

Surgical Site Infections (SSI) Toolkit

A Provider's Guide to Preventing Surgical Site Infections

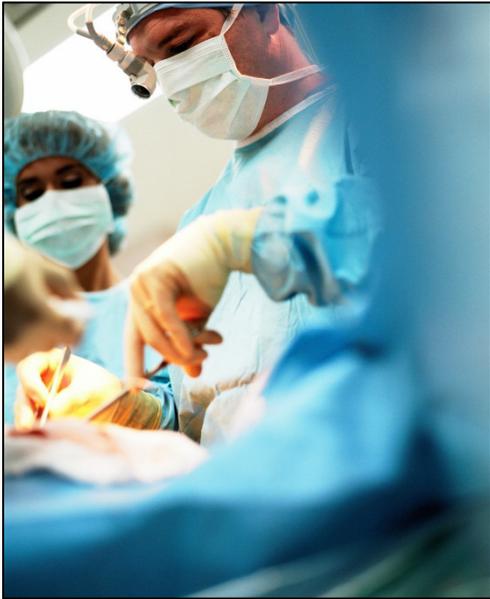


Table of Contents

What is the SSI Toolkit? 3

How to Use the SSI Toolkit..... 3

What are HAIs? 4

HAI National Action Plan to Prevent Healthcare-Associated Infections..... 4

Surgical Site Infections (SSI) 5

Surgical Safety Checklist (2009 Edition) 9

General Strategies - Leadership 11

General Strategies - Communication 14

General Strategies – Antibiotic Stewardship Protocol 17

General Strategies - Hand Hygiene 18

Hand Hygiene Compliance Audit Tool 21

General Strategies – Environment 23

CDC Environmental Checklist for Monitoring Terminal Cleaning¹ 24

What is the SSI Toolkit?

This toolkit is a compilation of evidence-based research and guidelines, recommendations, tools and resources to be used in work on the Healthcare Acquired Infections (HAI) components of the Centers for Medicare Services/Quality Improvement Organizations (CMS/QIO) 10th Scope of Work (SoW). This toolkit specifically addresses 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)
- Institute for Healthcare Improvement (IHI)

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

How to Use the SSI 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 description of HAIs, the national action plan, and a brief description of SSI. The strategy section outlines successful strategies applicable to all types of HAIs. 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 frequently asked questions.

General strategies include 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. Each section ends with a list of resources and tools.

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.

About 13 percent of high-risk adult patients developed healthcare-acquired infections (HAI) in 2000, according to the **(Roberts, et al. 2010)** study of 1,253 patients. The total costs attributable to HAI ranged up to \$21,000 per patient and an increase in length of stay of about 6 to 10 days was found. Healthcare-acquired infection was found to double hospital cost. In a study based on a review of the published literature, **(Scott, 2009)** concluded that the direct medical cost to the nation of HAI ranges from about \$28 billion to \$34 billion each year. The **(Edwards, et al. 2009)** article reports data from a large-scale study of the prevalence of central line associated bloodstream infections, urinary catheter-associated urinary tract infections, and ventilator-associated pneumonia. This article, out of the National Healthcare Safety Network, provides mean, median, and percentile rates for these HAIs for different types of units within hospitals .¹

For more information, please review the U.S. Department of Health and Human Services' [Action Plan to Prevent HAIs](#).

HAI National Action Plan to Prevent Healthcare-Associated Infections

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.

¹ [HHS HAI Website](#)

¹**Sources:**

Roberts RR, and others. [Costs attributable to healthcare-acquired infection in hospitalized adults and a comparison of economic methods](#). *Medical Care*;48(11):1026-1035, Nov. 2010.

Scott, R.D., II. *The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention*. U.S. Centers for Disease Control and Prevention, Mar. 2009. Free full text here: http://www.cdc.gov/ncidod/dhqp/pdf/Scott_CostPaper.pdf

Edwards, J.R., and others. National Healthcare Safety Network (NHSN) report: data summary for 2006 through 2008, issued December 2009. *American Journal of Infection Control*;37:783-805, Dec. 2009. Free full text here: <http://www.cdc.gov/nhsn/PDFs/dataStat/2009NHSNReport.PDF>

[HHS HAI Website](#)

- 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.

Please visit the [National Action Plan](#) for more information and resources. This HAI Action Plan includes five-year goals for nine specific measures of improvement in HAI prevention.

Surgical Site Infections (SSI)

Surgical site infections (SSI) are the second most common type of adverse events occurring in hospitalized patients.² SSI have been shown to increase mortality, readmission rate, length of stay, and cost for patients who incur them.³ While nationally the rate of SSI 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.

Surgical Site Infection Cost

At the SHEA conference in April 2012, Deborah Yokoe, M.D. M.P.H. noted the estimated annual hospital cost of SSIs to be \$7,421,000, 000 with 13,088 deaths per year. Over 290,000 infections are estimated to occur annually, while treatment averages just over \$25,000 per infection.

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 SSI, resulting in the nearly complete elimination of preventable SSI in many cases.⁴

Goal for 10th SoW: 50 percent of hospitals participating in CMS HAI subaim agree to participate SSI reduction projects.

Basic Practices (SHEA Compendium)

- Perform SSI surveillance for targeted procedures
- Provide ongoing feedback to personnel and leadership
- Make use of automated data to increase the efficiency of surveillance
- Administer antimicrobial prophylaxis in accordance with evidence-based standards and guidelines
- Initiate prophylaxis within the recommended time frame
- Provide a clear process

² Brennan. *N Engl J Med.* 1991;324:370-376

³ Kirkland. *Infect Control Hosp Epidemiol.* 1999;20:725

⁴ [IHI Website](#)

- [Use a surgical safety checklist](#)
- Control blood glucose levels immediately post operatively
- Implement policies and practices that meet regulatory and accreditation requirements and are aligned with evidence-based standards (e.g., HICPAC guidelines)
- Educate 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)

Strategies in OR

- Use Surgical scrub or alcohol-based surgical hand antiseptic agent
- Perform skin preparation at the operative site
- Optimize surgeon technique
- Adhere to principles of operating room asepsis
- Follow facility guidelines for Operating Room construction and ventilation
- Minimize traffic, optimize environmental cleaning
- Optimize sterilization of equipment; minimize use of flash sterilization

Top CDC recommendations for SSI Prevention

Before surgery

- Administer antimicrobial prophylaxis in accordance with evidence-based standards and guidelines
- Treat remote infections whenever possible before elective operations
- Avoid hair removal at the operative site unless it will interfere with the operation; do not use razors
- Use appropriate antiseptic agent and technique for skin preparation

During surgery

- Keep OR doors closed during surgery except as needed for passage of equipment, personnel, and the patient, minimizing traffic

After surgery

- Maintain immediate postoperative normothermia
- Protect primary closure incisions with sterile dressing
- Control blood glucose level during the immediate post-operative period (cardiac)
- Discontinue antibiotics according to evidence-based standards and guidelines

Also consider

Before surgery:

- Consider nasal screening and decolonization for *Staphylococcus aureus* carriers for select procedures (i.e., cardiac, orthopedic, neurosurgery procedures with implants).
- Screen preoperative blood glucose levels and maintain tight glucose control

During surgery:

- Redose antibiotic at the 3 hr interval in procedures with duration >3hrs
- Adjust antimicrobial prophylaxis dose for obese patients (body mass index >30)
- Use at least 50 percent fraction of inspired oxygen intraoperatively and immediately postoperatively in select procedure(s)

Sample Patient/Family Education Q&A – SSI

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.
- 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.

Nurse Phone # _____

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

Surgical Safety Checklist (2009 Edition)

Based on the [WHO Surgical Safety Checklist](http://www.who.int/patientsafety/safesurgery/en), URL <http://www.who.int/patientsafety/safesurgery/en>, © World Health Organization 2008 All rights reserved. Rev 1/2009

BEFORE ANESTHESIA INDUCTION

(with at least nurse and anaesthetist)

Has the patient confirmed his/her identity, site, procedure, and consent? <input type="checkbox"/> Yes
Is the site marked? <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable
Is the anaesthesia machine and medication check complete? <input type="checkbox"/> Yes
Is the pulse oximeter on the patient and functioning? <input type="checkbox"/> Yes
Does the patient have a: Known allergy? <input type="checkbox"/> No <input type="checkbox"/> Yes Difficult airway or aspiration risk? <input type="checkbox"/> No <input type="checkbox"/> Yes, and equipment/assistance available Risk of >500ml blood loss (7ml/kg in children)? <input type="checkbox"/> No <input type="checkbox"/> Yes, and two IVs/central access and fluids planned

BEFORE SURGERY

(with nurse, anaesthetist and surgeon)

<input type="checkbox"/> Confirm all team members have introduced themselves by name and role.
To surgeon, anaesthetist and nurse: <input type="checkbox"/> What is this patient's name, what procedure is planned, and where will the incision be made?
Has antibiotic prophylaxis been given within the last 60 minutes? <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable
Anticipated Critical Events
To surgeon: <input type="checkbox"/> What are the critical or non-routine steps? <input type="checkbox"/> How long will the case take? <input type="checkbox"/> What is the anticipated blood loss?
To anaesthetist: <input type="checkbox"/> Are there any patient-specific concerns?
To nursing team: <input type="checkbox"/> Has sterility (including indicator results) been confirmed? <input type="checkbox"/> Are there equipment issues or any concerns?
Is essential imaging displayed? <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable

BEFORE PATIENT LEAVES OR

(with nurse, anaesthetist and surgeon)

Nurse verbally confirms: <input type="checkbox"/> The name of the procedure <input type="checkbox"/> Completion of instrument, sponge and needle counts <input type="checkbox"/> Specimen labelling (read specimen labels aloud, including patient name) <input type="checkbox"/> Whether there are any equipment problems to be addressed
To surgeon, anaesthetist and nurse: <input type="checkbox"/> What are the key concerns for recovery and management of this patient?

Additional Tools and Resources for SSI

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](#)
8. [Patient Education](#)
9. [CDC Toolkits for SSI Prevention](#)

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 sustainable 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 leadership⁵:

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, 2012."
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. *Foster 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, and 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.

⁵ [IHI Website- Guide for Governance Leadership](#)

Strategies to Engage and Support Boards⁶

- 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, find a physician champion
 - Plan A – use existing relationships, when available, but if not successful – go to plan B.
 - Plan B – use the “6 degrees of separation” theory and seek contacts
 - Plan C – cold call on a board member, it is okay
 - 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

⁶ [TMIT Webinar Slides](#)

Additional Resources for General Strategies

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](#)
5. [Are You Ready?](#)

Introduction

There are many communication tools available to facilitate communication and foster teamwork when seeking to improve quality. TeamSTEPPS and Positive Deviance are only two of those. More are referenced in the resource list. Rapid changes followed by evaluation of the effectiveness of those actions may lead to sustainable change in the long-run.

TeamSTEPPS

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:⁷

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.

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:

⁷ [TeamSTEPPS Website](#)

- ✓ 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 are available](#)

Visit the [TeamSTEPPS website](#) for more information on the program, training and implementation.

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”.^{8,9,10,11} 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:¹²

- Communities that 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.”

⁸ [Plexus Institute](#)

⁹ Tuhus-Dubrow, R. The Power of Positive Deviants: A promising new tactic for changing communities from the inside. Boston Globe. November 29, 2009.

¹⁰ Sternin, J., & Choo, R. (2000). The power of positive deviancy. Harvard Business Review, January-February 2000: 14-15.

¹¹ 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.

¹² Pascale, Sternin, & Sternin. (2010) The Power of Positive Deviance: How Unlikely Innovators Solve the World’s Toughest Problems. Harvard Business Press.

In conjunction with the Plexus Institute, the Centers for Disease Control (CDC) and the Robert Wood 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 are¹³:

- 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

Additional Resources for Positive Deviance

1. [IHI Improvement Map](#)
2. [Positive Deviance Initiative](#)
3. [Q&A on Positive Deviance, Innovation and Complexity](#)
4. [Robert Wood Johnson Foundation – video featuring CDC and hospitals](#)
<http://teamstepps.ahrq.gov/>
5. <http://teamstepps.ahrq.gov/>

¹³ [Plexus Institute Final Report](#)

General Strategies – Antibiotic Stewardship Protocol

Magnitude of Antimicrobial Use

- Antibiotics are the second most commonly used class of drugs in the United States
- More than 8.5 billion dollars are spent on anti-infectives annually
- 200-300 million antimicrobials prescribed annually
- 53 percent for outpatient use
- 30-50 percent of all hospitalized patients receive antibiotics
- Studies estimate up to 50 percent of antibiotic use is either unnecessary or inappropriate across all types of health care settings

Antibiotic Stewardship Program Establishment¹⁴

- 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)
 - Enlist the help of Infectious Disease clinicians
 - Involve pharmacists in the program
- Initiate targeted consultations
 - Review Cases (positive cultures, specific antibiotic type, duration of antibiotics, antibiotic appropriateness for the organism)
 - Promote changing prescription habits among clinicians
 - Advocate timely start of antibiotics, the right antibiotic, discontinuing in 24 hours and the use standing orders as well as automatic stop orders
- De-escalate, based on culture
 - Present both patient and clinician education regarding antimicrobial use and bacterial resistance
 - Provide printed material regarding appropriate antibiotic use and resistance, targeted to both clinicians and patients
 - Treatment Guidelines

¹⁴[SHEA Antimicrobial Stewardship Abstract](#)
Clin Infect Dis 2007;44:159-177

- Practice dose optimization
 - Recommend new dose guidelines for antibiotics as available – Vancomycin – (CID 2009;49:325)
 - Use weight based dosing, not blood levels, and monitor renal function
 - 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)
- Restrict select antibiotics
- Restrict Fluoroquinolone in order to reduce *CDI*
- Partner with other state and national partners to share resources and maximize efforts

Additional Resources for Antimicrobial Stewardship

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](#)
8. Antimicrobial Stewardship: A collaborative partnership between infection preventionists and health care epidemiologists. *AJIC* (20) 2012 94-95

General Strategies - Hand Hygiene

In the United States, hospital patients get nearly two million infections each year. That's about one infection for every twenty 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.¹⁵

Hand Hygiene Basics

- Before and after all patient contact
- Before donning gloves
- Before performing invasive procedures
- Before inserting or manipulating urinary catheters, IV catheters, respiratory equipment, or other invasive devices
- After contact with contaminated equipment or other objects in the immediate vicinity of the patient
- After removing gloves
- When leaving a contaminated area to work in a clean area

Education/Motivation

- Monitor adherence and give feedback
- Encourage patients and their families to remind providers to practice hand hygiene
- Suggest caregivers remind each other to use hand hygiene and accept the reminders in the light of the best thing for the patient

¹⁵ CDC-MMWR Guidelines for Hand Hygiene in Health Care Settings, Oct 25, 2002, Vol. 51, No. RR-16

Strategies for Reducing CDI 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 more efficient patient care.
- 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.
- Insist upon medical staff compliance and forward compliance rates to hospital leadership.
- 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 are encouraged and make compliance the social norm.
- Set clear aims, quantitative time-specific improvement targets, and post compliance results for staff to see.

Hand Hygiene Compliance Audit Tool

Observation Number	Date	Unit	Shift Or Time	Type of Employee (RN, LPN, CNA, MD, other)	Observation of Opportunity (Before Care or After Care – Circle One)		Type of Hand Hygiene Observed (Wash or Alcohol Rub – Circle One or leave blank if no hand hygiene performed)		Compliance with Expected Procedure (Circle One)	
					Before	After	Wash	Alcohol	Yes	No
1					Before	After	Wash	Alcohol	Yes	No
2					Before	After	Wash	Alcohol	Yes	No
3					Before	After	Wash	Alcohol	Yes	No
4					Before	After	Wash	Alcohol	Yes	No
5					Before	After	Wash	Alcohol	Yes	No
6					Before	After	Wash	Alcohol	Yes	No
7					Before	After	Wash	Alcohol	Yes	No
8					Before	After	Wash	Alcohol	Yes	No
9					Before	After	Wash	Alcohol	Yes	No
10					Before	After	Wash	Alcohol	Yes	No
11					Before	After	Wash	Alcohol	Yes	No
12					Before	After	Wash	Alcohol	Yes	No
13					Before	After	Wash	Alcohol	Yes	No
14					Before	After	Wash	Alcohol	Yes	No
15					Before	After	Wash	Alcohol	Yes	No
16					Before	After	Wash	Alcohol	Yes	No
17					Before	After	Wash	Alcohol	Yes	No
18					Before	After	Wash	Alcohol	Yes	No
19					Before	After	Wash	Alcohol	Yes	No
20					Before	After	Wash	Alcohol	Yes	No
21					Before	After	Wash	Alcohol	Yes	No
22					Before	After	Wash	Alcohol	Yes	No
23					Before	After	Wash	Alcohol	Yes	No
24					Before	After	Wash	Alcohol	Yes	No
25					Before	After	Wash	Alcohol	Yes	No
26					Before	After	Wash	Alcohol	Yes	No
27					Before	After	Wash	Alcohol	Yes	No
28					Before	After	Wash	Alcohol	Yes	No
29					Before	After	Wash	Alcohol	Yes	No
30					Before	After	Wash	Alcohol	Yes	No

Instructions:

- Each observation consists of one opportunity when hand hygiene should be performed.
- The example shown captures seven pieces of information: (1) the date, (2) unit where observation took place, (3) type of staff observed (specify if other), (4) which of two opportunities for hand hygiene took place (before care or after care), (5) which type of hand hygiene occurred (wash at sink or use of alcohol based hand rub), and (6) whether compliance with expected procedure was observed (this can take into account whether resident was on precautions for C. difficile infection).

Additional Resources for Hand Hygiene

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](#)
6. [Multiple APIC resources for Infection Prevention](#)

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. It has been reported that 75 percent of surfaces in a patient room are contaminated with Methicillin-resistant *staphylococcus* or Vancomycin-resistant *enterococci*.¹⁶

It has been reported that 75 percent of surfaces in a patient room are contaminated with Methicillin-resistant *staphylococcus* (MRSA) or Vancomycin-resistant *enterococci* (VRE).¹⁷

Failure to properly clean the environment can allow the transmission of pathogens, such as *Clostridium difficile*, VRE, and MRSA. 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.¹⁸

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 standards¹⁴
 - 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

¹⁶ Boyce, JM. “Environmental contamination due to methicillin-resistant *Staphylococcus aureus*: possible infection control implications”. *Infect control Hosp Epidemiol*. 1997 Sep; 18(9):622-7.

¹⁷ Boyce, JM. “Environmental contamination due to methicillin-resistant *Staphylococcus aureus*: possible infection control implications”. *Infect control Hosp Epidemiol*. 1997 Sep; 18(9):622-7.

¹⁸ [HICPAC Disinfection Guidelines](#)

CDC Environmental Checklist for Monitoring Terminal Cleaning¹

(Begin with areas furthest from the door and work forward to avoid re-contamination.)

Date:	
Unit:	
Room Number:	
Initials of ES staff (optional):²	

Evaluate the following priority sites for each patient room:

High-touch Room Surfaces ³	Cleaned	Not Cleaned	Not Present in Room
Bed rails / controls			
Tray table			
IV pole (grab area)			
Call box / button			
Telephone			
Bedside table handle			
Chair			
Room sink			
Room light switch			
Room inner door knob			
Bathroom inner door knob / plate			
Bathroom light switch			
Bathroom handrails by toilet			
Bathroom sink			
Toilet seat			
Toilet flush handle			
Toilet bedpan cleaner			

Evaluate the following additional sites if this equipment is present in the room:

High-touch Room Surfaces ³	Cleaned	Not Cleaned	Not Present in Room
IV pump control			
Multi-module monitor controls			
Multi-module monitor touch screen			
Multi-module monitor cables			
Ventilator control panel			

Mark the monitoring method used:

- Direct observation Fluorescent gel
 Swab cultures ATP system Agar slide cultures

¹Selection of detergents and disinfectants should be according to institutional policies and procedures

²Hospitals may choose to include identifiers of individual environmental services staff for feedback purposes.

³Sites most frequently contaminated and touched by patients and/or healthcare workers

Additional Resources for Environmental Cleaning

1. [SHEA Disinfection Guidelines 2010](#)
2. [HICPAC Guidelines](#)

All material presented or referenced herein is intended for general informational purposes and is not intended to provide or replace the independent judgment of a qualified healthcare provider treating a particular patient. Ohio KePRO disclaims any representation or warranty with respect to any treatments or course of treatment based upon information provided. Publication No 311201-OH-1003-11/2012. This material was provided by the Oklahoma Foundation for Medical Quality and Stratis Health, the National Coordinating Center (NCC) for Improving Individual Patient Care (IIPC) Aim, and was prepared by Ohio KePRO, the Medicare Quality Improvement Organization for Ohio, under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. The contents presented do not necessarily reflect CMS policy.