

# *Clostridium difficile* Infections (CDI) Toolkit

A Healthcare Provider's Guide to Preventing *Clostridium difficile* Infections



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## ***What is the CDI Toolkit?***

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This toolkit is a compilation of evidence-based research and guidelines, recommendations, tools and resources to be used in work on the Healthcare Associated Infections (HAI) components of the CMS/QIO 10<sup>th</sup> Scope of Work (SoW). This toolkit specifically addresses *Clostridium difficile* Infections (CDIs), along with the aligned HAI National Action Plan to Prevent HAIs.

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 CDI Toolkit***

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This toolkit should be used by providers and others working to reduce 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 an informational section on CDI, followed by a general strategy section outlining successful strategies applicable to all types of HAIs and then by more specific applications for CDI. The patient is a crucial part of the healthcare team. Therefore, additional resources include a sample and/or links to patient education documents and/or links to patient education information and frequently asked questions.

This toolkit 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 CDI follow the general strategy section. Each section ends with a list of resources and tools.

## ***What are HAIs?***

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Healthcare Associated Infections (HAIs) are infections that patients acquire while receiving treatment for medical conditions or appear associated with recently received treatment. 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.

*Clostridium difficile* Infections (CDI) are one of the fastest growing HAIs, affecting patients in both acute and long-term care settings. 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.<sup>1</sup>

For more information, please review the [HHS Action Plan to Prevent Healthcare Associated Infections](#).

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<sup>1</sup> <http://www.hhs.gov/ash/initiatives/hai/index.html>HHS Healthcare Associated Infections Webpage.

## ***Clostridium difficile* Infections (CDIs)**

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*Clostridium difficile* is an anaerobic, gram positive, spore forming bacillus 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, CDIs 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 CDI, including some otherwise healthy people who aren't hospitalized or taking antibiotics<sup>2</sup>.

From 2000 to 2009, the number of hospitalized patients with any CDI discharge diagnosis more than doubled, from approximately 139,000 to 336,600, and the number with a primary CDI diagnosis more than tripled from 33,000 to 111,000. (MD, 2012)

In a study noted in the March 6, 2012 MMWR, rates of hospital-onset CDIs were compared between two eight-month periods near the beginning and end of three CDI prevention programs that focused primarily on measures to prevent intra-hospital transmission of CDI. The pooled CDI rate declined 20 percent among 71 hospitals participating in the CDI prevention programs.<sup>3</sup>

According to Becky A. Miller MD, who presented study results at an oral session at the Fifth Decennial International Conference on Healthcare Associated infections 2010, hospital-onset, healthcare associated *Clostridium difficile* infections (CDI) have increased in frequency. CDI has surpassed methicillin-resistant *Staphylococcus aureus* (MRSA) infections in the race to be the most prevalent hospital acquired infection in hospitals.

Complicating this difficult picture is the fact that common hand-hygiene products are often ineffective at killing CDI as the bacteria is sticky, similar to anthrax. The *C. difficile* spores have an exosporium that confers a particulate adherence-sticky chains of protein containing substances that stick on hands says Dr. Dale Gerding, associate chief of staff, research and development coordinator for Edward Hines Jr. VA Hospital. These results reinforce the need for contact precautions, complete with gloves, for the care of these patients.

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<sup>2</sup><http://www.mayoclinic.com/health/c-difficile/DS00736> Mayo Clinic Website

<sup>3</sup><http://www.cdc.gov/mmwr> CDC MMWR Website

On May 19<sup>th</sup>, 2010, the Association for Professionals in Infection Control and Epidemiology (APIC) released a national survey. Of the hospitals that participated, most are using multiple strategies to address CDI.

- 83% had hand hygiene initiatives
- 90% conducted surveillance or other methods and activities to promptly identify CDI cases
- 94% always placed these patients on contact precautions, using gowns and gloves when caring for them
- 86% had increased their emphasis on environmental cleaning to address CDI spores staying on surfaces

Some areas of progress are not as evident. Only 30% of respondents monitored the number of colectomies at their institutions, which may indicate the more severe strain of CDI. Nearly a quarter of institutions did not monitor environmental cleaning effectiveness. Lack of resources and staff time seems to be the reason some measures have not been implemented.

Four in ten respondents did not have an antimicrobial stewardship program, which is an important strategy due to the fact that 90% of patients with CDI have previously received antibiotics. The variation in some of practices identified in the CDI Pace of Progress Poll point out the need to improve standardization of prevention measures and guide future practices.

#### KEY POINTS TO SHARE WITH HOSPITAL BOARDS

1. *Clostridium difficile* infections increased several fold in the past decade and became more serious, but are nonetheless preventable.
2. Of all CDIs, 94 percent are related to health-care exposures and are potentially preventable by reducing unnecessary antibiotic use and interrupting patient-to-patient transmission of CDI.
3. CDIs were reduced by 20 percent over approximately twenty-one months by seventy-one hospitals participating in prevention programs focused primarily on infection control strategies (e.g. early reliable detection, isolation, and enhanced environmental cleaning).
4. Of all healthcare associated CDIs, 75 percent have their onset outside of hospitals, and 52 percent of the CDIs treated in hospitals are present on admission; these infections are a potential source for intra-hospital transmission.
5. More must be done to prevent CDIs by various stakeholders working together to expand prevention strategies, including a greater focus on antibiotic stewardship and extending prevention strategies in settings across the continuum of health-care delivery.

## Environment

Environmental contamination also has an important role in transmission of *C. difficile* in healthcare settings. There have also been outbreaks traced back to electronic rectal thermometers, inadequately cleaned commodes or bedpans shared between patients.

The environment must be accepted as a critical source of contamination as it plays an important role in supporting the spread of infection. Because *C. difficile* is shed in feces, any surface, item, or medical device that becomes contaminated with feces is a source for the spores and becomes involved in infection transmission. *C. difficile* spores can exist for five months on hard surfaces. In one study, spores were found in 49% of the rooms occupied by patients with CDI and 29% of the time in rooms with asymptomatic carriers.

The heaviest contamination would be on floors, in bathrooms and any surfaces commonly touched by hands, such as light switches, bed-rails and table tops. Other potential contamination sites include electronic thermometers, blood pressure cuffs and call buttons.

## Symptoms of CDI

- Watery diarrhea three or more times a day for two or more days
- Mild abdominal cramping and tenderness
- Fever
- In more severe cases, *C. difficile* causes the colon to become inflamed (colitis) or to form patches of raw tissue that can bleed or produce pus (pseudomembranous colitis). Signs and symptoms of severe infection include:
  - Watery diarrhea 10 to 15 times a day
  - Abdominal cramping and pain, which may be severe
  - Fever
  - Blood or pus in the stool
  - Nausea
  - Dehydration
  - Loss of appetite
  - Weight loss

## Diagnostic Testing

Diagnostic testing for *C. difficile* should be performed only on diarrheal stool unless ileus due to *C. difficile* is suspected. The most sensitive test is a stool culture, even though turnaround time is slow. The sensitivity and specificity of stool cultures followed by toxigenic culture is the standard against which other clinical test results are measured.

Testing of stool from asymptomatic patients is not clinically useful, even use as a test of cure and not recommended, except for epidemiological studies. Stool culture is the most sensitive test and essential for epidemiological studies. Even though the slow turn-around time makes stool culture not always clinically practical, the sensitivity and specificity, followed by identification of a toxigenic isolate, provides the standard against which other clinical test results are compared.

## Prevention Guidelines for CDI<sup>4</sup>:

1. Basic practices for prevention and monitoring of *Clostridium difficile* infection (CDI) include:
  - Use of contact precautions for all confirmed CDI patients
  - Use of contact precautions for all suspected CDI patients until ruled out
  - Strict 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 CDI education
  - Patient and family education about CDI
  - Compliance with Centers for Disease Control and Prevention or World Health Organization hand hygiene and contact precaution recommendations
  - Emphasis of hand hygiene with soap and water before and after patient contact, and before and after putting on and taking off gloves.
  - Assignment of accountability
  - Robust Antimicrobial Stewardship program

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<sup>4</sup> <http://www.jstor.org/stable/10.1086/651706>



2. Special approaches for prevention of CDI in hospitals with unacceptably high CDI rates include:

- Risk assessment of patients most likely to acquire CDI.
- Minimizing CDI transmission by healthcare personnel (e.g., hand hygiene).
- Prevent CDI transmission from the environment (e.g., sodium hypochlorite [bleach]).
- Reduce 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.

#### **Strategies to Control CDI:**

- Perform facility-wide surveillance for CDI in all units and report all HAI 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.
- Monitor gown and glove use with CDI patients.

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

### **What is *Clostridium difficile* (CDI)?**

*Clostridium difficile* is a bacterium that causes diarrhea as well as more serious intestinal conditions such as colitis and bowel inflammation. Many clinicians refer to this as CDI or *C.diff*.

### **What is CDI?**

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 off some good bacteria in the bowel, allowing other bacteria to grow. When *Clostridium difficile* multiplies, toxins are produced that can cause damage to the bowel.

### **Who can develop CDI?**

This infection 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 the *Clostridium difficile* bacteria.

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

- 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).
- Take only antibiotics as prescribed by your doctor.
- Clean your own hands after using the bathroom and before eating.

### **Will I give CDI 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?**

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

### **Where can I get more information?**

- The Centers for Disease Control and Prevention also has additional educational information [available online at www.cdc.gov](http://www.cdc.gov).

### **Additional Resources for CDI**

1. [Webpage: Strategies to Prevent \*C. difficile\* Infections](#)
2. Webpage: [CDC's CDI information page](#)
3. Webpage: [CDC's CDI FAQs](#)
4. Article Citation: CDC. Schuster L, Chinn RYW, the Healthcare Infection Control Practices Advisory Committee (HICPAC): MMWR 2003; 52 (RR10):1–42.
5. Webpage: [Guidelines for Environmental Infection Control in Healthcare Facilities](#)
6. [PDF: Strategies for Acute Care –CDI Prevention](#)
7. Webpage: [Mayo Clinic](#)
8. PDF: [Patient Education FAQ](#)
9. Webpage: [MMWR](#)
10. [Webpage: Multiple APIC resources for Infection Prevention](#)

## **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. This HAI Action Plan includes five-year goals for nine specific measures of improvement in HAI prevention.

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 [HHS Healthcare Associated Infections Webpage](#).

## General Strategies – Leadership

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### 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 leadership<sup>5</sup>:

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.

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<sup>5</sup> <http://www.ihl.org>: [IHI's How-To Guide for Governance Leadership](#)

## 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.

## Strategies to Engage and Support Boards<sup>6</sup>

- 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

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<sup>6</sup> [http://safetyleaders.org/downloads/TMITWebinar\\_PanelistSlides\\_02\\_24\\_11.pdf](http://safetyleaders.org/downloads/TMITWebinar_PanelistSlides_02_24_11.pdf) TMIT Webinar Slides

- Decide who will be used to “open the door” – assume the board wants/needs to know, find a physician champion
  - Plan A – use existing relationships when available, or 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 – *Fill in your own ideas on this line*
- 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 and ask the board to prepare for discussion
  - Offer follow-up

#### Additional Resources for General Strategies

1. [PDF: TMIT/Safety Leaders](#)
2. [Webpage: IHI/Board on Boards](#)
3. [Webpage with slide decks: CMS QualityNet Conference 'Sparking innovation, igniting action, lighting the way to tomorrow's healthcare' videos of presentations, transcripts, and slide sets.](#)
4. [Webpage: The CareBoards](#)
5. [Webpage: Are You Ready?](#)

## **General Strategies - Communication**

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### **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: <sup>7</sup>

*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.

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<sup>7</sup> [http://teamstepps.ahrq.gov/about-2cl\\_3.htm](http://teamstepps.ahrq.gov/about-2cl_3.htm) TeamSTEPPS Website



*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.
- ✓ [Download tools and materials.](#)

For more information on the TeamSTEPPS program, training and implementation, [click here](#).

### **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”) who’s 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”.<sup>8,9,10,11</sup>

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<sup>8</sup> <http://www.plexusinstitute.org/?page=complexity3> Plexus Institute Website

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

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

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:<sup>12</sup>

- 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 Wood Johnson Foundation (RWJF) expanded work to support six hospitals in 2006 to pilot PD in their facilities to develop better strategies to reduce HAIs in their facilities. 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<sup>13</sup>:

- While leadership support is essential, engagement of front-line staff is more essential
- Habitual behaviors that lead to transformations 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 accelerated PD implementation
- Informal and formal social networks are accelerators

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<sup>11</sup> 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.

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

<sup>13</sup> [RWJF Final Report](#)

## Additional Resources for Positive Deviance

1. [Webpage: IHI Improvement Map](#)
2. [Webpage: Positive Deviance Initiative](#)
3. [Webpage: Q&A on Positive Deviance, Innovation and Complexity](#)
4. [Webpage: RWJF Whitepaper on Positive Deviance](#)

## ***General Strategies – Antibiotic Stewardship Protocol***

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### **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 are prescribed annually.
- 53 percent are 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 Establishment<sup>14</sup>**

- 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 of standing orders as well as automatic stop orders.

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<sup>14</sup>[http://www.shea-online.org/Assets/files/2007\\_SHEA\\_Antimicrobial\\_Stewardship\\_Abstracts.pdf](http://www.shea-online.org/Assets/files/2007_SHEA_Antimicrobial_Stewardship_Abstracts.pdf) Abstract Clin Infect Dis 2007;44:159-177

- 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.
    - [GetSmartTreatment Guidelines](#)
- Practice dose optimization
  - Recommend new dose guidelines for antibiotics as available – Vancomycin – (CID 2009;49:325).
  - Use weight based dosing, no blood levels, and monitor renal function.
  - Recommend the shortest course of antibiotics possible. (guidelines example follow)
    - Ventilator-associated pneumonia: 8 vs. 15 days. (JAMA 2003; 290:2588)
    - Community-associated pneumonia: 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. [PDF: Minimum Antibiotic Stewardship Measures](#)
2. PDF: Antimicrobial Stewardship
3. [SHEA Guideline-Antibiotic Stewardship:](#)
4. [Webpage: AHRQ Guidelines](#)
5. [PDF: Shea Online-Antimicrobial Stewardship](#)
6. [Webpage: IDSA](#)
7. [Webpage: CDC Get Smart Guide](#)
8. Article Citation: Antimicrobial Stewardship: A collaborative partnership between infection preventionists and health care epidemiologists. AJIC (20) 2012 94-95

## ***General Strategies - Hand Hygiene***

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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.<sup>15</sup>

### **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

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

## **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

## **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. [Webpage: CDC-MMWR Guidelines for Hand Hygiene in Health Care Settings, Oct 25, 2002, Vol. 51, No. RR-16](#)
2. Webpage: [Multiple APIC resources for Infection Prevention](#)
3. Webpage: [Hand Hygiene Basics-CDC](#)
4. [Webpage: Hand Hygiene project HRET Six Sigma](#)
5. [PDF: WHO Hand Hygiene Guidelines](#)
6. [Webpage: Hand hygiene guidelines, tools, resources and much more compiled from several national and international initiatives](#)



## General Strategies – Environment

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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* (MRSA) or Vancomycin-resistant *enterococci* (VRE).<sup>16</sup>

Failure to properly clean the environment can allow the transmission of pathogens, such as CDI, 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.<sup>17</sup>

### 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<sup>14</sup>
  - 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 cause cross-contamination of items during the process

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

<sup>17</sup> [http://www.cdc.gov/hicpac/pdf/guidelines/Disinfection\\_Nov\\_2008.pdf](http://www.cdc.gov/hicpac/pdf/guidelines/Disinfection_Nov_2008.pdf) CDC Guidelines

- 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

**CDC Environmental Checklist for Monitoring Terminal Cleaning<sup>1</sup>**

<b>Date:</b>	
<b>Unit:</b>	
<b>Room Number:</b>	
<b>Initials of ES staff (optional):<sup>2</sup></b>	

**Evaluate the following priority sites for each patient room:**

<b>High-touch Room Surfaces<sup>3</sup></b>	<b>Cleaned</b>	<b>Not Cleaned</b>	<b>Not Present in Room</b>
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:**

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

**Mark the monitoring method used:**

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Direct observation | <input type="checkbox"/> Fluorescent gel | <input type="checkbox"/> Agar slide cultures |
| <input type="checkbox"/> Swab cultures      | <input type="checkbox"/> ATP system      |  |

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<sup>1</sup>Selection of detergents and disinfectants should be according to institutional policies and procedures

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

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

#### Additional Resources for Environmental Cleaning

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