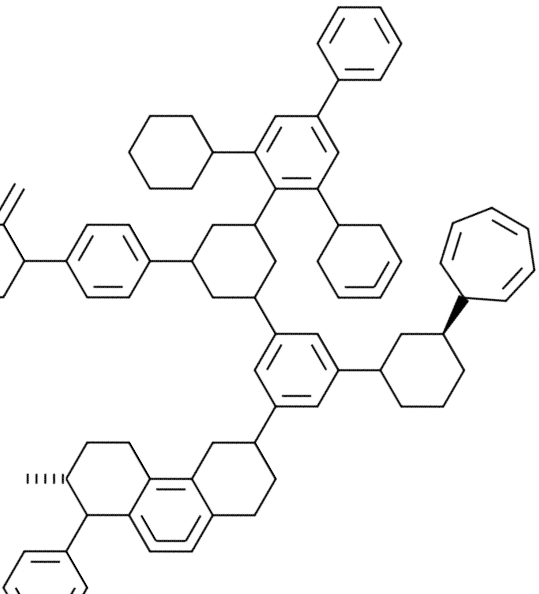
# *Clostridium difficile* Infection (CDI) Toolkit

A Healthcare Professional's Guide to Preventing CDIs



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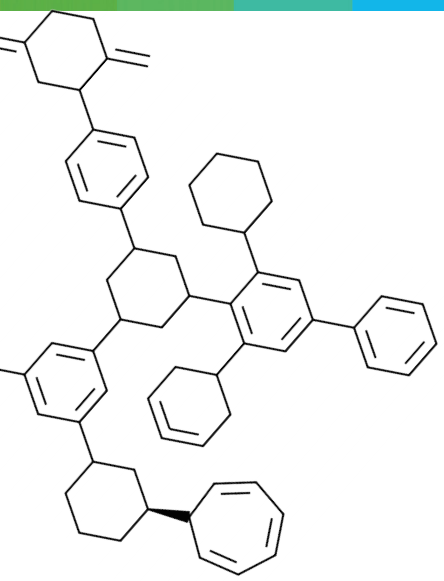

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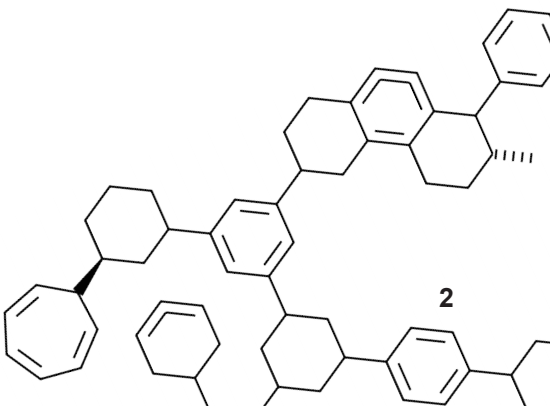


# Introduction

This compilation of evidence-based research and guidelines, recommendations, tools and resources is for working on the healthcare associated infections (HAI) components of the Centers for Medicare & Medicaid Services (CMS)/Quality Improvement Organization (QIO) initiative. This toolkit specifically addresses Clostridium difficile infections (CDIs), along with the aligned HAI National Action Plan to Prevent HAIs.

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

- U.S. Department of Health and Human Services (HHS)
- Centers for Medicare & Medicaid Services (CMS)
- 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. The electronic version may be updated as new information is acquired and will be made available at www.atomAlliance.org.

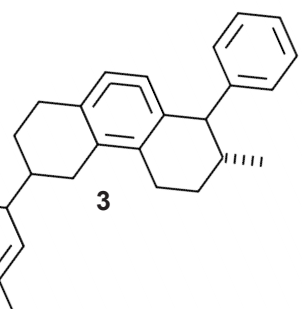
## How to Use the CDI Toolkit

This toolkit should be used by providers and other healthcare professionals working to reduce HAIs. Each section contains information and additional online resources that can be used at any stage of progress, such as

- introductory information,
- tools and guidelines,
- online resources, and
- strategies and recommendations.

This toolkit includes approaches on leadership engagement (not inclusive), communication and hand hygiene. 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 strategy section ends with a list of resources and tools.

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 samples and/or links to patient education documents, information and frequently asked questions.



## What Are Healthcare Associated Infections (HAIs)?

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

> CDIs 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 create up to $33 billion in excess healthcare costs each year.[1]

For more information, please review the National Action Plan to Prevent Healthcare Associated Infections.

## *Clostridium difficile* Infections (CDIs)

*Clostridium difficile* (C. diff) 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. diff 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 C. diff, including some otherwise healthy people who are not hospitalized or taking antibiotics.[2]

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.[3]

In a study noted in the March 6, 2012, Morbidity and Mortality Weekly Report (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% among 71 hospitals participating in the CDI prevention programs.[4]

1. "Healthcare Associated Infections," U.S. Department of Health & Human Services, accessed October 19, 2012, http://www.hhs.gov/ash/initiatives/hai/index.html.

2. Mayo Clinic Staff, "C. difficile," Mayo Clinic. November 3, 2010. http://www.mayoclinic.com/health/c-difficile/DS00736.

3. Centers for Disease Control and Prevention (CDC), "Vital Signs: Preventing Clostridium difficile infections," Morbidity and Mortality Weekly Report (MMWR) Early Release 61 (March 6, 2012): accessed October 19, 2012, http://www.cdc.gov/mmwr/pdf/wk/mm61e0306.pdf.

4. Ibid.

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 CDIs have increased in frequency. CDI has surpassed methicillin-resistant Staphylococcus aureus (MRSA) infections in the race to be the most prevalent HAI 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. diff spores have an exosporium that confers particulate adherence-sticky chains of protein-containing substances that stick on hands, reinforcing the need for contact precautions, complete with gloves, for the care of these patients.

On May 19, 2010, the Association for Professionals in Infection Control and Epidemiology (APIC) released a national survey called the 2010 C. diff Paces of Progress Survey. Of the hospitals that participated, most are using the following multiple strategies to address CDI:

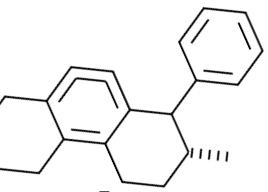
- 83% had hand hygiene initiatives
- 90% conducted surveillance or other methods and activities to promptly identify CDI cases
- 94% always placed these patients on contact precautions, using gowns and gloves when caring for them
- 86% had increased their emphasis on environmental cleaning to address 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 practices, identified in the CDI Pace of Progress Survey, point out the need to improve standardization of prevention measures and guide future practices.

## Key Points to Share with Hospital Boards

1. CDIs increased several fold in the past decade and became more serious but are, nonetheless, preventable.
2. Of all CDIs, 94% are related to healthcare exposures and are potentially preventable by reducing unnecessary antibiotic use and interrupting patient-to-patient transmission of CDI.
3. CDIs were reduced by 20% over approximately 21 months by 71 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% have their onset outside of hospitals, and 52% of the CDIs treated in hospitals are present on admission; these infections are a potential source for intra-hospital transmission.
5. To prevent CDIs, more must be done 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 healthcare delivery.



## Role of the Environment

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

The environment must be accepted as a critical source of contamination as it plays an important role in preventing the spread of infection. Because C. diff is shed in feces, any surface, item or medical device that becomes contaminated with feces is a source of spores and becomes involved in infection transmission. C. diff 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 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, inflamed colon (colitis) or patches of raw tissue that can bleed or produce pus (pseudomembranous colitis)

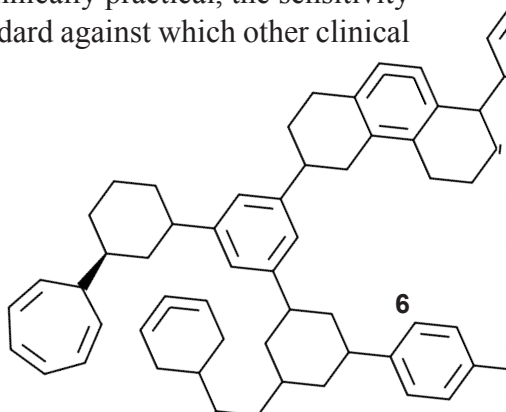
## Signs and Symptoms of Severe Infection:

- Watery diarrhea 10 to 15 times a day
- Abdominal cramping and pain (may be severe)
- Fever
- Blood or pus in the stool
- Nausea
- Dehydration
- Loss of appetite
- Weight loss

## Testing for CDI

Diagnostic testing for C. diff should be performed on diarrheal stool only when illness due to C. diff 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 stool from asymptomatic patients is not clinically useful, even less as a test of cure, and is not recommended except for epidemiological studies. Stool culture is the most sensitive test and essential for epidemiological studies. Even though the slow turnaround 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:[5]

1. Basic practices for prevention and monitoring of 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 reporting
- Educating healthcare personnel on CDI
- Patient and family education about CDI
- Compliance with CDC or World Health Organization hand hygiene and contact precaution recommendations
- Emphasis on 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

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

- Risk assessment of patients most likely to acquire CDI
- Minimizing CDI transmission by healthcare personnel (e.g., hand hygiene)
- Preventing CDI transmission from the environment (e.g., sodium hypochlorite [bleach])
- Reducing the risk of CDI acquisition (antimicrobial stewardship program)
- Continually educating for rigorous environmental cleaning, with special emphasis on all areas that come into contact with patient, caretaker and visitor hands, such as door handles, privacy curtains and light switches (see included sample Q&A document for patient and/or family education)
- Using environmental cleaning checklists for all rooms

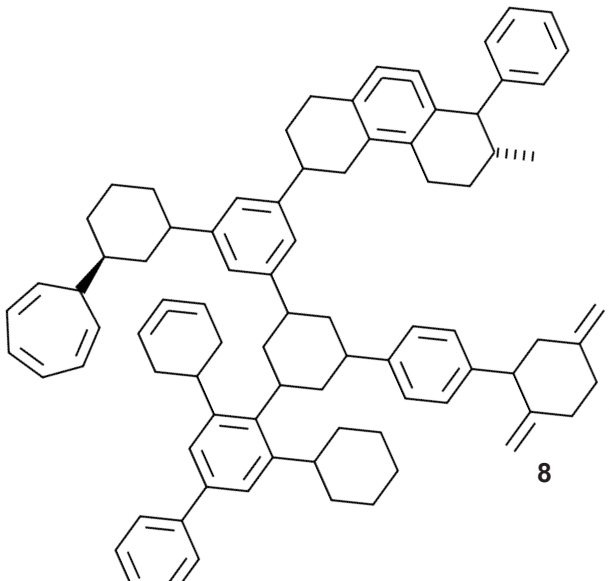
The following approaches should not be considered a routine part of CDI prevention:

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

5. Stuart H. Cohen, et al., "Clinical Practice Guidelines for Clostridium difficile Infection in Adults: 2010 Update by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA)," Infection Control and Hospital Epidemiology 31, no. 5 (May 2010): 431-55, accessed October 25, 2012, http://www.jstor.org/stable/10.1086/651706.

## Strategies to Control CDI:

- Perform facility-wide surveillance for CDI in all units and report all HAI rates to the facility's 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. diff 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 precautions, such as private or cohorted rooms, if possible. Dedicated equipment and gowns and gloves upon entrance to the patient room are essential.
- Monitor gown and glove use with CDI patients.
- 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).
- 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.



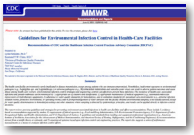
## Additional Resources for CDI

PDF: Strategies for Acute Care—CDI Prevention

Webpage: CDC's CDI information page

Webpage: CDC's CDI FAQs

Webpage: MMWR



Webpage: Guidelines for Environmental Infection Control in Healthcare Facilities

Webpage: Mayo Clinic

PDF: Patient Education FAQ

Webpage: Multiple APIC resources for Infection Prevention

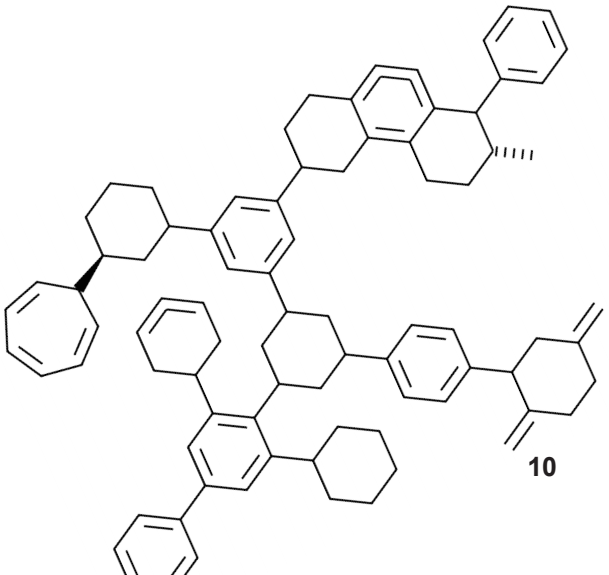
# National Action Plan to Prevent HAIs

In response to the national and international concern of the increasing threat of HAIs, the HHS has developed a National Action Plan for preventing and eliminating 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 National 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 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

Organizations with engaged executive leadership teams and 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 IHI's "Boards on Board" and the IHI "Framework for Leadership for Improvement," there are six things all boards should do and five for executive leadership.[6]

### Board Engagement

1. Set aims: Set a specific aim to reduce harm this year. For example, "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 establishing and maintaining a respectful, fair and just environment for all who experience avoidable harm. Include patients, families and staff.
5. Foster board education: Learn about "best in the world" boards and set an expectation of similar education levels for all executives and staff.
6. Establish executive accountability: Set clear quality improvement targets and hold executives accountable for reaching them.

### Executive Leadership 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 the board, establish an interdisciplinary Board Quality Committee, develop board education, allocate resources to educating staff members about quality improvement and build a culture of "walk-the-walk" conversations and actions about improving care at board, committee, physician/nurse leader, and administration meetings.
3. Build will: Establish a policy of full transparency on quality/safety data, review both data and stories from patients and 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 and an oversight process, review your own data weekly (rather than benchmarks), ask "Are we on track?," and know why and how to get there if you are not on track.

6. "Governance Leadership of Safety and Improvement," Institute for Healthcare Improvement, accessed October 25, 2012, http://www.ihi.org/explore/GovernanceLeadership/Pages/default.aspx.

## Strategies to Engage and Support Boards[7]

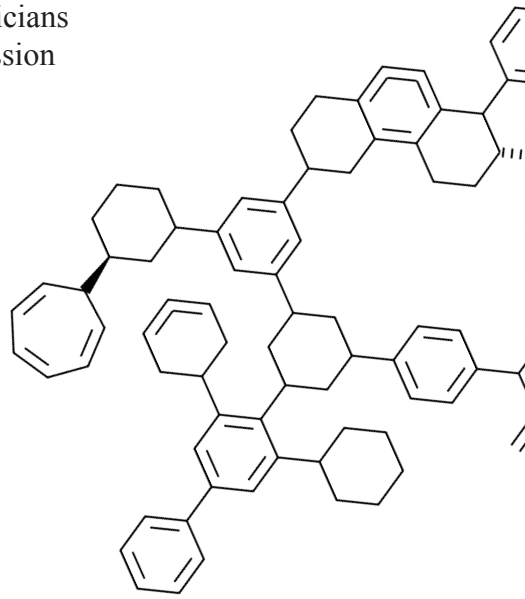
- Develop a "door opener":
  - Provide an executive summary overview of issues
  - Ask, "What patients have lost their lives to HAI or Healthcare Acquired Conditions (HACs)?"
  - Ask, "What is the financial cost of HAIs to the organization?"

- Use a timely and high-impact patient safety issue for engagement:
  - Mention relevance of HAIs, HACs and/or readmissions to your facilities
  - Ask, "What is our performance and trend on HAIs or HACs?"

- Relay 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 healthcare professional to obtain their views and suggestions
  - Communicate improvement initiatives

- Decide who will be used to "open the door," assume the board wants/needs to know and 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 a board member; it is okay
  - Plan D—Come up with your own ideas

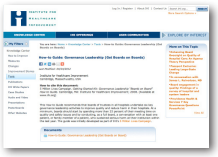
- Lead a great discussion in the boardroom:
  - Pictures are worth a thousand words
  - Personal stories are priceless
  - Use an 80/20 discussion and presentation format
  - Encourage questions; stimulate dialog
  - Keep in mind that the majority of the audience members are not clinicians
  - Forward materials in advance and ask the board to prepare for discussion
  - Offer follow-up



7. TMIT, "Engaging, Activating, and Partnering with Healthcare Boards," SafetyLeaders, 2011 webinar, accessed October 25, 2012, http://safetyleaders.org/downloads/TMITWebinar_PanelistSlides_02_24_11.pdf.

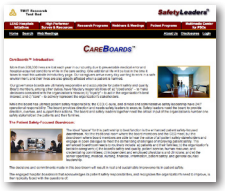
## Additional Resources for Leadership Strategies


PDF: TMIT/Safety Leaders
This is a large file, so download time may be longer depending upon your connection speed.



Webpage: IHI/Boards on Board


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.




Webpage: The CareBoards

## Communication

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 additional resource list at the end of this subsection. Rapid changes followed by evaluation of the effectiveness of those actions may lead to sustainable change.

### TeamSTEPPS

TeamSTEPPS is an evidence-based teamwork system for improving communication and teamwork skills among healthcare professionals to improve patient safety. It was developed by the Department of Defense's Patient Safety Program in collaboration with 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:[8]

> 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 follow 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 several days or dosing training done in more focused sessions lasting 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 to 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:

1. Leadership
2. Communication
3. Situation Monitoring
4. Mutual Support

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

1. Performance
2. Knowledge
3. Attitudes

8. "About TeamSTEPPS," Agency for Healthcare Research and Quality, accessed October 25, 2012, http://teamstepps.ahrq.gov/about-2cl_3.htm.

TeamSTEPPS curriculum is an easy-to-use comprehensive multimedia kit that contains

- fundamentals modules in text and presentation formats,
- a pocket guide that corresponds with the essentials version of the course,
- video vignettes to illustrate key concepts, and
- workshop materials, including a supporting CD and DVD, on change management, coaching, and implementation.

For more information on the TeamSTEPPS program, training and implementation, click here.

## Positive Deviance (PD)

PD, created by the Plexus Institute, 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, just 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. [9,10,11,12]

This strength-based approach is applied to problems requiring behavior and social change. It is based on the following principles:[13]

- 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 or external experts, but is distributed throughout the community. Thus, the aim of PD is to cull collective intelligence and apply it to a specific problem requiring behavior or social change.
- Sustainability is the cornerstone of the PD approach. It 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."

9. "Positive Deviance," Plexus Institute, accessed October 29, 2012, http://www.plexusinstitute.org/?page=pd.

10. Rebecca Tuhus-Dubrow. "The Power of Positive Deviants: A Promising New Tactic for Changing Communities from the Inside, Boston Globe, (November 29, 2009): accessed October 29, 2012, http://www.boston.com/bostonglobe/ideas/articles/2009/11/29/the_power_of_positive_deviants/.

11. Jerry Sternin and Robert Choo, "The Power of Positive Deviancy," Harvard Business Review, (January 2000): accessed October 29, 2012, http://hbr.org/2000/01/the-power-of-positive-deviancy/ar/1.

12. Arvind Singhal and Lucia Dura. Protecting Children from Exploitation and Trafficking: Using the Positive Deviance Approach in Uganda and Indonesia (Save the Children Federation, Inc., 2010), http://www.amazon.com/Protecting-Children-Exploitation-Trafficking-Indonesia/dp/0615311415/ref=sr_1_1?ie=UTF8&s=books&qid=1264013464&sr=8-1#noop.

13. Richard Pascale, Jerry Sternin, and Monique Sternin, The Power of Positive Deviance: How Unlikely Innovators Solve the World's Toughest Problems, (Harvard Business Press Books, June 16, 2010), Prod. # 1066-HBK-ENG, http://hbr.org/product/power-of-positive-deviance-how-unlikely-innovators/an/1066-HBK-ENG.

In conjunction with the Plexus Institute, the CDC and the Robert Wood Johnson Foundation expanded work to support six hospitals in a 2006 PD pilot to develop better strategies to reduce HAIs. The best performing hospital reported a decrease from 35 infections in 2005 to 2 infections by 2008. PD was then expanded to 53 hospitals.[14]

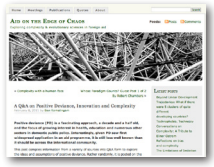
Strategies listed by these successful hospitals include:[15]

- While leadership support is essential, engagement of frontline staff is more essential.
- Habitual behaviors that lead to transformations.
- Move beyond doctors and nurses.
- Success in preventing HAIs 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.

## Additional Resources for PD

Webpage: IHI Improvement Map

Webpage: Positive Deviance Initiative



Webpage: Q&A on Positive Deviance, Innovation and Complexity

Webpage: RWJF Whitepaper on Positive Deviance

14. "RWJF Final Narrative," Plexus Institute, accessed October 29, 2012, http://c.ymcdn.com/sites/www.plexusinstitute.org/resource/collection/6528ED29-9907-4BC7-8D00-8DC907679FED/55726FNR_-_RWJF_Final_Report_-_PD_MRSA.pdf

15. Ibid.

# 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 is spent on anti-infectives annually.
- 200–300 million antimicrobials are prescribed annually, 53% for outpatient use.
- 30–50% of all hospitalized patients receive antibiotics.
- Studies estimate up to 50% of antibiotic use is either unnecessary or inappropriate across all types of healthcare settings.

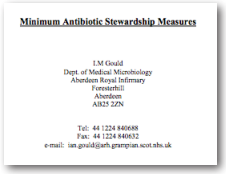
## Antibiotic Stewardship Program Establishment[16]

1. Enlist physician champions before beginning the program.
2. Analyze the needs of the healthcare system.
3. Assess the resistance risk for that system.
4. Establish clinical pathways and guidelines using Infectious Disease Society of America (IDSA) and CDC examples.
    - Enlist the help of infectious disease clinicians.
    - Involve pharmacists in the program.
5. 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 antibiotics, discontinuing in 24 hours and using standing and automatic stop orders.
6. De-escalate based on culture.
    - Present both patient and clinician education about antimicrobial use and bacterial resistance.
    - Provide printed material (targeted to both patients and clinicians) on appropriate antibiotic use and resistance.
    - Implement GetSmartTreatment Guidelines
7. Practice dose optimization.
    - Recommend new dose guidelines for antibiotics as available such as Vancomycin.
    - Use weight-based dosing, not blood levels and monitor renal function.
    - Recommend the shortest course of antibiotics possible.
        - Ventilator-associated pneumonia: 8 vs. 15 days
        - Community-associated pneumonia: 3 vs. 8 days
        - Septic arthritis: 10 vs. 30 days
8. Restrict select antibiotics.

16. Timothy H. Dellit, et al., "Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship," Clinical Infectious Diseases 44 (2007): 159-77, accessed October 29, 2012, http://www.idsociety.org/uploadedFiles/IDSA/Guidelines-Patient_Care/PDF_Library/Antimicrobial%20Stewardship.pdf.

9. Restrict Fluoroquinolone to reduce CDI.
10. Partner with other state and national entities to share resources and maximize efforts.

## Additional Resources for Antibiotic Stewardship



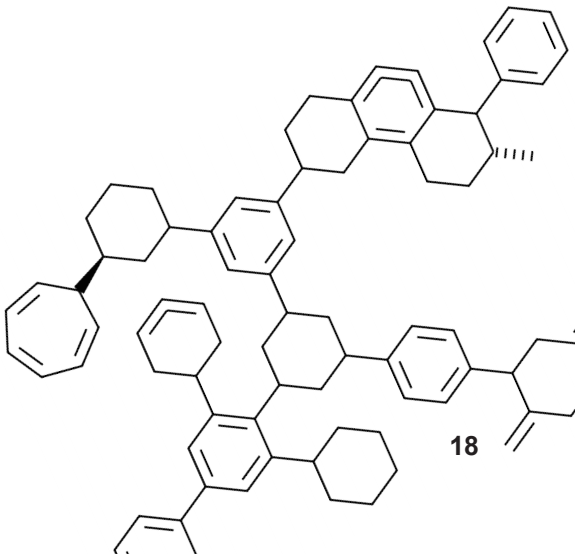

PDF: Minimum Antibiotic Stewardship Measures


Webpage: AHRQ Guidelines

PDF: SHEA Online-Antimicrobial Stewardship


Webpage: IDSA


Webpage: CDC Get Smart Guide



# Hand Hygiene

In the United States, hospital patients get nearly two million infections each year. That's about one 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 healthcare 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, the CDC recommends the use of alcohol-based hand rubs by healthcare personnel for patient care because they address some of the obstacles that healthcare 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%, prevent cross-contamination and protect patients and healthcare 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 intensive-care unit nurse's time will be saved by using an alcohol-based hand rub.[17]

## The Basics

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

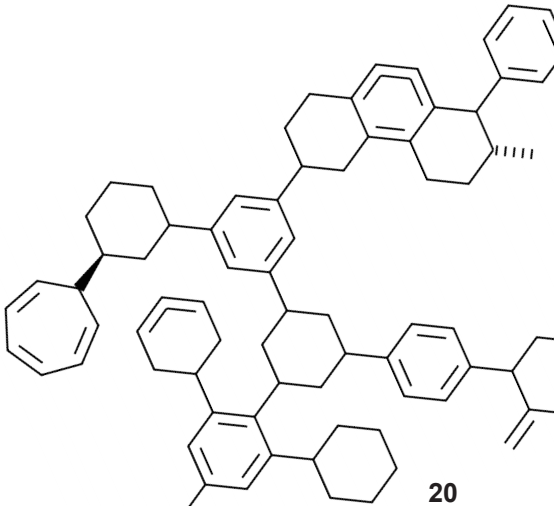
## Education/Motivation

- 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 as the best thing for the patient.

17. CDC, "Guidelines for Hand Hygiene in Health-Care Settings: Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force," MMWR 51, no. RR-16 (October 25, 2002): [inclusive page numbers] accessed October 30, 2012, http://www.cdc.gov/mmwr/pdf/rr/rr5116.pdf.

## 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 healthcare 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 professionals.
- Provide videotape presentations of correct hand washing and hand rubbing techniques in educational material for healthcare professionals.
- 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 performance feedback. Consider using technology for monitoring hand hygiene compliance.
- Ensure staff members wear gloves according to recommendations listed in the 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.

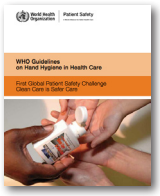


## Additional Resources for Hand Hygiene

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

Webpage: Hand Hygiene Basics-CDC


Webpage: Hand Hygiene Project HRET Six Sigma




PDF: WHO Hand Hygiene Guidelines

# Environment

In addition to the hands of multiple caregivers, the patient care environment can be a source of contamination. Each contact with a bed, table, door and medical device can be a major risk to patients. In a patient room, 75% of surfaces are contaminated with MRSA or Vancomycin-resistant enterococci (VRE).[18]

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, healthcare 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.

## Strategies for Environmental Cleaning

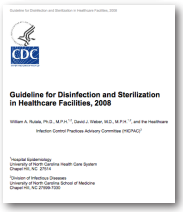
- Establish barrier precaution guidelines:
  - Encourage units to write guidelines for their specific units, even if they are stricter than standards and guidelines.
  - Involve unit line staff and housekeeping, as well as leaders.
- Eliminate patient equipment sharing:
  - Propose the use of equipment 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.[19]
  - 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.
  - 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.

18. JM Boyce, et al., "Environmental Contamination Due to Methicillin-Resistant Staphylococcus aureus: Possible Infection Control Implications," Infection Control and Hospital Epidemiology 18, no. 9 (September 1997): 622-27, accessed October 30, 2012, http://www.ncbi.nlm.nih.gov/pubmed/9309433.

19. William A. Rutala, David J. Weber and the Infection Control Practices Advisory Committee (HICPAC), Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008, accessed October 30, 2012, http://www.cdc.gov/hicpac/pdf/guidelines/Disinfection_Nov_2008.pdf.

# Additional Resources for Environmental Cleaning

PDF: SHEA Disinfection Guidelines 2010



PDF: HICPAC Guidelines

# Sample Patient/Family Education Q&A—CDI

## What is *Clostridium difficile* (C. diff)?

C. diff 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 infection.

## What is CDI?

It is the most common cause of infectious diarrhea in healthcare facilities. Symptoms include diarrhea, fever and abdominal pain or tenderness. CDI may occur when antibiotics are taken to treat an infection because the antibiotics may kill some good bacteria in the bowel and allow other bacteria to grow. When C. diff 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 were recently, and you develop diarrhea and fever, the doctor may have a sample of your stool collected and sent to the lab for analysis to find C. diff toxins.

## How is CDI treated?

Your doctor may prescribe specific antibiotics that target and kill the C. diff bacteria.

## What can I do to help prevent CDI?

- Make sure all healthcare professionals clean their hands with soap and water or alcohol hand cleanser 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 has additional educational information available online at www.cdc.gov.

# Hand Hygiene Compliance Audit Tool

Each observation consists of one opportunity when hand hygiene should be performed. This tool captures seven pieces of information: (1) the date, (2) the unit where the observation took place, (3) shift or time, (4) the type of staff observed, (5) which of two opportunities for hand hygiene took place (before or after care), (6) which type of hand hygiene occurred (wash or alcohol-based hand rub), and (7) whether compliance with expected procedure was observed (can take into account whether resident was on precautions for Clostridium difficile infection).

| Observation Number | Date | Unit | Shift or Time | Type of Employee (RN, LPN, CNA, MD, other) | Observation of Opportunity (before or after care circle one) | Type of Hand Hygiene Observed (wash or alcohol rub, circle one or leave blank if none) | Compliance with Expected Procedure (circle one) |
|---|---|---|---|---|---|---|---|
| 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 |

# CDC Environmental Checklist for Monitoring Terminal Cleaning

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

| | |
|---|---|
| Date: | |
| Unit: | |
| Room Number: | |
| Initials of ES staff (optional):[1] | |

[1] Hospitals may choose to include identifiers of individual environmental services staff for feedback purposes.

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

| High-touch Room Surfaces[2] | 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[2] | 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 | | | |

[2] Sites most frequently contaminated and touched by patients and/or healthcare workers.

**Mark the monitoring method used:**

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

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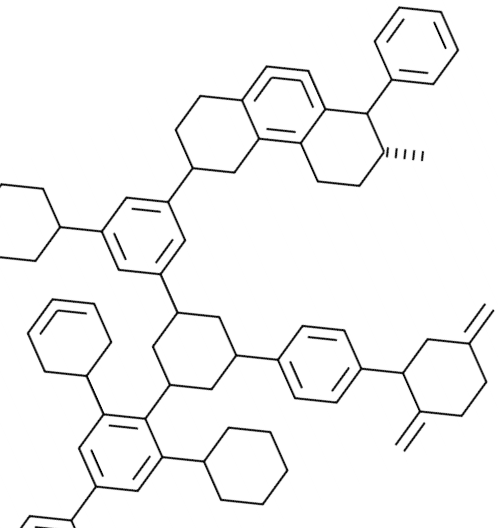

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