

## CDI Guide to Patient Safety Tool

The *Clostridium difficile* infection (CDI) Guide to Patient Safety (GPS) is a brief troubleshooting tool to aid infection prevention teams in reducing CDI in their hospital or unit. Modeled after the validated catheter-associated urinary tract infection (CAUTI) GPS developed by researchers at Veterans Affairs Ann Arbor Healthcare System and University of Michigan, the CDI GPS is designed to help teams re-examine their CDI data and prevention activities, and direct them toward specific strategies and resources to overcome barriers and challenges.

The CDI GPS is a brief self-administered assessment of yes/no questions. Multidisciplinary CDI prevention teams should answer the 11 questions that comprise the assessment, either thoughtfully as a group, or independently followed by group review. When done this way, the guide can stimulate discussion and uncover barriers that may be impeding CDI reduction progress.

### Instructions for Use

To accurately assess the team's CDI prevention efforts, it is recommended that:

1. The team working on CDI prevention at the hospital or unit-level completes the CDI GPS assessment. This can be done independently or as a group.
2. The responses are reviewed as a team as a means to uncover strengths and barriers to reducing CDI.
3. For questions that were answered with a "No," the team should click on the link below the question or reference the indicated section to review approaches, advice, tools and resources to better implement the indicated CDI prevention strategy.

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# CDI Guide to Patient Safety

Hospital \_\_\_\_\_

Unit \_\_\_\_\_

1. Do you have a well-functioning team (or work group) focusing on CDI prevention?

Yes       No

*If you answered 'No' to the question above, review guidance and resources on [having a well-functioning team](#).*

2. Do you have a team leader with dedicated time to coordinate your CDI prevention activities?

Yes       No

*If you answered 'No' to the question above, review guidance and resources on [having a CDI team leader](#).*

3. Do you have an effective physician champion for your CDI prevention activities?

Yes       No

*If you answered 'No' to the question above, review guidance and resources on [physician champions](#).*

4. Is senior leadership supportive of CDI prevention activities?

Yes       No

*If you answered 'No' to the question above, review guidance and resources on [engaging senior leaders](#).*

5. Do you routinely collect CDI-related data (e.g., incidence, prevalence, compliance with prevention practices) in the unit(s) or populations in which you are intervening to reduce infection?

Yes       No

*If you answered 'No' to the question above, review guidance and resources on [CDI-related data](#).*

6. Do you routinely provide CDI-related data back to frontline staff and physicians? (e.g., incidence, prevalence, compliance with prevention practices, etc.)

Yes       No

*If you answered 'No' to the question above, review guidance and resources on [feedback](#).*

7. Is staff empowered to speak up and remind colleagues about proper hand hygiene and personal protective equipment use?

Yes       No

*If you answered 'No' to the question above, review guidance and resources on [empowering staff to speak up about CDI prevention best practices](#).*

# CDI Guide to Patient Safety

Hospital \_\_\_\_\_

Unit \_\_\_\_\_

8. Do you conduct audits and provide feedback on the effectiveness of environmental cleaning?  
 Yes       No

*If you answered 'No' to the question above, review guidance and resources on [effective environmental cleaning to prevent CDI](#).*

9. Do you have an antibiotic stewardship team that includes at least one physician and one pharmacist?  
 Yes       No

*If you answered 'No' to the question above, review guidance and resources on [antibiotic stewardship related to CDI prevention](#).*

10. Does your laboratory reject formed stools if submitted for CDI testing?  
 Yes       No

*If you answered 'No' to the question above, review guidance and resources on [stool stewardship](#).*

11. Are clinicians educated as to when to order CDI testing?  
 Yes       No

*If you answered 'No' to the question above, review guidance and resources on [clinician education on testing stewardship](#).*

## Question 1: Do you have a well-functioning team (or work group) focusing on CDI prevention?

“For the change effort to be successful, a powerful group must lead the change; and members of that group must work together as a team. Key characteristics that must be represented on the team include power, leadership skills, credibility, communications ability, expertise, authority, analytical skills, and a sense of urgency.” (From TeamSTEPPS; TeamSTEPPS® 2.0. Content last reviewed September 2016.

Agency for Healthcare Research and Quality, Rockville, MD.

<https://www.ahrq.gov/teamstepps/index.html>)

You indicated that either you don't have a team or work group or the one you have does not function well. A key aspect of implementing a CDI prevention initiative is to identify an implementation team at your site. This team plays a critical role in developing the initiative and assisting with implementation. Key responsibilities of this team are education, data collection and evaluation. Individuals can fill more than one role and some may be short-term and others longer-term.

### A. Suggested Team Membership

Team composition can be crucial to the success of the team. Individuals with different clinical expertise and levels of experience can provide unique perspective and insight, enhancing initiative implementation. The following are suggested members to include on the team:

- **Team Leader:** The team leader is responsible for coordinating CDI prevention efforts, integrating CDI prevention practices into daily workflow, and collaborating with the various initiative champions. When selecting a team leader, consider someone with leadership and management skills and previous successes in leading quality improvement. These attributes are more important than the job title or content expertise. For more information, [click here](#).
- **Nurse Champion:** The nurse champion is responsible for engaging nursing staff in CDI prevention efforts and working to integrate practice into daily nursing workflow. When selecting a nurse champion, consider someone who is well respected and in a position to obtain support from other nurses.
- **Physician Champion:** The physician champion is responsible for engaging physicians in CDI prevention efforts and coordinating CDI prevention efforts that require physician support. When selecting a physician champion, consider someone who is highly regarded by his or her peers. The first choice should be a physician who is actively engaged in the process; however, if one is not available, consider a physician who is widely respected by their peers, even if they are only able to lend their name to the initiative as this will still be an asset. Physicians involved in antibiotic stewardship at their hospital or infectious diseases physicians would be ideal candidates. For more information, [click here](#).
- **Pharmacist Champion:** The pharmacist champion is responsible for engaging pharmacy staff and coordinating antibiotic stewardship efforts to prevent CDI. When selecting a pharmacist champion, consider someone who is passionate about CDI prevention and takes pride in providing excellent care. A pharmacist who has expertise in infectious diseases and antibiotic stewardship would be a particularly good choice.

- **Performance Improvement Leader:** The performance improvement leader is responsible for providing expertise to the team on systematic formal approaches of performance improvement. Select someone in your organization with training and expertise in performance improvement strategies, data collection strategies, and sampling methods and who knows where key data in your organization resides, such as billing or coding data.
- **Infection Preventionist:** This person will provide content expertise and will be heavily involved in developing prevention strategies, an educational plan, and a monitoring plan.
- **Data Champion:** The data champion is a vital member of the team, so this person must be committed to the initiative. Collecting and monitoring the data are crucial components of preventing CDI. This person will work closely with the quality improvement leader, the infection preventionist and others to oversee and manage data collection, aggregation and reporting.
- **Microbiologist:** This microbiologist will be essential to assist in understanding the facility's *C. difficile* testing and impact of other diagnostics on antibiotic utilization. Familiarity with local *C. difficile* testing practices and specimen handling are necessary to understand how best to select a *C. difficile* diagnostic assay(s) for a facility and how to interpret that assay based on local practices. In addition, this team member can advise on more rapid diagnostic technologies; these technologies would shorten the time to identify microorganisms, allow for better targeting of antibiotic therapy and potentially reduce both unnecessary antibiotic exposures and time of optimal therapy. The microbiologist can also advise regarding best pre-analytical specimen processing protocols to ensure proper and timely specimen collection for needed diagnostics.
- **Environmental Services Champion:** Effective environmental cleaning is a crucial part of preventing CDI transmission. The environmental services champion will garner buy-in and help integrate CDI prevention strategies into the environmental services daily workflow. Some hospitals have trouble getting environmental services involved in quality improvement efforts; using a champion and engaging them early will help bolster this partnership and lead to better coordination of environmental services and infection prevention efforts.
- **Other Persons to Consider Including:** A senior leader, nurse educator, infectious diseases physician, finance expert, communications or electronic medical representative and a patient who has had CDI or their family member.

This list is by no means exhaustive but provides the minimum recommended members. You should consider adding other individuals based on the culture of your institution. In addition, some team members may assume more than one role. For example, the quality improvement leader may also be the team leader. Dedicated time for the initiative for each member is ideal; however, if this is not possible, then consider having co-champions to lighten the workload and provide mutual support.

## B. Team Expectations

- The team must take ownership of the CDI prevention.
- The team must meet on a regular basis; every other week is recommended in the beginning.
- The team must implement the initiative, which will involve educating various health care staff, auditing practices and providing feedback to staff and leadership on implementation.
- The team must collect data on a regular basis and share it with staff.

## **Tools, Resources and Further Reading**

- TeamSTEPPS Fundamentals Course: Module 2. Team Structure. Content last reviewed March 2014. Agency for Healthcare Research and Quality, Rockville, MD. Available at <https://www.ahrq.gov/teamstepps/instructor/fundamentals/module2/igteamstruct.html>.
- [AHRQ Team Assessment Tool](#)
- Damschroder LJ, Banaszak-Holl J, Kowalski CP, Forman J, Saint S, Krein SL. [The role of the champion in infection prevention: results from a multisite qualitative study](#). *Qual Saf Health Care*. 2009; 18(6):434–40.
- Jain M, Miller L, Belt D, King D, Berwick DM. [Decline in ICU adverse events, nosocomial infections and cost through a quality improvement initiative focusing on teamwork and culture change](#). *Qual Saf Health Care*. 2006; 15(4):235-9.
- Santana C, Curry LA, Nembhard IM, Berg DN, Bradley EH. [Behaviors of successful interdisciplinary hospital quality Improvement teams](#). *J Hosp Med*. 2011; 6(9):501-6.

## Question 2. Do you have a team leader with dedicated time to coordinate your CDI prevention activities?

You indicated that either you do not have a team leader or that the one you have does not have appropriate time for the initiative. The team leader is responsible for coordinating CDI prevention efforts and integrating CDI prevention practices into daily workflow and collaborating with the various initiative champions. In other words, the details of the CDI prevention initiative fall to the team leader. It is his or her responsibility to keep the infection prevention efforts moving forward and coordinate the moving pieces. It is unlikely that the CDI prevention initiative is the only responsibility of the team leader, and because of this, there may not be enough time devoted to the prevention efforts. Creating that dedicated time is imperative to a successful initiative. The following are recommendations on how to ensure the success of the team leader:

### A. If the team leader role needs to be filled, consider:

- Asking senior leadership for advice about whom they recommend who can have some protected time to do this work.
- Finding someone who has been successful in coordinating other performance improvement initiatives.
- Reaching out to a staff person who is passionate about CDI prevention and may be motivated to be a part of this initiative.
- Recruiting an individual with leadership skills, enthusiasm, persistence and credibility. Their experience and knowledge on CDI should be secondary; leaders can reach out to content experts for guidance related to the technical aspects of the work.

### B. If the selected team leader is not as effective as necessary, then:

- Check to see if the team leader has been given dedicated time to work on this particular initiative. If not, engage leadership to help ensure the team leader has enough dedicated time.
- Consider that the team leader may need coaching in communication, collaboration and other teamwork skills. Identify a coach or mentor for the team leader and engage that person to provide coaching on an ongoing basis.
- In some instances, the team leader may not be a good fit for the initiative. Perhaps they were appointed rather than recruited, and a replacement should be considered.

## Tools, Resources and Further Reading

- [Top 10 Qualities of a Project Manager](#)
- [Top 10 Characteristics of Great Project Managers](#)
- TeamSTEPPS Fundamentals Course: Module 4. Leading Teams. Content last reviewed March 2014. Agency for Healthcare Research and Quality, Rockville MD. Available at <https://www.ahrq.gov/teamstepps/instructor/fundamentals/module4/igleadership.html>.
- Cannon-Bowers, J. A., S. I. Tannenbaum, E. Salas, and C. E. Volpe. "Defining competencies and establishing team training requirements". Team effectiveness and decision-making in organizations. Ed. R.A. Guzzo, E. Salas, and Associates: San Francisco: Jossey-Bass, (1995) 333.
- Salas E, Burke CS, Stagl KC. "Developing teams and team leaders: strategies and principles." Leader Development for Transforming Organizations. Ed. R. G. Demaree, S. J. Zaccaro, and S. M. Halpin: Mahwah, NJ: Lawrence Erlbaum Associates, Inc., (2004).

### Question 3. Do you have an effective physician champion for your CDI prevention activities?

You indicated that either you do not have a physician champion or that the one you have is not effective. The physician champion is responsible for engaging physicians in CDI prevention efforts and coordinating CDI prevention efforts that require physician support. A successful CDI prevention initiative requires collaboration and cooperation with physicians. A physician champion is needed to bring the initiative to the other physicians, to help engage them, to be a part of problem solving when there is resistance or another challenge from this group of providers, and to gain physician cooperation.

#### A. If the physician champion role needs to be filled, then:

- Identify the type of physician who will work best in your organization. There is no “one-size-fits-all” strategy. Some suggestions include hospital epidemiologists, hospitalists, infectious diseases specialists and gastroenterologists. At teaching hospitals, residents or chief residents may also be good candidates. However, beware of choosing people based on their job title; unfortunately, titles do not guarantee an individual will be up to the task.
- Recruit a physician champion who has pride in the hospital’s culture of excellence or concern over the lack of one. Ideally, this physician may have the ear of the hospital administration and the respect of their peers from the quality of their service and excellent patient care. They would be someone who has the patience to hear others’ views that may differ from their own.
- Temporarily relieve the physician champion of some responsibilities to give them time for CDI-related work.
- Assure physicians that their role will not take too much time. Physicians, especially those who are not hospital employees, may be resistant to the idea of taking on more work. Physician champions should not, for example, be expected to attend all meetings or be otherwise involved in matters unrelated to clinical concerns, unless of course they want to be. Their chief responsibility will be to share the details of the initiative with colleagues and gain their cooperation.
- Consider including the champion’s activities towards their obligations to meet credentialing requirements for the hospital.
- Consider using co-champions if other measures do not work as this can help to lighten the workload; however, this can also diffuse responsibility.
- Consider ways to recognize and reward physicians, including:
  - Recognizing a member of the medical staff with a “physician champion” award, complete with a certificate signed by the hospital’s chief of staff and a gift certificate to a local restaurant.
  - Providing financial compensation to physicians who actively participate in infection prevention initiatives as champions.

B. If the physician champion on your team is not as effective or engaged as needed, then:

- Use influencers, such as strong nurse-physician working relationships, to garner physician buy-in and support, especially if the new practice is viewed as a “nursing initiative.” However, since there are significant physician practice initiatives within CDI prevention work, such as antibiotic stewardship, having one or even two strong physician champions is essential.
- Check to see if the physician champion has been given dedicated time to work on CDI prevention. If not, engage leadership to help with this.
- In some instances, the physician champion is not a good fit for the initiative; perhaps they were appointed rather than recruited. Consider replacing the physician champion.
- Make sure that medical leadership supports the initiative.
- Find a member of the ‘tribe.’ Some physicians respond better and are more receptive to ideas from physicians within the same discipline. For example, surgeons may be more receptive to a new collaborative or protocol if you have another surgeon championing the initiative. For CDI prevention initiatives, consider recruiting a physician champion who is an infectious disease specialist, an internist, or hospitalist. However, it is important to keep in mind the culture of your hospital’s medical staff. Which individuals are thought leaders and are well-respected among their colleagues? These individuals will have more success at getting buy-in from resistant peers.

### Tools, Resources and Further Reading

- Damschroder LJ, Banaszak-Holl J, Kowalski CP, Forman J, Saint S, Krein SL. [The role of the champion in infection prevention: results from a multisite qualitative study](#). *Qual Saf Health Care*. 2009; 18(6):434-40.
- Reinertsen JL, Gosfield AG, Rupp W, Whittington JW. Engaging physicians in a shared quality agenda. IHI Innovation Series white paper. (2007); Cambridge, MA: Institute for Healthcare Improvement. (Available on [www.IHI.org](http://www.IHI.org))
- Saint S, Kowalski CP, Banaszak-Holl J, Forman J, Damschroder L, Krein SL. [The importance of leadership in preventing healthcare-associated infection: results of a multisite qualitative study](#). *Infect Control Hosp Epidemiol*. 2010; 31(9):901-7.

## Question 4. Is senior leadership supportive of CDI prevention activities?

You indicated that you do not have the support of senior leadership. Given the many competing priorities of hospitals, having the support of leadership is key to making immediate and lasting progress with your CDI prevention initiative. Having a member of the hospital executive leadership team oversee the initiative lets the hospital staff know the importance of the initiative.

### A. Strategies to Engaging Leadership

- Understand senior leadership's perspective and priorities and tailor what and how you communicate information about this initiative. Senior leaders are essential allies in securing resources, overcoming barriers and aligning organizational priorities for your CDI prevention activities. The American College of Healthcare Executives annual survey highlights that the top issues of immediate concern for hospital CEOs are: financial challenges, government mandates and patient safety and quality. (From Top Issues Confronting Hospital in 2016. American College of Healthcare Executives. 2016. Accessed July 12, 2017. Available at <https://www.ache.org/pubs/research/ceoissues.cfm>)
- Appreciate that different senior leaders may have different concerns about the initiative or hospital priorities. For example, the chief nursing officer may be concerned about nursing shortages and their impact on patient outcomes, while the finance executive may worry more about how to help keep costs down. By understanding what matters to the individual, you can more effectively tailor your communications, and your requests will be more likely to gain support.
- Create a business case to help succinctly present your plan to leadership, ensure sufficient resources are available to sustain performance, summarize the goals and vision of the initiative, define how the organization will avoid errors and prepare for success, and connect your CDI prevention efforts with other safety initiatives and organizational performance.
- Share monthly data and high-level progress updates with leadership. Important data to share include:
  - Number of patients with hospital-associated CDI
  - Compliance with process measures, such as hand hygiene, environmental cleaning, stool testing, etc.

### B. Ways for Leaders to Show Support

- Share information about the CDI prevention initiative in leadership and staff meetings and during staff encounters. Consider including initiative updates and successes in hospital-wide newsletters, patient and family information, and online communications. Make sure to emphasize that CDI prevention efforts reflects the hospital's mission and values.
- Attend and listen to report-outs on CDI prevention efforts. This will help to boost the improvement team's sense of purpose.
- Include staff engagement in infection prevention initiatives in hospital employee credentialing requirements.
- Encourage supervisors to provide support and backing when the improvement team encounters roadblocks.

## Tools, Resources and Further Reading

- Tools for an Infection Prevention Business Case
  - Murphy D, Whiting J, Hollenbeak CS. Dispelling the myths: the true cost of healthcare-associated infections. Washington, DC: Association for Professionals in Infection Control and Epidemiology (APIC). 2007. Available at <http://www.spyderstyle.com/media/pdf/white-papers/The%20True%20Costs%20of%20Healthcare%20Associated%20Infections.pdf>
  - Kerkering TM. Building a Business Case for Infection Prevention. Society of Hospital Medicine. Available at <https://www.hospitalmedicine.org/CMDownload.aspx?ContentKey=95f19518-799c-4e62-ae27-07aa87b6f53e&ContentItemKey=765daf1b-7065-4b48-8e5c-7168331bfc4f>
- Lipp MJ, Nero DC, Callahan MA. [Impact of Hospital-Acquired \*Clostridium difficile\*](#). *J Gastroenterol Hepatol*. 2012; 27(11): 1733-7.
- Kotter J. [Leading change: why transformation efforts fail](#). *Harv Bus Rev*. 1995; 59-67.
- Saint S, Kowalski CP, Banaszak-Holl J, Forman J, Damschroder L, Krein SL. [The importance of leadership in preventing healthcare-associated infection: results of a multisite qualitative study](#). *Infect Control Hosp Epidemiol*. 2010; 31(9):901-7.
- Scott RD. [The direct medical costs of healthcare-associated infections in U.S. hospitals and the benefits of prevention](#). Centers for Disease Control and Prevention. March 2009.

## Question 5. Do you routinely collect CDI-related data (e.g., incidence, prevalence, compliance with prevention practices) in the unit(s) in which you are intervening?

You indicated that you do not currently collect CDI-related data. Collecting, measuring, analyzing and reporting information on your CDI prevention activities are critical to ensure continued success. Outcome data, such as total CDI burden, enable you to monitor the success of your CDI prevention initiatives and allow teams to compare how they are doing in their prevention efforts to other units and hospitals. Additionally, as health care moves from fee-for-service models of care to value-based compensation, healthcare-associated infection (HAI) rates, including CDI rates, are important metrics for determining care reimbursement. Process measures, such as hand hygiene compliance rates and the use of high-risk antibiotics, like fluoroquinolones, ensure that process interventions are being effectively implemented and point to areas that require continued enhancement or intervention. Lastly, sharing and highlighting data are crucial strategies for engaging physicians, frontline staff and senior leaders in infection prevention efforts.

### A. What Data to Collect and When to Collect it

- **C. difficile infection standard infection ratio (SIR):** A measure used to track HAIs at the national, state and local levels and used by the Centers for Medicare and Medicaid Services (CMS) for their value-based purchasing program. The SIR compares the actual number of infections to the expected/predicted number of infections. Using the CDC's National Healthcare Safety Network (NHSN) Targeted Assessment for Prevention (TAP) reports, you can use the SIR to calculate the **cumulative attributable difference (CAD)**, which tells you how many infections a hospital would need to prevent in order to reach a particular infection goal.
- **Number of LabID hospital-associated C. difficile infections:** Patients with stool samples that test positive for *C. difficile* four or more days after hospital admission.
- **Number of LabID non-hospital-associated infection or community-associated C. difficile infections:** Patients with stool samples that test positive for *C. difficile* day three or sooner after admission to the hospital.
- **Recurrent C. difficile infections:** Patients with stool samples that test positive for *C. difficile* more than 14 days (two weeks) but fewer than 56 days (eight weeks) after the most recent CDI LabID event for that patient.
- **Total antibiotic use:** Track total antibiotic use, including type of antibiotic, dose and duration.
- **Appropriate antibiotic use:** Antibiotics can either be tracked, as the antibiotics given for disease specific states or infections (e.g., urinary tract infection (UTI), pneumonia (PNA)), or the amount of prescribed antibiotics that are associated with a high-risk of CDI (e.g., fluoroquinolones).
- **Stool stewardship:** Rates of rejection of inappropriate stool samples sent for CDI testing.
- **Environmental cleaning compliance rates:** Compliance with institutional standards for daily cleaning procedures and discharge cleaning procedures.
- **Hand hygiene and PPE compliance rates:** Compliance with institutional standards for hand hygiene and effective PPE use.

## B. Strategies for Successful Data Collection

- Apply a consistent approach to data collection at all stages of your prevention initiatives so that you can compare across time periods and units.
- Designate personnel responsible for data collection. This will typically be infection preventionists or members of the quality improvement department.
- Review CDI line lists to monitor your hospital's CDIs. Line lists for CDIs will give you a perspective on dates of onset of infection and locations within the hospital, providing some insight into potential opportunities to intervene, such as a particular unit with a high prevalence of infection. We recommend using the *C. difficile* lab ID (ergo, the date the stool specimen tested positive) to generate the line list.
- Use the CDC NHSN TAP reports for tracking and monitoring CDI prevention efforts. Most hospitals already enter CDI data into NHSN, which calculates and compares hospitals' HAI rates using the SIR. The TAP strategy is a way to identify facilities or units with the highest excess numbers of infections so that prevention efforts may be directed toward facilities or units in greatest need of improvement. The TAP report displays a CAD, which is the number of infections a facility or unit would need to prevent to reach the health and human services CDI reduction goal. The CAD helps hospitals and units use data for action by translating a target SIR into an HAI prevention goal. This provides a concrete goal to drive action and translates the SIR into a simple message for frontline health care workers.
- Regularly provide data back to the entire CDI prevention team, senior leaders and frontline staff, including environmental services. Sharing data and highlighting success will help empower staff and encourage continued improvement and commitment to the initiative.

## Tools, Resources and Further Reading

- [APIC Reducing C. difficile Infections Toolkit](#), CDI Tracking Tool.
- [APIC Reducing C. difficile Infection Toolkit](#), Infection Prevention Checklist for *Clostridium difficile*, Observation Form.
- [APIC Reducing C. difficile Infection Toolkit](#), Environmental Cleaning Data Tool.
- Targeted Assessment for Prevention: Using Data for Action. Available at <https://www.cdc.gov/hai/prevent/tap.html>
- TAP Strategy 'How To Guide' for the individual user. Available at: <https://www.cdc.gov/hai/pdfs/prevent/TAP-Guide-for-Individual-Facility-User.pdf>
- National Healthcare Safety Network (NHSN). Surveillance for *C. difficile*, MRSA and other Drug-resistant Infections. Centers for Disease Control and Prevention, CDC. December 15, 2016. Available at: <https://www.cdc.gov/nhsn/acute-care-hospital/cdiff-mrsa/>

## Question 6. Do you routinely provide CDI-related data back to frontline staff and physicians? (e.g., incidence, prevalence, compliance with prevention practices)

You indicated that you do not routinely provide CDI-related data back to frontline staff. While collecting CDI-related data is key to measuring the success, it is imperative that the staff, especially those on the frontline, are aware of it. Data transparency can help motivate and engage staff at all stages of the initiative, as well as encourage them to continue the changes, promoting sustainability. Simply put, feedback improves motivation and engagement. Provide hospital initiative data as well as data from comparable hospitals and national aggregates. Simple run-charts or a CDI scorecard are great ways to quickly display and easily communicate data to both frontline staff and senior leaders.

### A. Feedback Mechanisms

- CDI Scorecard: Tracks hospital or unit progress towards achieving their CDI prevention goals; it should be displayed throughout the unit or hospital for all staff to see.
- Hospital newsletters
- Hospital electronic communications
- Staff educational events
- New employee orientation
- Staff meetings
- Unit huddles

### B. Keys to Giving Effective Feedback

- For feedback to be effective, it should be:
  - **Timely.** Feedback should be at least monthly or more often if possible. If you wait too long to provide feedback, key details are forgotten and/or the feedback loses its meaning.
  - **Individualized.** Feedback should relate to a specific situation, task, or individual. The more specific the feedback, the more the individual, unit, etc. will be able to correct or modify their performance to improve.
  - **Customizable.** Feedback should be detailed to the improvement goals of the individual, unit or organization. Different processes or data should be shared or highlighted depending on the targeted improvement goals.
  - **Non-punitive.** Feedback should be about performance of a specific situation or task; it should never be personal. Rather, feedback should be about achieving improvement goals.

(From: [Module 3. Communication](#). Content last reviewed March 2014. Agency for Healthcare Research and Quality, Rockville, MD.)

- Don't limit feedback to numbers (e.g., just CDI rate); share details to help make it more meaningful. Consider sharing the days the hospital or unit has gone without a CDI. Consider

using stories or pictures to help remind staff that each infection correlates to harm to a patient.

- When communicating CDI-related data to staff, consider the audience, and tailor what is shared to their needs. For example, complex rates or SIRs may be confusing for frontline staff, so instead, consider sharing new monthly CDI cases with ancillary unit staff; CDI rates and hospital SIR may be more appropriate to share with the infection preventionist and the infection prevention and control committee.
- Highlight and celebrate infection prevention successes, no matter how small. Consider rewarding staff for positive changes or making steps towards their CDI prevention goals.

### Tools, Resources and Further Reading

- TeamSTEPPS Fundamentals Course: Module 3. Communication. Content last reviewed March 2014. Agency for Healthcare Research and Quality, Rockville, MD. Available at <https://www.ahrq.gov/teamstepps/instructor/fundamentals/module3/igcommunication.html>
- TeamSTEPPS Fundamentals Course: Module 6. Mutual Support. Content last reviewed March 2014. Agency for Healthcare Research and Quality, Rockville, MD. Available at <https://www.ahrq.gov/teamstepps/instructor/fundamentals/module6/igmutualsupp.html>
- Dubbert PM, Dolce J, Richter W, Miller M, Chapman SW. [Increasing ICU staff handwashing: effects of education and group feedback](#). *Infect Control Hosp Epidemiol*. 1990; 11(4):191-3.

## Question 7. Is staff empowered to speak up and remind colleagues about proper hand hygiene and personal protective equipment use?

You indicated that staff are not empowered to speak up to remind colleagues to perform proper hand hygiene and use personal protective equipment (PPE). A key aspect of preventing CDI is preventing *C. difficile* transmission. Staff should be encouraged and empowered to remind colleagues about strict glove use, wearing proper PPE and performing hand hygiene. Consider using a facility-wide common reminder phrase to get everyone on the same page and keep reminders from feeling punitive; it's about patient safety, not punishment.

### A. Hand Hygiene and PPE Use Essentials for Preventing CDI

- Implement a process for early detection of CDI to promptly place patients into Contact Precautions.
- Promote strict glove use. Change gloves immediately if soiled, and remove gloves as well as other PPE used during patient care when leaving the patient room.
- Hand hygiene, using alcohol-based hand rub (ABHR) is the preferred method of hand hygiene in hospitals unless a hospital or unit has high endemic rates of CDI or hands are visibly soiled.
- In hospitals or units with high endemic (baseline) rates of CDI, promote hand hygiene with soap and water because *C. difficile* spores are not killed by alcohol.
- Perform hand hygiene prior to donning and doffing gloves; glove use is not a replacement for hand hygiene.
- Incorporate hand hygiene procedures and techniques and PPE use into routine, competency-based training for all staff.
- Conduct regular hand hygiene audits to ensure staff are performing hand hygiene effectively.
- Conduct regular PPE audits to ensure staff are correctly donning and doffing PPE.

### B. Strategies for Creating a Culture of Safety and Empowering Staff to Remind Colleagues

Staff should be empowered to speak up and remind colleagues if they see something wrong in the hospital or a hospital unit; this should be part of a hospital's or unit's culture. However, culture can be difficult to change. Moving a hospital or unit from punitive environment to one that focuses on and emphasizes open communication can have a profound impact on patient care and health outcomes. In a just culture, people are encouraged to report problems rather than hide them so issues can be addressed and prevented.

- Use of Champions. Recruit champions from different hospital disciplines to help bring the initiative to various hospital peer groups and units. Champions can help spearhead the initiative, provide support and guidance and empower colleagues to voice concerns. They can also help be a voice for frontline staff, relating ideas, barriers or concerns to the CDI prevention team and leadership.
- Create mutual understanding, using a common strategy or language to provide and receive feedback. Provide staff with the tools to help them speak up when Contact Precaution

procedures are not being followed or when anything happens that could impact patient safety. The TeamSTEPPS Module 3 Communication and Module 6 Mutual Support can assist you in devising a strategy that will work for your hospital.

- Share stories to help highlight the impact CDI and other infections have on patients. Staff engagement can be fostered or enhanced if all health care personnel appreciate the true risk associated with CDI. Sharing stories will also help tap into individuals' internal motivators (knowledge, attitudes, beliefs and values), which help to inspire human behavior.
- Share infection prevention data with staff. Data transparency can help motivate and engage staff to continue prevention efforts. Consider sharing the days that the hospital or unit has gone without a CDI. Staff can use this information to remind colleagues that proper hand hygiene and proper PPE use will help them continue the hospital or unit's success of days since the last infection.

### Tools, Resources and Further Reading

- [APIC Reducing C. difficile Infections Toolkit](#). Best Practices from the GYNHAU/UHF *Clostridium difficile* Collaborative. Greater New York Hospital Association, United Hospital Fund. 2011.
- TeamSTEPPS Fundamentals Course: Module 3. Communication. Content last reviewed March 2014. Agency for Healthcare Research and Quality, Rockville, MD. Available at <https://www.ahrq.gov/teamstepps/instructor/fundamentals/module3/igcommunication.html>
- TeamSTEPPS Fundamentals Course: Module 6. Mutual Support. Content last reviewed March 2014. Agency for Healthcare Research and Quality, Rockville, MD. Available at <https://www.ahrq.gov/teamstepps/instructor/fundamentals/module6/igmutualsupp.html>
- Dubberke ER, Carling P, Carrico R, Donskey CJ, Loo V, McDonald C, et al. [Strategies to Prevent Clostridium difficile Infections in Acute Care Hospitals: 2014 Update](#). *Infect Control Hosp Epidemiol*. 2014; 35(6):628 – 645.
- Ellingson K, Haas J, Aiello A, Kusesk L, Maragaksi L, Olmstead R, et al. [Strategies to Prevent Healthcare-Associated Infections through Hand Hygiene](#). *Infect Control Hosp Epidemiol*. 2014; 35(8):937-960.
- Grant AM, Hofmann DA. [It's Not All About Me: Motivating Hand Hygiene Among Health Care Professionals by Focusing on Patients](#). *Psychol Sci*. 2011; 22(12):1494-9.
- Stickbert-Bennett EE, DiBiase LM, Willis TMS, et al. [Reducing Health-Care Associated Infection by Implementing a Novel All Hands on Deck Approach for Hand Hygiene Compliance](#). *Am J Infect Control*. 2016; 44(5 Suppl):e13-6.

## Question 8. Do you conduct audits and provide feedback on the effectiveness of environmental cleaning?

You indicated that you do not conduct audits or provide feedback to staff on the effectiveness of environmental cleaning. Transmission of *C. difficile* is similar to other pathogens spread by contact; bacteria or bacterial spores can contaminate the patient or their environment and then be passed on to other patients via health care personnel or shared equipment, or to the next occupant of the patient room. A key aspect of preventing CDI is preventing *C. difficile* transmission. Hospitals and units need to ensure that environmental cleaning and disinfection are effectively decontaminating patient rooms and equipment.

### A. Environmental Cleaning and Disinfecting Essentials for Preventing CDI

Transmission of *C. difficile* is similar to other pathogens spread by contact; the patient or patient's environment can become contaminated, making it easy to spread *C. difficile* to other patients if the environment and equipment are not properly cleaned and disinfected. The formation of spores makes the removal of *C. difficile* more difficult than most pathogens, though their removal or deactivation is possible with thorough cleaning and disinfection.

- Include environmental services staff as key members of the CDI prevention team. Emphasizing their important role in infection prevention will help create buy-in and may assist in highlighting alternative approaches for decreasing CDI transmission.
- Train unit staff, as well as the environmental services staff, on how to clean the environment when *C. diff* is present. Patients with CDI will have frequent diarrheal stools, increasing the risk of patient environment contamination. Unit staff are often responsible for cleaning and disinfection of the patient environment and equipment when environmental services cannot arrive promptly and there is significant environmental soiling. Additionally, staff must be aware of how to properly clean and disinfect equipment and supplies that cannot be dedicated and/or are not disposable.
- When selecting products for cleaning and disinfection, the following factors should be considered before implementing new products:
  - Level of disinfection required and the most appropriate agent or solution for the job. (Products should have label claims clearly indicating that the product inactivates ***C. diff* spores**. Plain air will kill vegetative *C. diff* organisms, but the spores are very hardy and must be deactivated to effectively halt transmission.)
  - Ease of use (contact time, mixing requirements, stability, method of delivery, etc.)
  - Safety (toxicity, flammability, etc.)
  - Surface compatibility, persistent activity and odor
  - Accompanying products needed (mops, cloth, etc.)
  - Cost
  - Training and education
  - Potential barriers (product availability, staffing, workflow, etc.)

- Cleaning and disinfecting protocols should place particular emphasis on high-touch surfaces, such as the bed rails, over-bed tables and call buttons, and should encourage staff to follow a pre-determined logical cleaning pattern, moving from cleanest to dirtiest. Checklists are useful to ensure all items are included in the cleaning and disinfection process and that everyone is on the same page about what “clean to dirty flow” means for hospital rooms, operating rooms, etc.
- Use single-use or disposable supplies whenever possible. Examples of commonly used equipment for which single-use patient supplies may be substituted are stethoscopes and blood pressure cuffs.
- For shared patient equipment, a plan for cleaning and disinfection that includes who is to clean the equipment, when, and how should be developed, posted and monitored.
- Identify and address barriers to effective cleaning and disinfection (e.g., clutter in the patient room, lack of assigned responsibility for cleaning certain items).
- Include mechanisms for monitoring compliance and thoroughness of cleaning.

B. Strategies for conducting audits and providing feedback on environmental cleaning effectiveness

- Use evidence-based guidelines and regulatory standards to drive implementation of practices and determine auditing strategies to ensure safe and effective patient care.
- Audit environmental and equipment cleaning and disinfecting practices to make sure that the guidelines are being properly and effectively implemented; simply having these policies in place is not enough to ensure patient safety.
- Use objective measures to assess cleaning effectiveness. When conducted successfully, using a frequent and consistent approach, audits provide valuable information that can identify opportunities for quality improvement and track progress over time.
- Use audits as an opportunity for improvement, not for punishment.
- Consider using the following popular, relatively easy-to-use tools to audit cleaning practices:
  - Fluorescent gel. Fluorescent gel is placed on a surface before cleaning. After cleaning is complete, a black light is used to illuminate whether or not the gel has been removed.
  - ATP. The presence of ATP can indicate the presence of organic matter, such as *C. difficile* or *C. difficile* spores. ATP creates a bioluminescence, which is measured by a device called a luminometer. For surface contamination testing, the specific area is swabbed and inserted into the luminometer to measure the organic material.
- Base auditing frequency on the needs, resources and improvement goals of hospitals and/or units. However, auditing frequency must be risk-based (e.g., high-risk areas such as the operating room and bone marrow transplant/cancer unit will need more frequent auditing). Also, it is very important to make sure that all staff responsible for cleaning and disinfecting the environment are monitored at least annually.
- Provide feedback to staff on environmental cleaning and disinfecting practices in a timely, clear manner that is directed towards improvement rather than punishment.

- Encourage the group or team atmosphere when providing feedback by using ‘we’ statements (e.g., how can ‘WE’ work together to improve CDI cleaning and disinfection?). Spend time listening to staff concerns, and refrain from placing blame.

### Tools, Resources and Further Reading

- [CDC Environmental Checklist for Monitoring Terminal Cleaning](#)
- [Options for Evaluating Environmental Cleaning](#)
- [APIC Guide to Preventing \*Clostridium difficile\* Infections](#)
- Dubberke ER, Carling P, Carrico R, et al. [Strategies to Prevent \*Clostridium difficile\* Infections in Acute Care Hospitals: 2014 Update](#). *Infect Control Hosp Epidemiol*. 2014; 35(6): 628-45.
- Dubberke ER. [Preventing \*Clostridium difficile\* Infection: Clarifying Common Misperceptions](#). *Medscape*. 2015.

## Question 9. Do you have an antibiotic stewardship team that includes at least one physician and one pharmacist?

You indicated that you do not have at least one physician and/or one pharmacist engaged on your hospital's antibiotic stewardship team. Inappropriate and avoidable exposure to antibiotics is the single most important risk factor for developing CDI. A successful CDI prevention initiative requires collaboration and cooperation with physicians and pharmacists. Physician and pharmacist champions can help bring the initiative to the other physicians and pharmacists, aid with engagement and be a part of problem solving when there is resistance or another challenge from providers.

### A. Strategies to Connect CDI Prevention and Antibiotic Stewardship Efforts:

Antibiotic stewardship programs not only help individual patients by avoiding exposure to inappropriate antibiotics but also have a multiplicative effect on helping to reduce CDI at the unit and even hospital level. At their core, antibiotic stewardship programs coordinate interventions designed to improve and measure the appropriate use of antibiotics by promoting the selection of the optimal antibiotic drug regimen, including dose, duration of therapy, and route of administration. Ensuring that your antibiotic stewardship team is effective is critical to reducing CDI rates.

- Engage a physician champion and a pharmacist champion to lead antibiotic stewardship efforts, placing particular emphasis on routinely monitoring and discussing CDI rates, rates of antibiotic use and rates of high-risk antibiotic use (e.g., fluoroquinolones).
- Reduce unnecessary exposure to broad-spectrum antibiotics, tailoring ongoing antibiotic use based on the latest clinical data and lab results.
- Consider specific actions to optimize antibiotic use by:
  - Implementing interventions that occur across a unit, service or facility.
  - Implementing specific interventions focused on particular infections or antibiotics.
  - Implementing pharmacy or lab-driven interventions that are built into the ordering system.
- Implement a plan to communicate antibiotic use rational, dose and duration when patients are transferred between units and to other health care facilities.
- Implement initial changes on a smaller scale as some facilities may be resistant to broad, sweeping changes.
- Avoid implementing too many actions and interventions simultaneously; this may spread resources too thin and lead to staff confusion and resistance.
- Consider what hospital characteristics may influence CDI prevention efforts, such as:
  - What are the underlying issues at your facility that are driving increased CDI rates?
  - What are unique characteristics of your facility or patient population that may affect initiative implementation?
  - What is the institutional culture?
  - What about timing? Will the intervention require significant lead-time?

## B. Strategies for Engaging Physician and Pharmacist Champions

- There is no “one-size-fits-all” strategy to finding a physician or pharmacist champion. You must identify the type of physician who will work best in your organization. Some suggestions include: engaging clinicians who participate on the hospital Pharmacy and Therapeutics Committee, infectious disease doctors or hospitalists. If no one is available, consider reaching out to an off-site or “remote” leader. When selecting a physician champion, consider someone who is passionate about antibiotic stewardship and/or preventing CDI. Regardless of who is chosen, it is important to engage the Pharmacy and Therapeutics Committee early in the process and maintain ongoing communication.
- Often, successful physician and pharmacist champions are those who have pride in the hospital’s culture of excellence or are interested in making improvements. Ideally, this physician or pharmacist may have the ear of the hospital administration and the respect of their peers. They would be someone who is willing to collaborate with other disciplines and is open to differing viewpoints and perspectives.
- Because many physicians have clinical responsibilities and may not be employees of the institution, it is important to consider their workload when asking them to become a champion of this work. Consider the following suggestions:
  - Be clear on the expectations for the physician champion at the beginning. The primary roles of the physician champion are to share details of the initiative with their colleagues and gain their cooperation and support to improve patient and safety outcomes. Physician champions should not, for example, be expected to attend all meetings, be otherwise involved in matters unrelated to clinical concerns, such as budget discussions or internal promotional plans, or work out details of data collection (unless they want to).
  - Temporarily relieve the physician of some of their responsibilities. Develop some type of recognition for the physician(s). One hospital recognized a member of its medical staff with a “physician champion” award, complete with a certificate signed by the hospital’s chief of staff and a gift certificate to a local restaurant.
  - Consider rewarding physicians who actively participate in infection prevention initiatives as champions. This can include financial compensation for the champion role and the extra time spent assisting with these efforts.
  - Consider having co-champions to lighten the workload and provide mutual support. A co-champion can be another physician or an additional pharmacist. Typically, clinical pharmacists have a great deal of credibility with the medical staff, and therefore, pairing a physician with a clinical pharmacist as co-champions to engage the medical staff can be a very effective strategy.
  - Include a champion’s activities towards his/her obligations to meet credentialing requirements for the hospital.
- The pharmacist champion is likely an employee of the hospital, and duties related to antibiotic stewardship should be included in his or her routine responsibilities. Time and resources for this work will be necessary, and typically, the pharmacist will be tasked with

- much of the work to develop and implement an antibiotic stewardship program. The pharmacist champion should be involved in budgets, promotional work, and data collection strategies as they have the expertise related to pharmacy systems, the drugs themselves, and related costs that will be needed for data collection and tracking of outcomes. In addition, they are a key educator and champion to engage fellow pharmacists in this work and thus needs first-hand, tacit knowledge of the program.
- Leadership commitment to the antibiotic stewardship program can be the deciding factor for pharmacist and physician involvement. To help get leadership buy-in, develop a strong business case highlighting the return on investment for involvement in antibiotic stewardship programs. Antibiotic stewardship efforts to reduce CDI can often pay for themselves through savings. This includes direct savings through decreased antibiotic costs and indirect savings through decreased costs of caring for patients who will subsequently not develop CDI. Make sure that medical leadership allows the physician and pharmacist champions dedicated time to work on antibiotic stewardship.

### Tools, Resources and Further Reading

- [CDC Core Elements of Hospital Antibiotic Stewardship Programs](#)
- [CDC Antibiotic Stewardship Implementation Tools](#)
- [Strategies to Assess Antibiotic Use to Drive Improvements in Hospitals. Centers for Disease Control and Prevention](#)
- Wenzler E, Mulugeta SG, Danziger LH. [The Antimicrobial Stewardship Approach to Combating \*Clostridium difficile\*](#). *Antibiotics* (Basel). 2015; 4(2): 198-215.
- Feazel LM, Malhotra A, Perencevich EN, et al. [Effect of Antibiotic Stewardship Programmes on \*Clostridium difficile\* Incidence: A systematic Review and Meta-Analysis](#). *J Antimicrob Chemother*. 2014; 69(7):1748-54.
- Leffler DA, Lamont JT. [Clostridium difficile infection](#). *N Engl J Med*. 2015; 372:1539-48.
- Srinivasan A. [Engaging Hospitalists in Antimicrobial Stewardship: The CDC Perspective](#). *J Hosp Med*. 2011; 6 Suppl 1: S31-3.
- Damschroder LJ, Banaszak-Holl J, Kowalski CP, Forman J, Saint S, Krein SL. [The role of the champion in infection prevention: results from a multisite qualitative study](#). *Qual Saf Health Care*. 2009; 18(6):434-40.
- Infectious Disease Society of America (IDSA): Promoting Antimicrobial Stewardship in Human Medicine. [http://www.idsociety.org/Stewardship\\_Policy/](http://www.idsociety.org/Stewardship_Policy/)
- American Society of Health-System Pharmacists: A hospital pharmacist's guide to antimicrobial stewardship programs. <http://www.ashpadvantage.com/docs/stewardship-white-paper.pdf>

## Question 10. Does your laboratory reject formed stools if submitted for CDI testing?

You indicated that your laboratory does not reject formed stools submitted for CDI testing. It is important to remember that *C. difficile* infection is a clinical diagnosis; lab tests help support a clinical suspicion, but they should not be taken out of the clinical context. In order to limit inappropriate testing, clinical laboratories can set a threshold on the type of stool that is acceptable for *C. difficile* testing.

### A. Connecting Stool Stewardship and CDI Prevention

- The crucial symptom of CDI is clinically significant diarrhea with loose stools. Coordinating with clinical laboratories to set a threshold on the type of stool that is acceptable for *C. difficile* testing can help to ensure that this standard has been met and will prevent inappropriate testing.
- Stool stewardship can help drive down false positive rates and help prevent inappropriate antibiotic use on patients who are only colonized and do not actually have an active CDI.
- The Bristol Stool scale is the most widely used standardization of stools to determine when CDI testing is appropriate. Coordinate with clinical lab personnel to ensure that they are familiar with these standards.
- Empower lab staff to reject stool samples that do not meet recognized standards. It is important that the ordering clinician be informed of this rejection and its rationale. This can also be an effective educational intervention.
- Beyond testing only unformed stools, efforts should be made to ensure that there is no other explanation for the cause of the diarrhea. Studies indicate that between 19-40% of patients who are tested for CDI are currently receiving laxatives, which further cloud the clinical picture.

### Tools, Resources and Further Reading

- [Bristol Stool Form Scale](#)
- [A Practical Guidance Document for the Laboratory Detection of Toxigenic \*Clostridium difficile\*](#)
- Caroff DA, Edelstein PH, Hamilton K, Peques DA, CDC Prevention Epicenters Program. [The Bristol Stool Scale and Its Relationship to \*Clostridium difficile\* Infection](#). *J Clin Microbiol*. 2014; 52(9):3437-9.
- Solomon DA, Milner DA. [ID Learning Unit: Understanding and Interpreting Testing for \*Clostridium difficile\*](#). *Open Forum Infect Dis*. 2014; 1(1): ofu007.
- Dubberke ER, Burnham C-AD. [Diagnosis of \*Clostridium difficile\* infection](#). *JAMA Internal Medicine*. 2015;175(11):1801

## Questions 11. Are clinicians educated as to when to order CDI testing?

You indicated that clinicians are not educated as to when it is appropriate to order CDI testing. CDI is a clinical diagnosis; lab tests help support a clinical suspicion, but they should not be taken out of the clinical context. It is important that clinicians are educated and informed of high *C. difficile* colonization rates to illustrate that indiscriminate testing will lead to false-positive results.

### A. Engaging and Educating Clinicians on CDI Testing Best Practices

- Coordinating with the physician champion on the CDI team will be very important to help tailor the educational intervention aimed at improving physician CDI testing. There are many opportunities to provide this education, which include:
  - Physician CDI ordering scorecard: Tracking physicians' ordering patterns and using these to provide feedback to the physicians can help them improve
  - Hospital newsletters and electronic communications
  - Best practice advisories/alerts built into the ordering system
  - Unit-based educational sessions
  - New physician onboarding
  - Resident training (if applicable)
  - Physician conferences
  - Clinical laboratory rejection of inappropriate samples
- Ordering providers should be aware of many aspects of appropriately testing a patient's stool for CDI. Some specific aspects include:
  - Patients who do not have clinically significant loose stools should not have testing for CDI.
  - Patients who are on laxatives that explains their loose stools should not have testing for CDI.
  - Patients should not be tested at the end of the antibiotic course to ensure that the CDI has resolved, except in epidemiological studies.
  - Physicians should be aware of the specific lab test that a facility uses to determine the presence of *C. difficile* (Antigen EIA, Toxin EIA, PCR) as well as what each test means.
- Nursing staff should also have education about appropriate testing for CDI because they are often the ones that communicate the presence of diarrhea to physicians and ask for CDI testing. If they understand the testing for CDI, they are more likely to request lab tests only when clinically appropriate.

### Tools, Resources and Further Reading

- [Bristol Stool Form Scale](#)
- [Guidance to Providers: Testing for \*C. difficile\* Infection](#)
- Caroff DA, Edelstein PH, Hamilton K, Peques DA, CDC Prevention Epicenters Program. [The Bristol Stool Scale and Its Relationship to \*Clostridium difficile\* Infection](#). *J Clin Microbiol.* 2014; 52(9): 3437-9.

- Solomon DA, Milner DA. [ID Learning Unit: Understanding and Interpreting Testing for \*Clostridium difficile\*](#). *Open Forum Infect Dis*. 2014; 1(1): ofu007.
- Kwon JH, Reske KA, Hink T, Burnham CA, Dubberke ER. [Evaluation of Correlation between Pretest Probability for \*Clostridium difficile\* Infection and \*Clostridium difficile\* Enzyme Immunoassay Results](#). *J Clin Microbiol*. 2017; 55(2): 596-605.