



Clostridioides Difficile (CDI) Road Map

MHA’s road maps provide hospitals and health systems with evidence-based recommendations and standards for the development of topic-specific prevention and quality improvement programs, and are intended to align process improvements with outcome data. Road maps reflect published literature and guidance from relevant professional organizations and regulatory agencies, as well as identified proven practices. MHA quality and patient safety committees provide expert guidance and oversight to the various road maps.

Each road map is tiered into fundamental and advanced strategies:

- **Fundamental strategies** should be prioritized for implementation, and generally have a strong evidence base in published literature in addition to being supported by multiple professional bodies and regulatory agencies.
- **Advanced strategies** should be considered in addition to fundamental strategies when there is evidence the fundamental strategies are being implemented and adhered to consistently and there is evidence that rates are not decreasing and/or the pathogenesis (morbidity/mortality among patients) has changed.

Operational definitions are included to assist facility teams with road map auditing and identifying whether current work meets the intention behind each road map element.

Resources linked within the road map include journal articles, expert recommendations, electronic order sets and other pertinent tools which organizations need to assist in implementation of best practices.

The CDI road map includes best practices for the prevention and control in hospitals. The strategies include the appropriate identification and management of patients with suspected and/or confirmed CDI, cleaning and disinfection of the environment, antibiotic stewardship, staff and patient education, among other topics. It is important to note that appropriate testing for CDI is critical for best practice implementation and patient outcomes. The best practices are appropriate for patients with signs and symptoms compatible with CDI (e.g., clinically significant diarrhea). Some patients may have the bacteria without signs or symptoms of infection – testing asymptomatic patients is not clinically useful, and may lead to unnecessary antibiotic use.

Additionally, the road map includes planning for CDI outbreak situations whereby some of the advanced measures for patient isolation and cleaning/disinfection become fundamental.

Road map sections	Road map questions (if not present at your hospital or answering no, please see next column for suggested resources)	If specific road map element is missing, consider the following resources:
CDI surveillance	<p>FUNDAMENTAL (check each box if “yes”)</p> <ul style="list-style-type: none"> <input type="checkbox"/> The facility’s CDI surveillance processes include monitoring CDI diagnoses and management within the facility [1,2]. <input type="checkbox"/> CDI audit and surveillance data is provided to environmental services leadership and staff [1,3]. 	<p>Surveillance is the foundation of infection prevention efforts. The National Healthcare Safety Network (NHSN) provides standardized definitions for reporting through their Multidrug-Resistant Organism & Clostridioides Difficile Infection (MDRO/CDI) Module.</p> <p>The Greater New York Hospital Association United Hospital Fund, Appendix C has a useful CDI Tracking Tool.</p>

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CDI surveillance, continued	<p>ADVANCED (check each box if “yes”)</p> <p><input type="checkbox"/> Surveillance for colectomies associated with CDI [3] is included in the facility’s CDI surveillance processes.</p> <p><input type="checkbox"/> Root cause analyses are conducted for colectomies/deaths associated with CDI [3].</p>	
Early detection and appropriate testing	<p>FUNDAMENTAL (check each box if “yes”)</p> <p><input type="checkbox"/> Timely communication is provided to the health care provider that a patient is suspected of having CDI [1].</p> <p><input type="checkbox"/> Appropriate health care personnel (HCP) are trained to obtain only unformed stool samples for laboratory testing of patients suspected of having CDI.</p>	
Laboratory processes for CDI testing	<p>FUNDAMENTAL (check each box if “yes”)</p> <p><input type="checkbox"/> The facility has a lab testing method that enhances the sensitivity and specificity of CDI detection [1].</p> <ul style="list-style-type: none"> - If the facility has diagnostic testing criteria [See “Clinical processes for CDI testing”] in place, consider using only a nucleic acid amplification test [NAAT]. - If the facility does not have diagnostic testing criteria [See “Clinical processes for CDI testing”], consider using a stool toxin test as part of a multistep algorithm rather than a NAAT alone. <p><input type="checkbox"/> A process is in place to limit CDI testing for pediatric patients.</p> <ul style="list-style-type: none"> - The process includes a notification process for testing pediatric patients. For example, the electronic health record includes a prompt/flag to electronically alert staff regarding patients who do not meet the age criteria for testing, per facility policy. 	<p>Consider resources such as the New Cool Bristol Stool Tool to assist with training on the signs/symptoms of CDI.</p> <p>The Minnesota Department of Health has developed a summary reviewing different laboratory tests for Clostridioides Difficile infection.</p> <p>Limiting CDI testing to patients with a reasonable probability of having the disease helps avoid detection of colonized patients. Consider the following when developing processes which support appropriate testing practices:</p> <ul style="list-style-type: none"> • HRET, Appendix III Vanderbilt EHR Screenshot – electronic alerts to help educate staff and prevent unnecessary CDI stool testing • Cleveland Clinic Choosing Wisely®: C. difficile Infection Testing • Morgan DJ, Malani P, Diekema DJ. Diagnostic Stewardship—Leveraging the Laboratory to Improve Antimicrobial Use. JAMA. 2017;318(7):607-608. https://jamanetwork.com/journals/jama/article-abstract/2647071

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Laboratory processes for CDI testing, continued		<ul style="list-style-type: none"> • Madden G, Weinstein R, Sifri C. Diagnostic Stewardship for Healthcare-Associated Infections: Opportunities and Challenges to Safely Reduce Test Use. <i>Infect Control Hosp Epidemiol.</i> 2018;39(2):214-218. Available at https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/diagnostic-stewardship-for-healthcare-associated-infections-opportunities-and-challenges-to-safely-reduce-test-use/E2E185BF9CF7D0C9CAB0A8395ED5FEC9 • MHA developed a calculation tool for estimating the expected number of hospital-onset CDI based on the NHSN CDI SIR model: https://www.mnhospitals.org/Portals/0/Documents/patientsafety/HAI/MHA_NHSN_CDI_model_tool.xlsx
Clinical processes for CDI testing	<p>FUNDAMENTAL (check each box if “yes”)</p> <p><input type="checkbox"/> The facility has a process in place to limit diagnostic testing for CDI to only symptomatic patients [1,2].</p> <ul style="list-style-type: none"> - Laboratory testing methods are optimized when testing patients who are likely to have CDI (vs colonization). Poor test ordering practices (i.e., testing formed stool or repeat testing in negative patients) may lead to many false positives. Therefore, diagnostic testing criteria should consider: <ul style="list-style-type: none"> ○ Diarrheal symptoms such as patients with unexplained and new-onset ≥ 3 unformed stools in 24 hours [1,2]. ○ Avoiding testing when diarrheal symptoms may be attributable to therapies such as tube feeding, intensive cancer chemotherapy or laxatives; or underlying conditions such as inflammatory bowel disease [1]. ○ Clinical symptoms such as fever, elevated white blood cell count or abdominal pain. - CDI diagnostic process includes submitting one stool specimen for initial CDI testing [2], and not conducting repeat testing (within 7 days) during the same episode of diarrhea for confirmed CDI patients [1,2,5]. 	<p>Limiting CDI testing to patients with a reasonable probability of having disease helps avoid detection of colonized patients. Consider the following when developing processes which support appropriate testing practices:</p> <ul style="list-style-type: none"> • HRET, Appendix IX University of Wisconsin Health Inpatient Testing Algorithm for Clostridioides Difficile infection • Vanderbilt Guidance to Providers: Testing for C. difficile Infection • University of California San Francisco Diarrhea Decision Tree • Intermountain Healthcare Best Practice Flash Card for C. difficile • University of Michigan Medicine Clinical Guideline for Clostridioides Difficile Infection in Adults and Children • Sinai Health System University Health Network Antimicrobial Stewardship Program First Episode Clostridium difficile Infection (CDI) Management Algorithm

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Clinical processes for CDI testing, continued	<input type="checkbox"/> The facility has a process in place to evaluate retesting of patients diagnosed and treated for CDI who continue to be symptomatic. <input type="checkbox"/> “Tests of cure” are not conducted post treatment [1,2,5]. <input type="checkbox"/> The facility has a process in place for diagnostic testing of pediatric patients. The process includes [1,6]: <ul style="list-style-type: none"> - Patients ≤ 12 months of age: not routinely testing for CDI. - Patients 1-2 years of age: not routinely testing for CDI unless other infectious or noninfectious causes have been excluded. - Children ≥2 years of age: testing for CDI in patients with prolonged or worsening diarrhea and risk factors (e.g., underlying inflammatory bowel disease or immunocompromising conditions) or relevant exposures (e.g., contact with the health care system or recent antibiotics). <input type="checkbox"/> The facility has a process in place for timely communication of CDI test results [1,3,4,7]. <ul style="list-style-type: none"> - Includes timely communication to: patient care unit/facility, provider, infection prevention, and patient and/or family. 	
Patient & family education	<p>FUNDAMENTAL (check each box if “yes”)</p> <input type="checkbox"/> The facility has a process in place to educate patients diagnosed with CDI. <ul style="list-style-type: none"> - Education includes topics such as symptoms of CDI, what the health care personnel/prescribers are doing to prevent infection, and what the patient can do to help prevent an infection [1]. 	<p>Patient engagement is an important component of CDI prevention and treatment. Consider the following examples when developing teaching materials:</p> <ul style="list-style-type: none"> • Centers for Disease Control and Prevention FAQs about Clostridioides Difficile • Fairview Health Services Clostridioides Difficile infection patient education • Mount Sinai Hospital Special Isolation Precautions for Clostridioides Difficile (C. difficile) • The Ohio State University Medical Center Clostridioides Difficile patient education
Isolation precautions	<p>FUNDAMENTAL (check each box if “yes”)</p> <input type="checkbox"/> Patients with confirmed CDI are placed in a private room [1-4,7-9] with a bathroom or bedside commode solely for use by patient [3]. <input type="checkbox"/> HCP and prescribers perform hand hygiene and don gloves and gown prior to entering patient room [1-4,7-10].	<p>Isolation precautions help prevent infections that are spread through touch in the environment. Consider the following when developing organizational processes for the use of precautions:</p> <ul style="list-style-type: none"> • CDC Frequently Asked Questions about Clostridioides Difficile for Healthcare Providers • CDC Clostridioides Difficile Infection (CDI) Toolkit • CDC Clostridioides Difficile Infection (CDI) Prevention Primer

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Isolation precautions. continued	<input type="checkbox"/> Hand hygiene is performed before and after entering the CDI patient room (to coincide with before patient contact and after removing gloves) with soap and water or an alcohol-based product [1-4,7-10]. <input type="checkbox"/> Isolation precautions are continued for at least 48 hours after diarrhea has resolved [1].	<ul style="list-style-type: none"> • SHEA/TJC/APIC/IDSA/AHA “Rationale for Hand Hygiene Recommendations after Caring for a Patient with Clostridioides Difficile Infection” • MHA Controlling CDI Environmental Cleaning Training and Supervision Tool Kit, Precautions signs • Seattle Children’s Hospital Isolation Precautions Policy – Inpatient Settings • University of California San Francisco Diarrhea Decision Tree • HRET, Appendix VIII California Pacific Medical Center Diarrhea/Enhanced Precautions Decision Tree
	<p>ADVANCED (check each box if “yes”)</p> <input type="checkbox"/> The facility preferentially places incontinent patients suspected of having CDI in private rooms if private room availability is limited [1,3]. <input type="checkbox"/> The facility preemptively places patients with loose stools (e.g., ≥3 unformed stools in 24 hours) in isolation precautions [1,3,7]. <input type="checkbox"/> When using preemptive isolation precautions, patients are removed from isolation precautions if CDI test is negative and other infectious agents that require isolation precautions have been ruled out. <input type="checkbox"/> Isolation precautions are continued for the duration of the current hospitalization for confirmed CDI patients, even if diarrhea resolves [1,3,7,8]. <input type="checkbox"/> Universal glove use is implemented on floors/units/areas with endemic rates or ongoing transmission of CDI [4,7]. <input type="checkbox"/> Increasing frequency and/or scope of monitoring compliance with isolation precautions and hand hygiene [1,3,7].	
Strategies to implement in settings with an outbreak or increased CDI rate	<p>FUNDAMENTAL (check each box if “yes”)</p> <input type="checkbox"/> The facility has a process in place for implementing isolation precautions in settings in which there is an outbreak or an increased CDI rate. <ul style="list-style-type: none"> - Preferentially placing incontinent patients in private rooms if private room availability is limited [1,3]. - Patients are removed from preemptive isolation precautions if CDI test is negative and other infectious agents that require isolation precautions have been ruled out. 	<p>The CDC developed a Targeted Assessment for Prevention (TAP) framework for quality improvement which helps organizations use data for action in the prevention of infections. The TAP strategy supports facilities in identifying locations within facilities with a disproportionate burden of infections so that prevention resources can be used most effectively.</p>

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Strategies to implement in settings with an outbreak or increased CDI rate, continued	<ul style="list-style-type: none"> - Increasing frequency and/or scope of monitoring compliance with isolation precautions and hand hygiene [1,3,7]. <input type="checkbox"/> The facility has a process in place for performing hand hygiene in settings in which there is an outbreak or an increased CDI rate. <input type="checkbox"/> Perform hand hygiene with soap and water preferentially instead of alcohol-based hand hygiene products after caring for a CDI patient [1-4,7-10]. <input type="checkbox"/> Implementing universal glove use on floors/units/areas [4,7]. <input type="checkbox"/> The facility's cleaning and disinfection processes include conducting an evaluation of the use of chlorine-containing or other sporicidal product/technology used for daily and terminal environmental disinfection for all patient rooms and patient care equipment on affected unit if transmission is ongoing [2,3,7-9,11]. 	
Environmental cleaning and disinfection	<p>FUNDAMENTAL (check each box if "yes")</p> <ul style="list-style-type: none"> <input type="checkbox"/> The environmental services director and infection preventionist partner to ensure effective cleaning and disinfection strategies [3]. <input type="checkbox"/> Environmental services staff is notified of patient rooms requiring enhanced cleaning and disinfection. <input type="checkbox"/> Chlorine-containing or other sporicidal product/technology is used for daily and terminal environmental disinfection for all CDI patient rooms and patient care equipment, per organizational policy [1,3,4]. <input type="checkbox"/> The routine cleaning and disinfection processes are evaluated periodically through direct practice observation. <ul style="list-style-type: none"> - For example, use a visual inspection process with checklist. <p>ADVANCED (check each box if "yes")</p> <ul style="list-style-type: none"> <input type="checkbox"/> The facility's cleaning and disinfection processes include an evaluation of the use of chlorine-containing or other sporicidal product/technology used for daily and terminal environmental disinfection for all patient rooms and patient care equipment on CDI-affected unit if transmission is ongoing [2,3,7-9,11]. <input type="checkbox"/> Routine cleaning/disinfection processes are evaluated periodically through a technology-based approach using a biochemical product (e.g., fluorescent markers, ATP bioluminescence, cultures) [1,3,4,7]. 	<p>Environmental cleaning is a critical component of CDI prevention. Consider the following resources when developing cleaning and disinfection processes:</p> <ul style="list-style-type: none"> • MHA Environmental Services Cleaning Guidebook • CDI Environmental Cleaning in the O.R. and the E.D. toolkit • MHA webinar: Environmental Interventions to Reduce Clostridioides Difficile • CDC Options for Evaluating Environmental Cleaning • CDC Environmental Checklist for Monitoring Terminal Cleaning • CDC Environmental Cleaning Evaluation Worksheet • CDC Options for Evaluating Environmental Cleaning [See: Level II] • MHA UV Gel Testing Procedure

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Antimicrobial stewardship & medication management	<p>FUNDAMENTAL (check each box if “yes”)</p> <p><input type="checkbox"/> The facility has an antibiotic stewardship program that follows the Centers for Disease Control and Prevention’s Core Elements of Hospital Antibiotic Stewardship Programs [12,13].</p> <p><input type="checkbox"/> The facility collaborates with medical staff to set clear expectations for appropriate antibiotic use and follows current national recommendations for CDI treatment, e.g., guidelines developed by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA) [2] and the American College of Gastroenterology [5].</p> <ul style="list-style-type: none"> - Appropriate CDI patient management includes: avoiding antiperistaltic agents for patients suspected/diagnosed with CDI [2,5]; Consultation with specialists when recurrent or worsening CDI is identified (e.g., infectious disease physician, general surgeons). 	<p>Antimicrobial stewardship is an essential component of reducing the incidence of CDI infection. Facility antibiotic stewardship programs should follow the CDC Core Elements of Hospital Antibiotic Stewardship Programs. Consider the following selected implementation resources to support antibiotic stewardship work:</p> <ul style="list-style-type: none"> • CDC Implementation of Antibiotic Stewardship Core Elements at Small and Critical Access Hospitals • National Quality Forum National Quality Partners Playbook: Antibiotic Stewardship in Acute Care • MHA Antibiotic Stewardship collaborative webinars
Performance improvement monitoring	<p>FUNDAMENTAL (check each box if “yes”)</p> <p><input type="checkbox"/> The facility has a process to measure and monitor CDI prevention processes and outcomes.</p> <ul style="list-style-type: none"> - CDI prevention processes include: compliance with guidelines/ best practices (e.g., isolation precautions, hand hygiene, etc.) and evaluation of the education program provided to staff and licensed independent practitioners. - CDI outcomes include CDI rates using evidence-based metrics (e.g., NHSN). <p><input type="checkbox"/> The facility has a process in place to assess appropriateness of testing in the patients from which samples are submitted. This may involve periodic medical record review in a sample of patients to assess for clinical risk factors, signs and symptoms suggestive of CDI [1].</p>	<p>Surveillance is the foundation of infection prevention efforts. The National Healthcare Safety Network (NHSN) provides standardized definitions for reporting through their Multidrug-Resistant Organism & Clostridioides Difficile Infection (MDRO/CDI) Module.</p> <p>The Greater New York Hospital Association United Hospital Fund, Appendix C has a useful CDI Tracking Tool.</p>
Staff education	<p>FUNDAMENTAL (check each box if “yes”)</p> <p><input type="checkbox"/> Basic education on isolation precautions is conducted as part of the orientation process.</p>	

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Staff education, continued	<ul style="list-style-type: none"> <input type="checkbox"/> Education on isolation precautions is conducted annually for specified roles, as applicable. <input type="checkbox"/> The facility has a process in place to provide additional education, as needed, for physician, prescriber, nursing and laboratory. <ul style="list-style-type: none"> - Education includes: role in antimicrobial stewardship, early and accurate recognition of CDI, current research, diagnostic methods, and collection practices. 	<p>Education in basic CDI prevention, including hand hygiene, should be provided to multidisciplinary staff with potential for exposure to patients and/or infectious materials. Consider the following resources when developing staff education materials:</p> <ul style="list-style-type: none"> • MHA Controlling CDI Environmental Cleaning Training and Supervision Tool Kit [See: “Environmental services cleaning protocol educational presentation”] • CDC Clean Hands Count, Education Module: “Hand Hygiene, Glove Use, and Preventing Transmission of C. difficile (2017)” • Greater New York Hospital Association United Hospital Fund, Appendix G Environmental Services Training Video and Presentation • Cleveland Clinic C. difficile education

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