

C. difficile Infection Reduction in Long-Term Care: Session 6 – Comprehensive Review



Paula St. Hill, MPH, a-IPC

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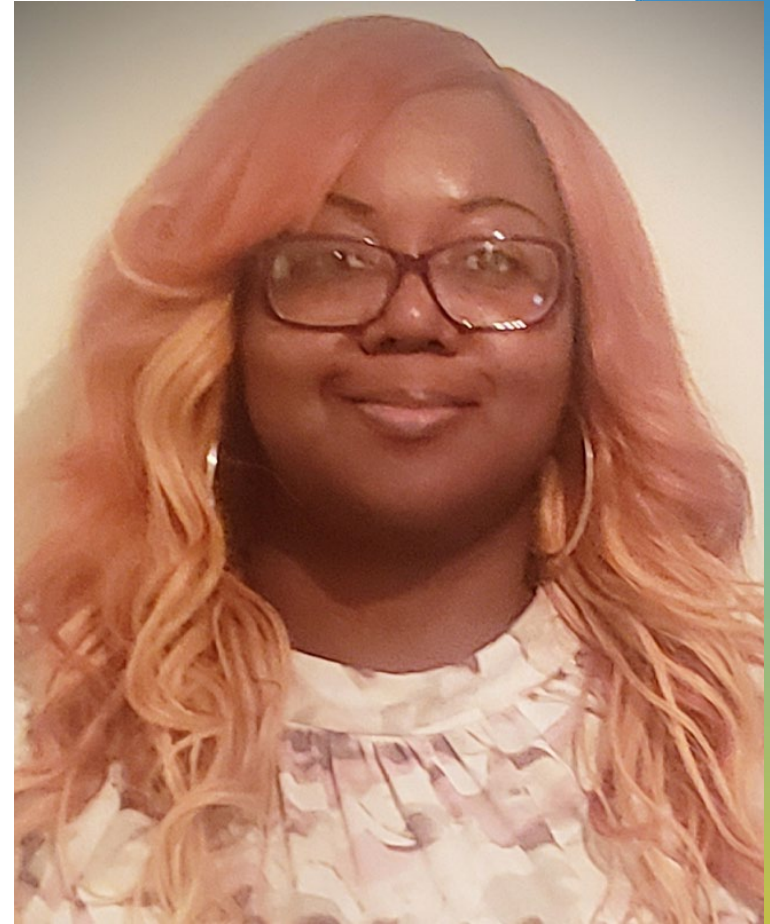
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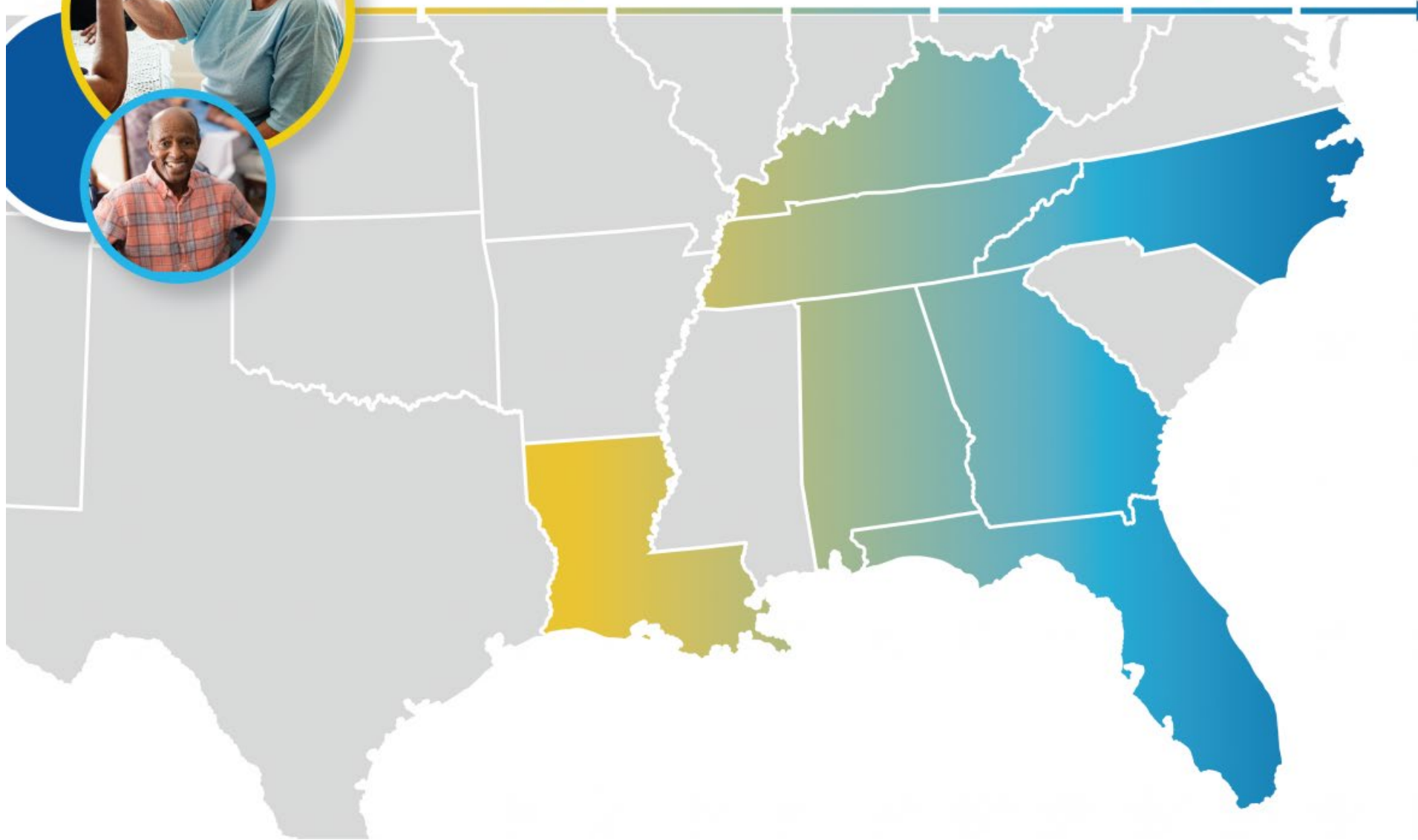
Paula is a doctoral student with a diverse background in public health, infection control, epidemiology and microbiology. She enjoys public health and identifying ways to improve health outcomes, specifically those related to health care-associated infections. She has 10 years of health care experience.

Paula enjoys spending time with her friends and family.

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Making Health Care Better *Together*



About Alliant Health Solutions

Learning Objectives

By the end of the session, the learner will be able to:

1. Understand *C. difficile* infection risk factors, treatment updates, and antimicrobial stewardship.
2. Implement decision-making strategies for enhancing early recognition of patients with *C. difficile* infections and environmental cleaning best practices.
3. Understand *C. difficile* surveillance definitions and testing recommendations.
4. Differentiate between enhanced barrier precautions and contact precautions.

Let's Recap!

Session 1: A tiered approach to prevent, contain and reduce hospitalizations – presented by Amy Ward, MS, BSN, RN, CIC, FAPIC

Amy discussed:

- The burden of *C. diff* infection (CDI) on the health care system.
- The importance of early detection and control as foundational to the CDI prevention program.
- The three-tiered approach to CDI prevention.

Risks and Cost of *C. diff* Infection

Risks:

- Medications disrupting intestinal flora (antibiotics, antacids, chemotherapy, etc.)
- Residents over 65 years old
- Residing in a long-term care facility (LTCF) or hospitalization
- One-quarter of all CDI cases in the United States had onset in nursing homes

Cost:

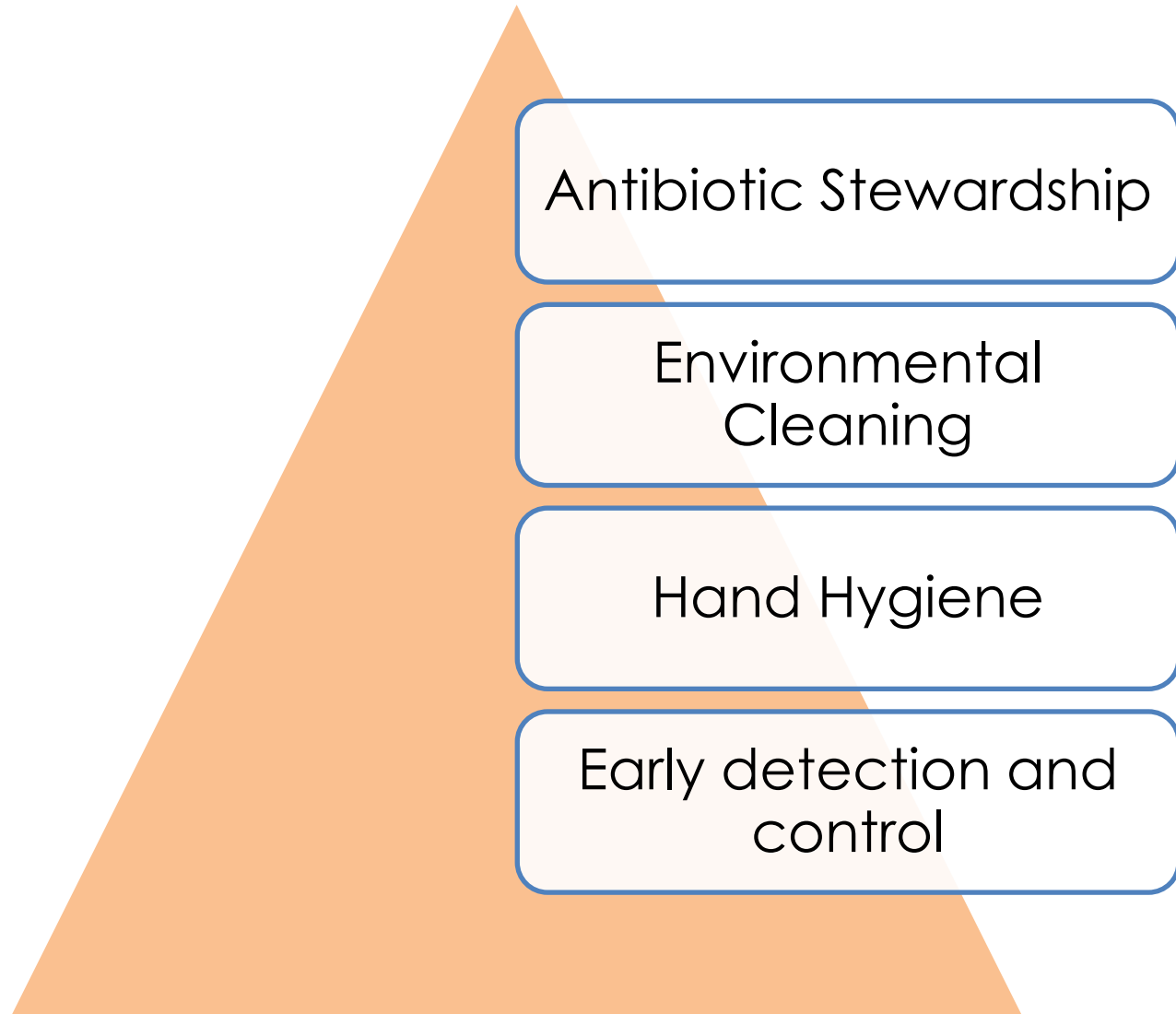
- 14,000 deaths in 2007
- \$4.8 billion in excess health care costs in 2007
- Average cost of CDI event: \$7,500

Foundation: Early Detection and Control

Who should be clinically evaluated for CDI?

- Residents who develop profuse, watery diarrhea (>3 stools in 24 hours).
 - Diarrhea continues after diarrhea-causing medications are stopped.
- Immediately initiate contact enteric precautions.
- Discuss any change in resident status with the provider and infection prevention RN.
- **DO NOT REQUEST TESTS FOR CURE!!**

Tiered Approach to CDI Prevention and Control



How Should Cases Be Identified and Reported?

- Nursing homes should monitor for CDI rates to understand how to improve resident outcomes.
 - Without data on CDI rates, how would you know if you have an increase in cases?
- Perform CDI surveillance of all residents regularly.
 - Review orders for C. diff tests to evaluate the clinical picture.
 - Review lab results for positive C. diff results.
 - Review new admissions for recent or historical CDI.

Session 2: *Clostridioides difficile* Treatment Update, Risk Factors and Antibiotic Stewardship – Terry Lubowski, Pharm. D., B.S.

In this session, Terry discussed:

- The pathophysiology of *C. difficile*.
- Risk factors for *C. difficile* infection.
- *C. difficile* and Antimicrobial Stewardship.

Pathophysiology

Typically, *C. difficile* produces two types of toxins:
Toxin A and Toxin B

Toxin A:

- Over 70% of *C. difficile* strains
- Leads to intestinal secretion, mucosal injury and inflammation

Toxin B:

- Found in all *C. difficile* strains
- Leads to damage to the intestinal walls

Goudarzi, M., Seyedjavadi, S. S., Goudarzi, H., Mehdizadeh Aghdam, E., & Nazari, S. (2014). *Clostridium difficile* infection: Epidemiology, pathogenesis, risk factors, and therapeutic options. *Scientifica*.

Tonna, I., & Welsby, P. D. (2005, June 1). *Pathogenesis and treatment of clostridium difficile* infection. *Postgraduate Medical Journal*

Risk Factors for *Clostridioides difficile* Infection

The risk for disease increases in patients/residents with:

- Antibiotic exposure (e.g., fluoroquinolones, third/fourth generation cephalosporins, clindamycin, carbapenems)
- Gastrointestinal surgery/manipulation
- A long length of stay in health care settings
- A serious underlying illness
- Immunocompromising conditions
- Advanced age

<https://www.cdc.gov/cdiff/clinicians/faq.html#:~:text=diff%3F-,C.,of%20all%20episodes%20of%20AAD>

C. *difficile* and Antimicrobial Stewardship (AS)

- Antimicrobial stewardship has proven to be the most effective way to decrease *C. difficile* rates.
- Hospital-based AS studies have demonstrated a reduction of *C. difficile* incidence by 24-60%.
- Antibiotic risks include the use of short-term perioperative antibiotics.
- The number of antibiotics and duration of therapy increase *C. difficile* risk.
- Risk can persist for as long as three months after antibiotic discontinuation.

***C. difficile* and Antimicrobial Stewardship (AS) (continued)**

- Discontinue therapy with the inciting antibiotic as soon as possible.
 - The disruption of the intestinal microbiota by antibiotics is long-lasting, and the risk of CDI increases during therapy and the three months following the cessation of therapy.
- Both longer exposure to antibiotics and exposure to multiple antibiotics increase the risk for CDI.

Session 3: Environmental Cleaning and Disinfection – Paula St. Hill, MPH, A-IPC

In this session, I discussed:

- The difference between cleaning and disinfecting.
- EPA List K cleaning agents effective against *C. difficile*.
- A basic guideline to describe who cleans what in the nursing facility.

Cleaning vs. Disinfecting: What Is Cleaning?

- Cleaning is the process of physically removing germs, dirt and other impurities from surfaces.
- To clean a surface, use an all-purpose cleaning agent and a microfiber cloth or terry rag to lift soils away.
- Cleaning only removes germs and soils from the surface. It does not kill them. Germs that were not removed will continue reproducing and spreading.

<https://www.epa.gov/coronavirus/whats-difference-between-products-disinfect-sanitize-and-clean-surfaces>

Cleaning vs. Disinfecting: What Is Disinfecting?

- Disinfection describes the process of eliminating many or all pathogenic microorganisms, except bacterial spores, on inanimate objects.
- Disinfectants do not clean soils from surfaces.
- Disinfectants must be used after cleaning agents because they can not break through the soil on surfaces.
- To kill germs, most disinfectants contain either quaternary ammonium chloride (QUATS), peroxide (Hydrogen-Peroxide-based) or hypochlorite (bleach-based).

EPA List K

Products on List K:

- Products on list K are registered for use against *C. diff* spores. EPA has reviewed required laboratory testing data demonstrating that these products kill *C. diff* spores.

How to check if a product is on List K:

- First, find the EPA registration number on the product label. Look for “EPA Reg. No.,” followed by two or three sets of numbers (ex. 1234-12 or 1234-12-123).
- On the disinfectant list, search for the registration number exactly as it appears on the label.
- Once you see the results on the disinfectant list, check that the product's label includes directions for use against *C. diff*.
- Regardless of whether you are using a primary registration product or a supplemental distributor product, always check that the label has the corresponding directions for use for the relevant pathogen.

EPA List K (continued)

Registration Number	Active Ingredients/s	Product Name	Company	Contact time (time surface should remain wet)	Formulation Type	Surface Types	Use sites (Hospital, Institutional, Residential)
75266-1	Sodium Hypochlorite	Activate 5.25% Institutional Bleach	Deardorff Fitzsimmons Corporation	4	Dilutable	Hard Nonporous (HN)	Hospital; Institutional
777-83	Sodium Hypochlorite	Lysol Brand Disinfectant Bleach Plus	Reckitt Benckiser	5	Ready to Use	Hard Nonporous (HN)	Hospital; Institutional; Residential
84526-6	Hydrogen Peroxide; Silver Nitrate	Halomist	Halosil International, Inc.	10	Ready to Use	Hard Nonporous (HN)	Hospital; Institutional; Residential
84697-2	Sodium Hypochlorite	Regular Scent Concentrated Bleach	GS Liquid Technologies, Inc.	10	Dilutable	Hard Nonporous (HN)	Hospital; Institutional; Residential
87518-6	Sodium Hypochlorite	Sporex	HSP USA, LLC	3	Ready to Use	Hard Nonporous (HN)	
88089-2	Hydrogen Peroxide; Peroxyacetic Acid (Peracetic Acid)	Peridox	Contec, Inc.	3	Ready to Use	Hard Nonporous (HN)	Hospital; Institutional; Residential
88089-4	Hydrogen Peroxide; Peroxyacetic Acid (Peracetic Acid)	Peridox RTU	Contec, Inc.	3	Ready to Use	Hard Nonporous (HN)	Hospital; Institutional; Residential

Environmental Cleaning Data Tool Sample

ENVIRONMENTAL CLEANING DATA TOOL					
SAMPLE ENVIRONMENTAL CHECKLIST - SUMMARY FORM					
FOR DAILY AND TERMINAL CLEANING ROOM OBSERVATIONS					
<<Modify instructions as needed to comply with data collection protocol or internal policies.>>					
Observe eight daily cleanings per month (try to observe about two per week) and one terminal cleaning per month. Report your results in the highlighted cells.					
Your hospital _____		→			
Reporting period _____		→			
Enter number of routine cleanings _____		→			
Enter number of terminal cleanings _____		→			
TOTAL CLEANINGS					
Instruction	Component	# Times Task Performed	# Times Task NOT Performed	# Times Not Applicable	Enviro-Score
At start, perform hand hygiene				Applicable to ALL	
Put on PPE					
Needed supplies/equipment					
High-touch surfaces: Disinfect w/hypochlorite-based disinfectant	Door knobs				
	Door surface				
	Light switches				
	Window sills				
	Spot clean walls with disinfectant cloth				
	Medical equipment (e.g., IV controls)				
	Bed rails				
	Call button				
	Phone				
	Over bed table & drawer				
	Countertop				
	Furniture				
	Arms of patient chair				
	Seat of patient chair				
	All other misc. horizontal surfaces				
Damp Dust:	Overhead light (if the bed is empty)				
	TV & stand				
Clean:	Lights				
	Bathroom door knob				
	Mirror				
	Tub/shower				
Bathroom:	Faucets (at sink)				
Disinfect w/hypochlorite-based disinfectant	Bathroom handrails				
	Sink				
	Toilet lever/flush				
	Toilet horizontal surface/seat				
Clean Floor:	Dust mop tile				
	Wet mop tile				
	Bed frame				
	Mattress covers				
For TERMINAL CLEANING, damp dust:	Pillows				
	Blood pressure cuffs, as per hospital policy				
	Remove unused linen and other such items				
EXIT ROOM AFTER CLEANING IS COMPLETE:					
Remove trash, mops, soiled curtains, discard wipes/cloths, etc.					
Dispose of gloves, gown, wash hands					
RE-STOCK ROOM with SUPPLIES and EQUIPMENT as needed:					
After Daily Cleaning (Replace as needed)	Hand sanitizer				
RE-ENTER with PPE - GOWN & GLOVES	Paper towels				
	Replace curtains as needed				
	Replace trash liner				
	Remake bed with clean linen				
After TERMINAL CLEANING, gowns/gloves not needed; it's a clean room	Replace as needed: Pillows, mattresses, pillow covers, mattress covers				
	Replace curtains as needed				
Other:					
Change mop heads after each room					
Remove PPE before walking in hallway					
Perform hand hygiene					
				Applicable to ALL	
Overall Enviro-Score					



Session 4: Surveillance, Data Tracking, and Reporting

In this session, I discussed:

- *C. difficile* surveillance definitions and the importance of definition standardization.
- Essential data collection strategies used to effectively monitor process and outcome measures for *C. difficile* reduction.
- Utilizing a *C. difficile* tracking tool.
- Best practices for CDI reporting.

CDC CDI Case Definitions

C. *difficile* infection incident case:

A case of CDI is defined as a positive *C. difficile* toxin assay or a positive *C. difficile* molecular assay (e.g., PCR) of a stool specimen from a resident of the surveillance catchment area who is at least one year old. Cases with a *C. difficile*-positive stool specimen greater than eight weeks after the last positive specimen are considered new cases with an incident stool specimen.

Recurrent episodes:

CDI cases with a positive *C. difficile* stool specimen between two to eight weeks of the last positive specimen are considered recurrent episodes.

Duplicate episodes:

CDI cases with a positive *C. difficile* stool specimen less than two weeks since the last positive specimen are considered duplicate episodes.

<https://www.cdc.gov/hai/eip/cdiff-tracking.html>

Standardized Definitions

- Health Care Facility-Onset (HCFO) - if the positive stool specimen was collected greater than three calendar days after hospital admission or in a resident of a long-term care facility.
- Community-Onset Health Care Facility-Associated (CO-HCFA) - if the positive stool specimen was collected in an outpatient setting or within three days after hospital admission in a person with documented overnight stay in a health care facility (i.e., hospitalization or long-term care facility stay) in the 12 weeks before stool specimen collection.
- Community-associated (CA) – if a positive stool specimen was collected in an outpatient setting or within three calendar days after hospital admission in a person with no documented overnight stay in a health care facility during the 12 weeks before the specimen was collected.

C. Diff Tracking Tool

C. DIFFICILE INFECTION TRACKING TOOL

EXAMPLE CLOSTRIDIUM DIFFICILE COLLECTION DATA FORM

<< Insert custom instructions to users here >>

Hospital Name	Total Discharges	Total Patient Days	Reporting Period				
Total C. difficile Cases Indicator							
Facility Associated		Possible Facility Associated		Non-Facility Associated		Recurrent	
Current Reporting Period							
Total							

Patient-Level Data

Case #	Medical Record Number	Last Name	First Name	Reporting Period	Age	Gender	Admission Date	Admission from Another Health care Facility	Name of Transferring Facility	Symptom Onset Date	Used Contact Precautions	Date of Contact Precautions	Date C.difficile Test was Obtained	Discharged Patient	Discharge Date	C. difficile Case Status	Diagnosis made on Specimen #	Colectomy	Patient Status at Discharge	Open Date Field	Open Alpha-Numeric Field	Open Alpha-Numeric Field	Fields automatically calculate				
																							Time Till Symptom Onset (Days)	Time Till Contact Precautions Initiated (Days)	Time Till Positive C. difficile Test (Days)	Length of Stay	
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
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Session 5: Early Detection, Isolation, and Recommendations for Testing

In this session, I discussed:

- Implementing decision-making strategies for enhancing early recognition of patients with *C. difficile* infections.
- Understanding *C. difficile* testing and ordering best practices.
- Understand isolation precautions for patients with *C. difficile* infections and discontinuation of isolation.

Early Recognition: Sign and Symptoms

- Watery diarrhea as often as 10 to 15 times a day
- Abdominal cramping and pain, which may be severe
- Rapid heart rate
- Dehydration
- Fever
- Nausea
- Increased white blood cell count
- Kidney failure
- Loss of appetite
- Swollen abdomen
- Weight loss
- Blood or pus in the stool

Testing

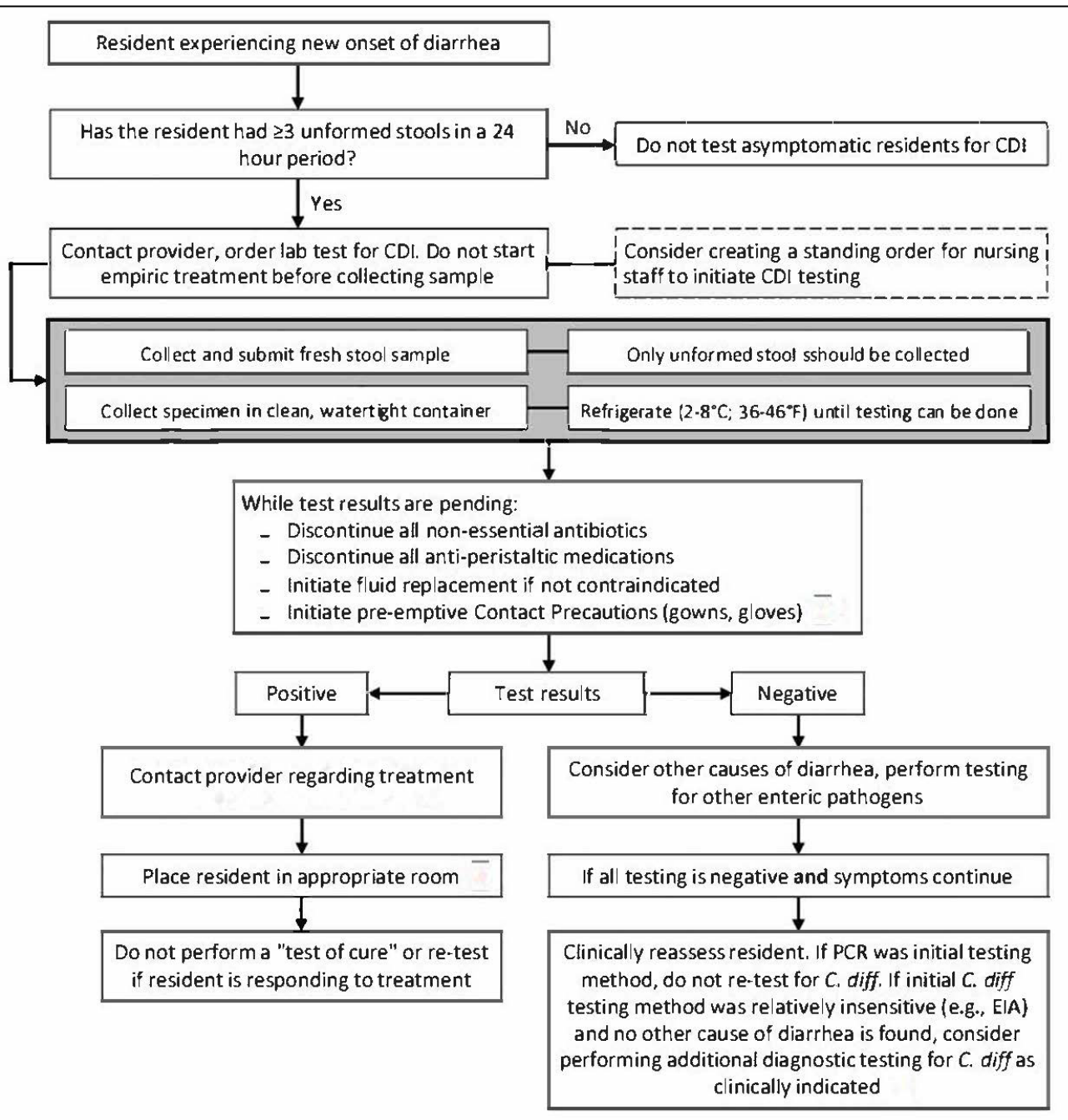
Four main tests:

- **Culture**
 - Most sensitive test available, but often associated with false-positive results due to the presence of non-toxigenic strains.
- **Antigen**
 - Detects the presence of *C. difficile* antigen (GDH) by latex agglutination or immunochromatographic assays.
- **Toxin**
 - Enzyme immunoassay (EIA) detects toxin A, toxin B, or both A and B.
- **PCR/ NAAT**
 - Detects toxigenic *C. difficile* in stool.

<https://www.cdc.gov/cdiff/clinicians/faq.html>

Testing (continued)

- Only watery or unformed stools should be collected and tested.
- Testing asymptomatic patients is not clinically useful and may lead to the use of unnecessary antibiotics.
- Repeat testing during the **same** episode of diarrhea is not recommended.
- "Test of cure" is not recommended.
- Retest after completion of treatment **only** if signs and symptoms of infection continue.
- Avoid routine testing of children <1 year of age.
- Testing for children one to three years of age can be considered, but testing for other causes of diarrhea (e.g., viral) is recommended first.
 - Children >3 years can be tested in the same manner as older children and adults.



Early Recognition and Testing Flow Chart

Contact Precautions

- Contact Precautions require wearing a gown and gloves on entering a resident's room. The resident should be given dedicated equipment (e.g., a stethoscope and blood pressure cuff) and placed into a private room. Residents on Contact Precautions should be restricted to their rooms except for medically necessary care and restricted from participation in group activities.
- Contact Precautions are recommended if the resident has acute diarrhea, draining wounds, or other sites of secretions or excretions that cannot be covered or contained or for a limited period during a suspected or confirmed MDRO outbreak investigation.

Discontinuing Contact Precautions

- Discontinue precautions when diarrhea has resolved (i.e., the resident has < 3 unformed stools in a 24-hour period).^{1,2}
- Some studies suggest continuing Contact Precautions for 48 hours after the resolution of diarrhea due to continued *C. difficile* shedding, environmental contamination, and resident skin colonization.
- Some facilities continue Contact Precautions through the completion of CDI antibiotic therapy.^{1,2}
- In facilities with high rates of CDI, consider continuing Contact Precautions until discharge.
- Consider extending Contact Precautions for incontinent residents who require considerable assistance with activities of daily living.

1. <https://www.health.state.mn.us/diseases/cdiff/hcp/ttctoolkit/isolation.html>

2. McDonald, L. C., Gerding, D. N., Johnson, S., Bakken, J. S., Carroll, K. C., Coffin, S. E., Dubberke, E. R., Garey, K. W., Gould, C. V., Kelly, C., Loo, V., Shaklee Sammons, J., Sandora, T. J., & Wilcox, M. H. (2018). Clinical Practice Guidelines for Clostridium difficile Infection in Adults and Children: 2017 Update by the Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA). *Clinical Infectious Diseases*, 66(7), e1–e48. <https://doi.org/10.1093/cid/cix1085>

Enhanced Barrier Precautions

- Enhanced Barrier Precautions (EBP) are an infection control intervention designed to reduce transmission of resistant organisms that employ targeted gown and glove use during high-contact resident care activities.
- EBP may be indicated (when Contact Precautions do not otherwise apply) for residents with any of the following:
 - Wounds or indwelling medical devices, regardless of MDRO colonization status.
 - Infection or colonization with an MDRO.
- Effective implementation of EBP requires staff training on the proper use of personal protective equipment (PPE) and the availability of PPE and hand hygiene supplies at the point of care.

Enhanced Barrier Precautions (continued)

Precaution	Applies to:	PPE used:	Required PPE:	Room Restriction
Enhanced barrier precaution	<p>All residents with any of the following:</p> <ul style="list-style-type: none"> • Infection or colonization with an MDRO when Contact Precautions do not apply • Wounds and/or indwelling medical devices (e.g., central line, urinary catheter, feeding tube, tracheostomy/ventilator) regardless of MDRO colonization status 	<p>During high-contact resident care activities:</p> <ul style="list-style-type: none"> • Dressing • Bathing/showering • Transferring • Providing hygiene • Changing linens • Changing briefs or assisting with toileting • Device care or use: central line, urinary catheter, feeding tube, tracheostomy/ventilator • Wound care: any skin opening requiring a dressing 	<ul style="list-style-type: none"> • Gloves and gown prior to the high-contact care activity <p>(Change PPE before caring for another resident)</p> <p>(Face protection may also be needed if performing activity with risk of splash or spray)</p>	None

IDSA/SHEA Recommendations for Health Care Providers: CDI Prevention and Control

Measure	Recommendation
<ul style="list-style-type: none"> Isolation 	<ul style="list-style-type: none"> Accommodate residents with CDI in a private room with a dedicated toilet to decrease transmission to other residents
<ul style="list-style-type: none"> Contact Precautions 	<ul style="list-style-type: none"> Use personal protective equipment, such as gloves and gowns, before entering resident rooms and wear them when in close contact with residents
<ul style="list-style-type: none"> Hand hygiene 	<ul style="list-style-type: none"> Wash with soap and water before and after contacting a resident and removing gloves. (Handwashing with soap and water is preferred over alcohol-based hand-hygiene products after contact with an area likely to be contaminated with fecal material.)
<ul style="list-style-type: none"> Bathing 	<ul style="list-style-type: none"> Encourage residents to wash their hands and shower to reduce the number of skin spores
<ul style="list-style-type: none"> Cleaning and disinfection of medical equipment 	<ul style="list-style-type: none"> Use disposable equipment and ensure that reusable equipment is thoroughly cleaned and disinfected, preferably with a sporicidal (EPA List K)
<ul style="list-style-type: none"> Environmental cleaning 	<ul style="list-style-type: none"> Evaluate cleaning processes to ensure quality and effectiveness of environmental cleaning
<ul style="list-style-type: none"> Antibiotic stewardship 	<ul style="list-style-type: none"> Minimize the frequency and duration of antibiotic use as well as the number of antibiotic agents

Links and Materials to Previous CDI Webinars

Session 1: A Tiered Approach to Prevent, Contain, and Reduce Hospitalizations

- [Video](#)
- [Slides](#)

Session 2: *Clostridioides difficile* Treatment Update, Risk Factors and Antibiotic Stewardship

- [Video](#)
- [Slides](#)

Session 3: Environmental Cleaning and Disinfection

- [Video](#)
- [Slides](#)

Session 4: Surveillance, Data Tracking, and Reporting

- [Video](#)
- [Slides](#)

Session 5: Early Detection, Isolation, and Recommendations for Testing

- [Video](#)
- [Slides](#)

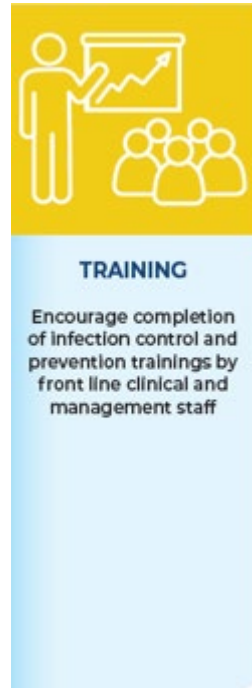
Questions?



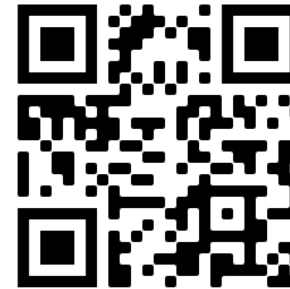
Scan the QR codes or Click the Links to Complete the Assessments!

CMS requested Alliant Health Solutions, your QIN-QIO, to work with select nursing homes to understand emerging health care needs in nursing homes. Alliant Health Solutions is engaging nursing home leadership in this key area to ensure plans are in place to achieve and maintain health quality and equity!

Please scan the QR code below and complete the assessment.



Nursing Home Infection Prevention (NHIP) Initiative Training Assessment



<https://bit.ly/NHIPAssessment>

Nursing Home and Partnership for Community Health: CMS 12th SOW GOALS



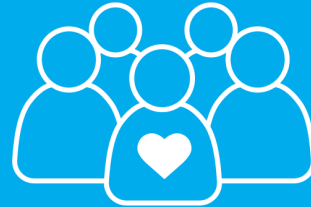
OPIOID UTILIZATION AND MISUSE

- Promote opioid best practices
- Reduce opioid adverse drug events in all settings



PATIENT SAFETY

- Reduce hospitalizations due to c. diff
- Reduce adverse drug events
- Reduce facility acquired infections



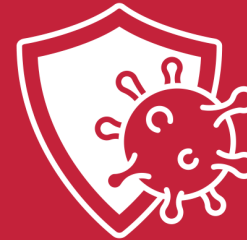
CHRONIC DISEASE SELF- MANAGEMENT

- Increase instances of adequately diagnosed and controlled hypertension
- Increase use of cardiac rehabilitation programs
- Reduce instances of uncontrolled diabetes
- Identify patients at high-risk for kidney disease and improve outcomes



CARE COORDINATION

- Convene community coalitions
- Reduce avoidable readmissions, admissions to hospitals and preventable emergency department visits
- Identify and promote optimal care for super utilizers



COVID-19

- Support nursing homes by establishing a safe visitor policy and cohort plan
- Provide virtual events to support infection control and prevention
- Support nursing homes and community coalitions with emergency preparedness plans



IMMUNIZATION

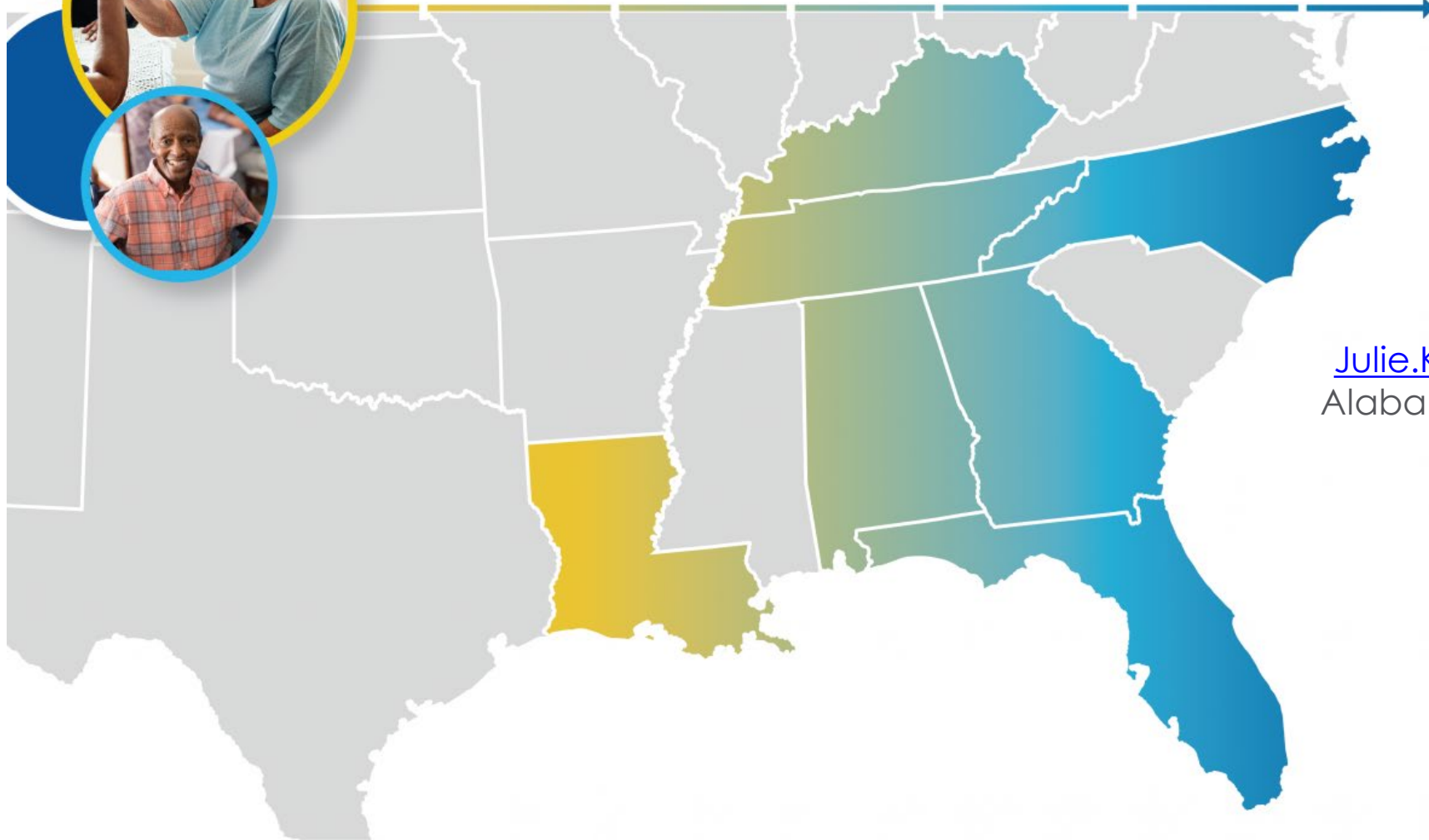
- Increase influenza, pneumococcal, and COVID-19 vaccination rates



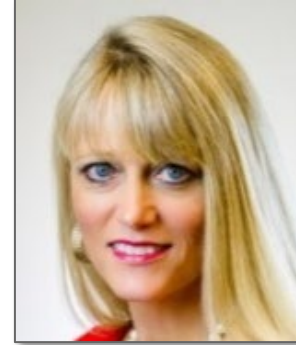
TRAINING

- Encourage completion of infection control and prevention trainings by front line clinical and management staff

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