteriuria not recommended.

Portable ultrasound devices can be used to assess urine volume in order to reduce unnecessary catheterizations in some patients. Currently, data supporting use of ultrasound bladder scanners are limited; however, this is a promising technology for CAUTI prevention.

Antiseptic or antimicrobial-impregnated catheters, such as silver-alloy coated catheters, may also reduce the risk of CAUTI. However, current data on the clinical benefit of such devices are also limited.

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[18] [SHEA Article: Strategies to Prevent Catheter-Associated Urinary Tract Infections in Acute Care Hospitals]()

Antimicrobial/antiseptic-impregnated catheters should be considered if the CAUTI rate in a facility is not decreasing, despite implementing and adhering to the core strategies to reduce CAUTI.[19]

**Strategies to Prevent CAUTI:**

- Provide written guidelines for catheter use, insertion and maintenance
- Bundle needed supplies
- Implement a strict documentation system
- Only use trained dedicated personnel to insert indwelling urinary catheters
- Provide education on the insertion, care, maintenance of urinary catheters and include alternatives to indwelling catheters
- Initiate a system of alerts or reminders to remove unnecessary catheters
- Provide stop orders for all urinary catheters
- Design protocols for nurse-directed removal of unnecessary catheters
- Adhere to guidelines/algorithms for appropriate perioperative catheter management
- Provide a system of accountability at all levels, from the CEO to senior management to direct caregivers
- Access CUSP STOP BSI recommendations

**Additional Resources**

1. CDC CAUTI Fast Facts

2. On the Cusp-Stop CAUTIs-Manuals and Toolkits

3. SHEA Strategies to Prevent Catheter-Associated Urinary Tract Infections in Acute Care Hospitals

4. National Healthcare Safety Network

5. Patient Education FAQ

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[19] NHSN Website

# *CLOSTRIDIUM DIFFICILE* INFECTIONS (CDI)

*Clostridium difficile*, often called C. *difficile* or C. *diff*, is a bacterium that can cause symptoms ranging from diarrhea to life-threatening inflammation of the colon. Illness from C. *difficile* most commonly affects older adults in hospitals or in long term care facilities and typically occurs after use of antibiotic medication.

In recent years, C. *difficile* infections have become more frequent, more severe and more difficult to treat. Each year, tens of thousands of people in the United States get sick from C. *difficile*, including some otherwise healthy people who aren't hospitalized or taking antibiotics[20].

**Prevention Guidelines for C. *difficile*[21]:**

1. Basic practices for prevention and monitoring of *Clostridium difficile* infection (CDI) include:
   - Use of contact precautions
   - Cleaning and disinfection of equipment and environment
   - Laboratory-based alert systems notifying clinical personnel of new cases of CDI
   - CDI surveillance, analysis, and data report
   - Healthcare personnel and patient and family education about CDI
   - Compliance with Centers for Disease Control and Prevention or World Health Organization hand hygiene and contact precaution recommendations
   - Emphasize hand hygiene with soap and water rather than using alcohol hand gel in C. diff cases
   - Assignment of accountability

2. Special approaches for prevention of CDI in hospitals with unacceptably high CDI rates include:
   - Risk assessment of patients most likely to acquire C. *difficile.*
   - Minimizing C. *difficile* transmission by healthcare personnel (*e.g.*, hand hygiene)
   - Minimizing C. *difficile* transmission from the environment (*e.g.*, sodium hypochlorite [bleach])
   - Reducing the risk of CDI acquisition (antimicrobial stewardship program)
   - Continual education regarding rigorous cleaning of the environment, with special emphasis on all areas that come into contact with patient, care-taker and visitor hands, such as door handles, privacy curtains and light switches (See included sample Q & A document for patient and/or family education with resources at the end of this section)
   - Use environmental cleaning checklists for all rooms

*The following approaches should not be considered a routine part of CDI prevention:*

- Testing patients without signs or symptoms of CDI. Repeating C. *difficile* testing at the end of successful therapy for a patient recently treated for CDI

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[20] [Mayo Clinic Website](#)

[21] [Clinical Practice Guidelines for Clostridium difficile Infection in Adults: SHEA and IDSA Article](#)

**Strategies to Control C. *difficile*:**

- Perform facility-wide surveillance for CDI in all units and report all nosocomial rates to the Infection Control Committee. Share data and interventions with all units, monitor for an increase of colectomies, network with other preventionists to enhance awareness of CDI in the community and keep open communications with local health departments
- Ensure that the microbiology lab is reporting positive C. *difficile* cultures to units even on weekends and holidays to ensure that contact precautions are initiated immediately
- Standard precautions are essential for all patients, but CDI patients must also have contact precaution, private rooms if possible, or cohorted. Dedicated equipment and gowns and gloves upon entrance to the patient room are essential
- An intensive hand hygiene program with strict antimicrobial stewardship is crucial for a comprehensive CDI prevention program
- Comprehensive education for visitors, patients and healthcare workers must be maintained. (See included sample Q & A document for patient and/or family education with other education resources available at the end of this section)
- Senior leadership must be aware of the CDI rates and resources needed to implement and maintain all measures implemented for both prevention and control of CDI

**Additional Resources**

1. [Strategies to Prevent C. *difficile* Infections](#)

2. [CDC-C. *difficile* Page](#)

3. [*C. difficile FAQs*](#)

4. [Guidelines for Environmental Infection Control in Healthcare Facilities](#)

5. [Clinical Practice Guidelines for *Clostridium difficile* Infection in Adults: by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA).](#)

6. [Mayo Clinic](#)

7. [Patient Education FAQ](#)

**Sample Patient/Family Education Q&A - CDI**

**What is *Clostridium difficile*?**

Clostridium difficile is a bacterium that causes diarrhea as well as more serious intestinal conditions such as colitis and bowel inflammation.

**What is *Clostridium difficile* infection?**

It is the most common cause of infectious diarrhea in healthcare facilities.  Symptoms include diarrhea, fever, and abdominal pain or tenderness and may occur when antibiotics are taken to treat an infection because the antibiotic may kill of some good bacteria in the bowel, allowing other bacteria to grow. When C. *difficile* multiplies, toxins are produced that can cause damage to the bowel.

**Who can develop *Clostridium difficile*?**

This infection, also known as CDI, usually occurs during or after the use of antibiotics, especially in the elderly, those having serious illness or those in chronic poor health.

**How is this disease diagnosed?**

If you are on antibiotics currently or recently and develop diarrhea and fever, the doctor may have a sample of your stool collected and sent to the lab for analysis for *Clostridium difficile* toxins.

**How is CDI treated?**

 Your doctor may prescribe specific antibiotics that target and kill C. *difficile*.

**What can I do to help prevent C. *difficile* infection?**

- o Make sure all healthcare providers clean their hands with soap and water or alcohol hand rub before and after caring for you (including doctors and nurses).
- o Take only antibiotics as prescribed by your doctor.
- o Clean your own hands after using the bathroom and before eating.

**Will I give C. *difficile* to my friends and family?**

Visitors are not likely to get it, but they should wash their hands when entering and leaving the room.

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

- o If you are given a prescription to treat C. *difficile*, take the medicine exactly as prescribed.
- o Wash your hands often.

**Where can I get more information?**

- o The Centers for Disease Control and Prevention also has additional educational information .

# SURGICAL SITE INFECTIONS (SSI)

Surgical site infections are the second most common type of adverse events occurring in hospitalized patients.[22] Surgical site infections have been shown to increase mortality, readmission rate, length of stay, and cost for patients who incur them.[23] While nationally the rate of surgical site infection averages between two and three percent for clean cases (Class I/Clean as defined by CDC), an estimated 40 to 60 percent of these infections are preventable.

A review of the medical literature shows that the following care components reduce the incidence of surgical site infection: appropriate use of prophylactic antibiotics; appropriate hair removal; controlled postoperative serum glucose for cardiac surgery patients; and immediate postoperative normothermia for colorectal surgery patients. These components, if implemented reliably, can drastically reduce the incidence of surgical site infection, resulting in the nearly complete elimination of preventable surgical site infection in many cases.[24]

**Strategies to Prevent SSI:**

To prevent SSIs, doctors, nurses, and other healthcare providers should follow CDC infection prevention guidelines including:

- Clean hands and arms up to the elbows with an antiseptic agent just before the surgery
- Clean hands with soap and water or an alcohol-based hand rub before and after caring for each patient.
- If indicated, remove hair immediately before surgery using electric clippers if the hair is in the same area where the procedure will occur.
- Wear special hair covers, masks, gowns, and gloves during surgery to keep the surgery area clean
- When indicated, give antibiotics before surgery starts. In most cases, antibiotics should be given within 60 minutes before the first incision and the antibiotics should be stopped within 24 hours after surgery
- Clean the skin at the surgery site with a special soap that kills germs
- Education patients and families on ways to prevent SSI. (See included sample Q & A document for patient and/or family education with other education information available in the resources at the end of this section).

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[22] Brennan. *N Engl J Med.* 1991;324:370-376

[23] Kirkland. *Infect Control Hosp Epidemiol.* 1999;20:725

[24] IHI Website- Prevent Surgical Site Infections

**Additional Resources**

1. How-to Guide: Prevent Surgical Site Infection (Institute for Healthcare Improvement)

2. Strategies to Prevent Surgical Site Infections in Acute Care Hospitals

3. CDC SSI FAQs

4. HICPAC Guidelines for the Prevention of SSIs

5. Michigan Hospital Keystone Project-Surgery

6. Specification Manual for measure information and recommendations

7. Patient Education FAQ

**Sample Patient/Family Education Q&A - SSI**

*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.  Surgical site infections can sometimes be superficial infections involving the skin only.  Other surgical site infections are more serious and can involve tissues under the skin, organs, or implanted material.

*What can I do to help prevent SSIs?*

Before surgery, talk to your doctor:

- o Tell your doctor about other medical problems you may have.
- o Tell your doctor about health problems such as allergies, diabetes, and obesity that could affect your surgery and your treatment.
- o Quit smoking – patients who smoke get more infections.  Talk to your doctor about how you can quit smoking before your surgery.
- o 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 surgery:

- o 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.

After surgery:

- o If you do not see your providers clean their hands, please ask them to do so.
- o Family and friends who visit you should not touch the surgical wound or dressings.
- o 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.
- o Make sure you understand how to care for your wound before you leave the hospital.
- o Always clean your hands before and after caring for your wound.
- o Make sure you know who to contact if you have questions or problems after you get home.
- o If you have any symptoms of an infection, such as redness and pain at the surgery site, drainage, or fever, call your doctor immediately.