



**Road Map to a
Comprehensive
Clostridium difficile
Infection (CDI)
Prevention Program**

The *Safe from CDI Road Map* provides consistent recommendations/standards for Minnesota acute care hospitals in the development of comprehensive *Clostridium difficile* infection (CDI) prevention programs. The road map and companion tool kit were developed as part of the Minnesota CDI Prevention Collaborative, made possible with American Reinvestment and Recovery Act funds through the Centers for Disease Control and Prevention Epidemiology and Laboratory Capacity Program.

The CDI prevention strategies are presented as a two-tiered approach (core and enhanced). Enhanced strategies are to be considered in addition to core strategies when there is evidence that the core strategies are being implemented and adhered to consistently and there is evidence of ongoing transmission of *C. difficile* and/or evidence that CDI rates are not decreasing and/or evidence of a change in CDI pathogenesis. The prevention strategies address four topic areas: early recognition of patients with CDI, isolation precautions, environmental cleaning and disinfection, and antimicrobial stewardship. The road map is based on current (October 2011) guidelines, recommendations, and published literature for CDI prevention and control in acute care hospitals. The road map content will be reviewed regularly and updated, as indicated, through available published literature.

We would like to thank the following individuals and organizations for sharing their time, expertise, and experiences which made the road map and tool kit possible:

Planning Group Members

Jessica Nerby, Abbott Northwestern Hospital,
Minneapolis

Karoline Sperling, Hennepin County Medical Center,
Minneapolis

Marilyn Grafstrom, LifeCare Medical Center, Roseau

Jim McManus, Mayo Clinic, Rochester

Michelle Farber, Mercy Hospital, Coon Rapids

Leslie Baken, Park Nicollet Health Services, Minneapolis

Christine Hendrickson, University of Minnesota Medical
Center, Fairview, Minneapolis

Julie Apold, Minnesota Hospital Association, St. Paul

Jane Harper, Minnesota Department of Health, St. Paul

Lindsey Leshner, Minnesota Department of Health, St. Paul

Kristin Shaw, Minnesota Department of Health, St. Paul

Pilot Hospitals

CentraCare Health System, Long Prairie

St. Cloud Hospital

Windom Area Hospital

Sanford Medical Center Canby

Mercy Hospital, Coon Rapids

Park Nicollet Methodist Hospital, Minneapolis

LifeCare Medical Center, Roseau

Queen of Peace Hospital

Definitions

Health care personnel (HCP): All persons, paid and unpaid, working in an acute care facility who have the potential for exposure to patients and/or infectious materials, including body substances, contaminated medical supplies and equipment, contaminated environmental surfaces, or contaminated air. This includes persons not directly involved in patient care (e.g., clerical, housekeeping, and volunteers) but potentially exposed to infectious agents that can be transmitted to and from HCP and patients. This term includes, but is not limited to, physicians, physician assistants, nurse practitioners, nurses, nursing assistants, therapists, technicians, emergency medical service personnel, dental personnel, pharmacists, laboratory personnel, autopsy personnel, students and trainees, and contractual personnel.

Prescriber: Health care personnel who are licensed to prescribe medications, including antimicrobial agents.

Road Map to a Comprehensive *Clostridium difficile* Infection (CDI) Prevention Program



	Safe from CDI Component	Specific Action(s)	Audit Questions
S	“Safe from CDI” Teams	<ol style="list-style-type: none"> 1) Identify senior leadership champion for CDI prevention. 2) Provide support and expectations for CDI prevention champions. 3) Adopt an interdisciplinary team approach to CDI prevention with a designated coordinator to oversee implementation. 	<ol style="list-style-type: none"> 1a) The facility has identified a senior leadership champion(s) to provide support and ensure resources for the CDI prevention program. 1b) Senior leadership is engaged in infection prevention, including CDI prevention, as evidenced by documented communication to key health care personnel (HCP). 2a) The facility has identified a physician champion(s) for CDI prevention. 2b) The physician champion(s) has a decision-making role on the facility antimicrobial stewardship team. 2c) The facility has identified an operational champion(s) for CDI prevention (e.g. environmental services director, infection preventionist, laboratorian, pharmacist, patient care director). 2d) A process is in place for communication between the physician and operational champion(s). 2e) A process is in place to partner the environmental services director and infection preventionist. 2f) The facility has defined roles, set expectations, and provides support for the champion(s). 3a) A team, with participation by front-line staff, is in place to oversee and support CDI prevention work. Team members include, at a minimum: <ol style="list-style-type: none"> i) Environmental services director or designee ii) Infection preventionist iii) Laboratorian iv) Pharmacist v) Patient care director or designee 3b) A coordinator is assigned to oversee CDI prevention implementation (e.g. schedule team meetings, plan HCP education). 3c) The coordinator has dedicated time to serve in this role. 3d) Individual roles in the CDI Prevention Strategies (patient care steps) are clearly defined and documented.
A	Access to Information	<ol style="list-style-type: none"> 1) Verify implementation of the CDI Prevention Strategies. 2) Audit the CDI Prevention Strategies. 3) Review and analyze the CDI Prevention Strategies audit data. 	<p>The facility has a process in place to:</p> <ol style="list-style-type: none"> 1a) Document implementation of the CDI Prevention Strategies. <p>Monitor compliance with Core and Enhanced (if indicated) CDI Prevention Strategies:</p> <ol style="list-style-type: none"> 2a) Early recognition of CDI 2b) Prompt implementation of Isolation Precautions 2c) Hand hygiene 2d) Environmental cleaning and disinfection of patient care equipment and the environment of CDI patients 2e) Antimicrobial stewardship <p>Review and analyze audit data for Core and Enhanced (if indicated) CDI Prevention Strategies:</p> <ol style="list-style-type: none"> 3a) Compliance with early recognition of CDI 3b) Compliance with Isolation Precautions 3c) Compliance with hand hygiene 3d) Compliance with environmental cleaning and disinfection of patient care equipment and the environment of CDI patients 3e) Compliance with antimicrobial stewardship

Road Map to a Comprehensive *Clostridium difficile* Infection (CDI) Prevention Program



	Safe from CDI Component	Specific Action(s)	Audit Questions
		<p>4) Conduct CDI surveillance.</p> <p>5) Review and analyze CDI surveillance data.</p> <p>6) Disseminate the CDI Prevention Strategies audit and surveillance data.</p>	<p>The facility has in place:</p> <p>4a) Facility-wide CDI surveillance.</p> <p>4b) Application of standardized National Healthcare Safety Network (NHSN) CDI surveillance definitions.</p> <p>4c) Surveillance for colectomies associated with CDI.</p> <p>4d) A process to conduct root-cause analyses for colectomies and deaths associated with CDI.</p> <p>4e) Periodic monitoring of autopsy and mortality data for unrecognized CDI.</p> <p>The facility has a process in place to review and analyze:</p> <p>5a) Facility-wide CDI surveillance data.</p> <p>5b) Surveillance data and root-cause analyses for colectomies/deaths associated with CDI.</p> <p>5c) Surveillance of autopsy and mortality data for unrecognized CDI.</p> <p>The facility has a process in place to provide CDI audit and surveillance data to key stakeholders at least quarterly:</p> <p>6a) Facility senior leadership</p> <p>6b) Physicians</p> <p>6c) Patient care staff</p> <p>6d) Environmental services leadership</p> <p>6e) Environmental services staff</p> <p>6f) Pharmacy</p> <p>6g) Laboratory</p>
<p>F</p>	<p>Facility Expectations</p>	<p>1) Set expectations for implementation of the CDI Prevention Strategies.</p> <p>2) Set expectations for hand hygiene practices.</p> <p>3) Expect HCP to “speak up” about HCP behavior or facility issues that may increase patient infection risk (e.g. hand hygiene or Isolation Precautions are not followed).</p> <p>4) Encourage patients and families to “speak up” about HCP/provider practices that may increase infection risk.</p>	<p>1a) The facility has outlined a roll-out plan for implementation (i.e. unit(s), evaluation, timelines, and prevention strategies).</p> <p>1b) The facility has developed and clearly communicated HCP expectations for implementation of the CDI Prevention Strategies.</p> <p>1c) The facility has defined provider (e.g. physician, physician assistant, nurse practitioner) expectations for implementation of the CDI Prevention Strategies.</p> <p>2a) The facility has developed and implemented a facility-wide hand hygiene program.</p> <p>2b) The facility has clearly communicated HCP expectations for appropriate hand hygiene practices.</p> <p>3a) The facility has engaged HCP, including providers, in creating a culture that encourages HCP to inform each other if noncompliance with CDI Prevention Strategies is observed.</p> <p>3b) The facility has engaged HCP, including providers, to create a culture that encourages HCP to provide positive feedback to each other when compliance with CDI Prevention Strategies is observed.</p> <p>4a) The facility has a process in place to encourage patients and families to speak up if they have concerns about HCP/provider practices or other issues that may increase infection risk.</p>

Road Map to a Comprehensive *Clostridium difficile* Infection (CDI) Prevention Program



	Safe from CDI Component	Specific Action(s)	Audit Questions
		<ul style="list-style-type: none"> 5) Set expectations for the clinical management of CDI patients. 6) Set expectations for environmental cleaning and disinfection. 7) Set expectations for antimicrobial stewardship. 	<p>Facility expectations for prescribers/providers include the following:</p> <ul style="list-style-type: none"> 5a) Discontinue inciting antibiotics, if possible, when CDI is suspected. 5b) Avoid antiperistaltic agents for patients suspected/diagnosed with CDI. 5c) Follow best practices for CDI treatment (e.g. 2010 SHEA-IDSA Guideline). 5d) Consult with specialists when recurrent or worsening CDI is identified (e.g. infectious disease physicians, general surgeons). <ul style="list-style-type: none"> 6a) The facility has a process in place to implement environmental cleaning and disinfection as outlined by environmental services and infection prevention and other departments as needed. 6b) The facility has clearly communicated HCP expectations for environmental cleaning and disinfection. <ul style="list-style-type: none"> 7a) The facility has a process in place to develop and implement an antimicrobial stewardship program.
<h2 style="font-size: 2em; margin: 0;">E</h2>	<h3 style="margin: 0;">Educate Staff and Patients</h3>	<ul style="list-style-type: none"> 1) Provide CDI prevention education for all HCP. 2) Provide cleaning and disinfection education for nursing and ancillary/support staff. 3) Provide education and competency testing for environmental services trainers. 4) Provide cleaning/disinfection training and evaluation for environmental services staff. 5) Provide competency testing to environmental services staff. 6) Provide physician/prescriber education on CDI prevention, diagnosis, management, and treatment. 	<ul style="list-style-type: none"> 1a) All HCP, including physicians, receive CDI prevention education at new employee orientation. 1b) All HCP including physicians, receive CDI prevention education at least annually. <ul style="list-style-type: none"> 2a) The facility has a process is in place to provide cleaning and disinfection education for nursing and ancillary/support staff. <p>The facility has a process in place to require person(s) responsible for environmental services training to:</p> <ul style="list-style-type: none"> 3a) Receive education on current environmental cleaning/disinfection practices at least annually. 3b) Complete a competency evaluation of cleaning/disinfection practices at least annually. <ul style="list-style-type: none"> 4a) Training materials are provided in the staff's native language, or ensure communication of the information through other means. 4b) Environmental services staff training includes return demonstration. 4c) A systematic process is in place to periodically evaluate terminally-cleaned rooms. 4d) Processes are in place to address issues identified through cleaning/disinfection evaluations. <ul style="list-style-type: none"> 5a) Environmental services staff training includes written or verbal competency testing. <ul style="list-style-type: none"> i) Competency testing includes demonstrated understanding of the rationale for cleaning/disinfection components. 5b) Expectations are in place for environmental services staff to pass a competency test prior to assignment to patient care areas. 5c) Expectations are in place for environmental services staff that do not pass the competency test to receive additional training or be assigned to non-patient care areas. <ul style="list-style-type: none"> 6a) CDI prevention education, including the physician/prescriber role in antimicrobial stewardship, is provided at orientation for new physicians/prescribers. 6b) A process is in place for the CDI physician champion to educate physicians/prescribers about CDI clinical spectrum (including treatment and disease severity), current research, and the facility's CDI diagnostic methods. 6c) Best practices for CDI diagnosis and management are readily available to physicians/prescribers. 6d) A process is in place to monitor CDI diagnosis and management within the facility.

Road Map to a Comprehensive *Clostridium difficile* Infection (CDI) Prevention Program



	Safe from CDI Component	Specific Action(s)	Audit Questions
		<p>7) Provide education on CDI laboratory diagnostic methods.</p> <p>8) Provide CDI prevention education to operational champion(s).</p> <p>9) Educate patients and families about their role in CDI prevention.</p>	<p>The facility has a process in place to:</p> <p>7a) Educate laboratory staff regarding specimen testing (e.g. policy for testing only unformed stools).</p> <p>7b) Educate laboratory leadership on current laboratory diagnostic research.</p> <p>7c) Educate nursing staff on facility policies for specimen collection and specimen testing (e.g. test only unformed stools).</p> <p>The facility has a process in place:</p> <p>8a) To provide operational champions with CDI education, including best practices, management and infection prevention and control strategies, at least annually.</p> <p>8b) For the operational champions to disseminate information throughout the organization (e.g. train-the-trainer).</p> <p>9a) Infection prevention education is provided to patients and families.</p>

CDI Prevention Strategies

CORE Prevention Strategies = Strategies that should always be in place.

ENHANCED Prevention Strategies = Strategies to be considered in addition to core strategies when:

- a) There is evidence that the core strategies are being implemented and adhered to consistently.
- And;
- b) There is evidence of ongoing transmission of *C. difficile* and/or
 - c) There is evidence that CDI rates are not decreasing and/or
 - d) There is evidence of change in CDI pathogenesis (e.g. increased morbidity/mortality among CDI patients).

Specific Action(s)	CORE Prevention Strategies	Specific Action(s)	ENHANCED Prevention Strategies
Early Recognition of CDI			
1) Early identification of patients with suspect CDI	<p>The facility has a standardized CDI identification process in place that includes the following:</p> <p>1a) Nurses are trained to recognize the signs/symptoms of CDI (see Bristol Stool Chart).</p> <p>1b) Appropriate HCP are trained to obtain specimens for laboratory testing of patients suspected of having CDI.</p> <p>1c) Timely communication to the provider of patients suspected of having CDI.</p>	Enhanced identification of patients with suspect CDI	<p>The facility has developed an ENHANCED CDI identification process that includes the following:</p> <p>1a) Identification of previously unrecognized patients with symptoms of CDI (e.g. patient care rounds).</p>
2) Laboratory testing	<p>2a) PCR-based molecular assay is evaluated for <i>C. difficile</i> diagnostic testing.</p>	Enhanced laboratory testing	<p>2a) Implement PCR-based molecular assay for <i>C. difficile</i> diagnostic testing.</p>

Specific Action(s)	CORE Prevention Strategies	Specific Action(s)	ENHANCED Prevention Strategies
	<p>The facility has a standardized laboratory testing policy in place that includes the following:</p> <ul style="list-style-type: none"> 2b) Reject formed stools. 2c) Avoid serial testing of patients. 		
3) Diagnosis	<p>The facility has a standardized diagnostic protocol in place that includes the following:</p> <ul style="list-style-type: none"> 3a) Test unformed stools only (see Bristol stool chart types 5 – 7). 3b) Submit one stool specimen for initial CDI testing. 3c) Avoid serial testing when initial test is negative. 3d) Do not test asymptomatic patients. 3e) Do not conduct repeat testing during the same episode of diarrhea for confirmed CDI patients (e.g. electronic flag). 3f) Retest only if CDI symptoms continue or recur after 10 days of treatment. 3g) Do not perform “tests of cure” post treatment. 3h) Do not routinely test patients less than 1 year of age. 3i) For patients 1 - 2 years of age, consider diagnoses other than CDI first; if no recent antimicrobial exposure, use more than one diagnostic approach (including culture). 3j) For patients >2 years of age with recent antimicrobial exposure, test and treat as for adults. 		
4) Communication	<p>The facility has a standardized communication process in place that includes timely communication of CDI test results to:</p> <ul style="list-style-type: none"> 4a) Patient care unit/facility 4b) Provider 4c) Infection Prevention 		

Isolation Precautions

1) Place patient in Isolation Precautions	<p>The facility has Isolation Precautions identified that include the following:</p> <ul style="list-style-type: none"> 1a) Patient is placed in a private room with a bathroom or bedside commode solely for use by patient. 1b) Health care workers perform hand hygiene and don gloves and gown prior to entering patient room. 1c) Gloves are changed immediately if visibly soiled and after touching or handling surfaces/materials contaminated with feces. 1d) Gloves and gown are removed before exiting the patient room. 1e) Hand hygiene (soap and water preferred) is performed before exiting the patient room; alcohol-based hand rub is used if soap and water are not available. 1f) Patient transport or movement outside of the room is avoided unless medically necessary. 	Enhanced patient placement in Isolation Precautions	<p>The facility has ENHANCED Isolation Precautions identified that include the following:</p> <ul style="list-style-type: none"> 1a) Patients with loose stools (e.g. ≥3 unformed stools in 24 hours) are preemptively placed in Isolation Precautions. 1b) Universal glove use is implemented on floors/units/areas with endemic rates or ongoing transmission of CDI. 1c) Frequency and/or scope of monitoring compliance with Isolation Precautions is increased.
--	--	--	--

Specific Action(s)	CORE Prevention Strategies	Specific Action(s)	ENHANCED Prevention Strategies
	1g) Single use patient care equipment is utilized when possible (e.g. blood pressure cuff). 1h) If private room availability is limited, incontinent patients are preferentially placed in private rooms. <i>NOTE: Asymptomatic patients are not placed in Isolation Precautions – even if they are colonized with C. difficile.</i>		
2) Cohort patients if private room is not available	2a) Cohorted patients each have a dedicated bedside commode. 2b) Health care workers change gown and gloves and perform hand hygiene when moving between cohorted patients. 2c) Patients with discordant status of infection or colonization with other epidemiologically important organisms (e.g. VRE, MRSA) are not cohorted.		
3) Isolation Precautions supplies are readily available	3a) Adequate supplies for compliance with Isolation Precautions (e.g. gowns, gloves) are readily accessible outside of the patient room. 3b) Responsibility is assigned for regularly checking and restocking supplies.		
4) Follow hand hygiene guidelines	4a) Hand hygiene practices follow CDC or WHO guidelines.	Enhanced hand hygiene guidelines	4a) Hand hygiene is performed with soap and water upon room exit. If hand-washing sink is not accessible, hand hygiene is performed with alcohol-based hand rub, and followed immediately with hand hygiene using soap and water after exiting the patient room. 4b) Frequency and/or scope of monitoring compliance with hand hygiene practices is increased.
5) Communicate Isolation Precautions status	5a) Isolation Precautions status is documented in the medical record. 5b) Isolation Precautions signage is immediately posted outside positive CDI patient rooms. 5c) Icons/symbols on Isolation Precautions signage include: i) Hand hygiene for entry and exit ii) Gown and gloves for room entry iii) Process for environmental cleaning/disinfection 5d) When CDI patients are transferred, Isolation Precautions status is communicated to receiving facilities.	Enhanced communication of Isolation Precautions status	5a) Environmental services staff is notified of patient rooms requiring ENHANCED cleaning and disinfection.
6) Discontinue Isolation Precautions as appropriate	6a) For patients preemptively placed in 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. 6b) Patients are removed from Isolation Precautions when CDI symptoms resolve (e.g. patient has <3 unformed stools in a 24 hour period).	Enhanced discontinuation of Isolation Precautions as appropriate	6a) Isolation Precautions are continued for the duration of the current hospitalization for confirmed CDI patients, even if diarrhea resolves.

Specific Action(s)	CORE Prevention Strategies	Specific Action(s)	ENHANCED Prevention Strategies
--------------------	-----------------------------------	--------------------	---------------------------------------

Environmental Cleaning and Disinfection

<p>1) Clean and disinfect patient rooms and patient care equipment</p>	<p>The facility has a standardized environmental cleaning and disinfection protocol in place that includes the following:</p> <ol style="list-style-type: none"> 1a) Hospital grade EPA-registered germicide is used for routine disinfection. 1b) Manufacturer product recommendations are followed for use, including contact time and dilution. 1c) Standard disinfectant application protocols. <ol style="list-style-type: none"> i) Disinfecting wiper is changed when unable to achieve appropriate wet contact time and when visibly soiled. ii) Disinfecting wipers are not pre-soaked or re-dipped in the open bucket system. 1d) Routine cleaning/disinfection processes are assessed using observational audits before changing products or processes. 1e) Responsibility is assigned for monitoring and restocking cleaning/disinfection and personal protective equipment supplies. 1f) Responsibility is defined for which patient care equipment and high touch surfaces will be cleaned and disinfected by nursing. 1g) A cleaning/disinfection schedule is implemented for patient care equipment and patient environment. 1h) Shared patient care equipment is cleaned/disinfected between every patient use. 	<p>Enhanced cleaning and disinfection of patient rooms and patient care equipment</p>	<p>The facility has an ENHANCED cleaning and disinfection protocol in place that includes the following:</p> <ol style="list-style-type: none"> 1a) Chlorine-containing or other sporicidal product/technology is used for daily and terminal environmental disinfection for <i>all CDI patient rooms</i> and patient care equipment. 1b) Evaluation of the use of chlorine-containing or other sporicidal product/technology used for daily and terminal environmental disinfection for <i>all</i> patient rooms and patient care equipment <i>on affected unit</i> if transmission is ongoing. 1c) Routine cleaning/disinfection processes are assessed using a biochemical product (e.g. ATP, bioluminescence, fluorescent dye/marker) before changing products or processes.
---	---	--	--

Antimicrobial Stewardship

<p>1) Implement antimicrobial stewardship program</p>	<p><i>NOTE: An antimicrobial stewardship program includes clearly defined expectations for clinical management strategies of CDI patients (see "F4–Facility Expectations" in "SAFE").</i></p> <p>The facility has in place:</p> <ol style="list-style-type: none"> 1a) A multidisciplinary antimicrobial stewardship team including a physician with infectious diseases interest and representation from clinical pharmacy, infection prevention, microbiology, information technology, and/or hospitalist/intensivist. <i>NOTE: Facilities without HCP or other resources for an antimicrobial stewardship team should consider obtaining this expertise through a cooperative relationship or consultation.</i> 1b) A process to prospectively audit antimicrobial use within the facility, including volume and classes, and report this information to prescribers. 	<p>Enhanced antimicrobial stewardship program</p>	<p>The facility has a process in place to:</p> <ol style="list-style-type: none"> 1a) Evaluate the antimicrobial stewardship program to ensure that all recommended components are in place and identify areas for improvement. 1b) Evaluate clinical management strategies of CDI patients. 1c) Monitor antimicrobial prescribing practices for the treatment of CDI and provide feedback to prescribers.
--	--	--	---

Specific Action(s)	CORE Prevention Strategies	Specific Action(s)	ENHANCED Prevention Strategies
	<ul style="list-style-type: none"> 1c) A process to monitor antimicrobial prescribing practices within the facility and provide feedback to prescribers highlighting the relationship of antimicrobial use to CDI. 1d) A process to provide antimicrobial utilization data to medical staff and facility leadership. 1e) Antimicrobial formularies and preauthorization requirements for non-formulary antimicrobial use. 1f) Guidelines or clinical treatment pathways based on local/regional and state antibiotic resistance data. 1g) A process for regular review of treatment pathways and order sets that includes antimicrobial prescribing. 1h) Clear expectations that empirically prescribed antibiotics are adjusted in a timely manner based on laboratory test results. 1i) Real-time surveillance of antimicrobial prescribing (e.g. frequency, duration, and number of antimicrobial agents prescribed per patient). 		<div style="text-align: right;"> 8 </div>