Learning Objectives

1. Review the evidence for the pathogenesis, epidemiology, incubation period, and transmission of CDI

2. Describe core strategies for the prevention of CDI, including
   - Minimizing the likelihood of transmission by assuring HCW adherence to contact precautions, hand hygiene, notification and prompt isolation
   - Ensuring removal of C difficile spores from the environment with thorough, effective cleaning
   - Adopting antimicrobial stewardship practices that have the greatest CDI impact

Highlight the role of nursing in CDI prevention
CDI is a Substantial and Increasing Public Health Problem

- *Clostridium difficile* caused an estimated 450,000 illnesses and 29,000 deaths in US in 2011 (CDC, 2014)
- 10,553 hospital-onset CDI cases reported by California hospitals in 2013
  - 5% increase since 2011

CDI Patients Cycle Among Regional Hospitals and Long-Term Care Facilities

In Orange County, 26% of CDI patients found to be readmitted to another hospital within 12 weeks of discharge

Clostridium difficile

- An anaerobic, gram-positive, spore-forming, toxin-producing bacillus
- Transmitted among humans via fecal-oral route
- The leading cause of antibiotic-associated colitis in hospitals and long termcare facilities
  - Severity of Clostridium difficile infection (CDI) ranges from mild to moderate diarrhea to fulminant pseudomembranous colitis
  - Death in up to 9% of CDI cases


Clostridium difficile Pathogenesis

1. Ingestion of spores transmitted to patients via the hands of healthcare personnel and environment

2. Germination into growing (vegetative) form

3. Changes in lower intestinal flora due to antimicrobial use allows proliferation of C. difficile in colon

4. Toxin A & B production leads to colon damage

CDI Requires a 2-Step Process

The following events may occur separately and in any order, but **both are required for infection to occur:**

1. The normal **intestinal flora must be compromised** allowing for *C. difficile* to establish itself and proliferate
2. The **C. difficile bacterium or spore must be ingested**


Most “Community-onset” CDI Related to Prior Hospitalization

- In a prospective study at a university hospital, of 136 patients with CDI, 28% had onset in the community, however **87% were previously hospitalized**
  

- In a multicenter study, the **81% of community-onset CDI was associated with a previous hospital stay**

Recognize CDI Signs and Symptoms

- Assess for diarrhea symptoms and duration
- Review recent history of healthcare exposure, hospitalization, clinic visits, long term care stay, history of recent antibiotics
- Collect stool samples for testing that meet laboratory requirements.
  - See Bristol Stool Chart for an example of stool quality to be submitted.
- Communicate and document test results

CDI Incubation Period is Brief

- Incubation period between exposure to *C. difficile* and occurrence of CDI has been estimated in multiple studies to be a median of 2–3 days
  - Molecular typing suggests incubation periods are most commonly a few days to 4 weeks
- Increased risk of CDI can persist many weeks after cessation of predisposing antimicrobial therapy, resulting from prolonged perturbation of normal intestinal flora

**Clostridium difficile** is **NOT** a Common Inhabitant of the Healthy Adult GI Tract

- Only 2–7% of the healthy adult population have been found to be colonized with *C. difficile*

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**C. Difficile Colonization Common Among Healthcare Facility Patients, Increases with Prior Healthcare Exposure**

- **10% of asymptomatic adult patients upon admission** to a tertiary care hospital were positive for toxigenic *C. difficile*; colonized patients were significantly more likely to have had a recent hospitalization
  

- **15% of asymptomatic adult patients upon admission** to a large teaching hospital with or without prior healthcare exposure
  

- **Up to 30% of asymptomatic residents of long-term care facilities**; higher in facilities with a prior CDI outbreak
  
  
Person-to-Person Transmission Within Healthcare Facilities Well-Documented

- Up to 37% of CDI resulted from **in-ward patient-to-patient transmission**
- Transmissions most commonly observed during the 1st week following the first *C. difficile* positive sample collected from a newly diagnosed patient
- **Both symptomatic CDI patients and asymptomatic *C. difficile*-colonized patients can spread *C. difficile*** to other patients through direct or indirect contact via hands of healthcare workers or the environment


Outpatient Setting - A Source for *C. difficile* Transmission

- Among community-associated **CDI patients cultured during outpatient visits:**
  - 27% of patients shed spores to one or more high-touch surfaces in the examination room


- Among 1000 **community-associated CDI cases** with no inpatient overnight stay within 12 weeks:
  - 41% had high-level outpatient healthcare exposure (surgery, dialysis, ED visit, inpatient visit not overnight)
  - 41% had low-level outpatient healthcare exposure (doctor or dentist office, pharmacy)

**Nursing Intervention: Initiate and Monitor Adherence with Contact Precautions**

- Place patients into contact precautions
  - Private room, cohorting, commode vs. bathroom
  - Presumptive isolation for any patient with diarrhea
  - Visible signage
  - Clear instructions for gown/glove use
    - Nursing competencies for don/doff of gown/gloves
  - Gowns/gloves available near point of use
  - Dedicated or disposable noncritical patient care equipment
  - Extend use of contact precautions beyond duration of symptoms

**Hand Hygiene for CDI**

- *C. difficile* spores are resistant to alcohol
- **During outbreaks or in settings with hyper endemic CDI, hand hygiene with soap and water is preferred**
  - Be aware that hand hygiene adherence may decrease when soap and water is preferred
  - Clinical studies have not found increase in CDI with alcohol-based hand hygiene products, but several did find reductions in MRSA or VRE
  - Gloves are effective at preventing *C. difficile* contamination of hands

Nursing Intervention: Perform Hand Hygiene to Prevent Carriage of *C. difficile* spores

- 24% of healthcare workers who cared for a CDI patient had *C. difficile* spores on their hands; spores found on
  - 44% of nursing assistants’ hands
  - 19% of nurses’ hands
  - 23% of physicians’ hands
- High-risk contact (i.e., exposure to fecal soiling) and at least one contact without the use of gloves were significantly associated with healthcare worker hand contamination with *C. difficile* spores


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Nursing Intervention: Hand hygiene Promotion and Modeling Behavior

- Nursing models hand hygiene behavior because of the frequency of brief and extended patient contact
  - Recent study highlighted that hand hygiene compliance was lowest after patient contact less than 2 minutes
- Nursing leadership at the unit level is crucial to impact culture change for hand hygiene compliance
  - 33.6% to 50% increased hand hygiene compliance
  - 8.7% to 17% decrease in unit HAI’s
- Nursing’s key responsibility is to educate patients and visitors on the importance of hand hygiene to control CDI

APIC Guidelines CDI elimination 2013
Barley Chapman Culture HH compliance system 2013
APIC guide HH implementation guide 2015
Nursing Intervention: Assist with Environmental Cleaning and Disinfection

- Nursing and environmental services (EVS) should be clear on which surfaces are cleaned by whom
- Provide additional cleaning of “near touch” surfaces
  - Nursing disinfection of side rails, over bed tables, IV poles and touch screens
  - Encourage removal of clutter which makes cleaning difficult
- Ensure dedicated non-critical, non-disposable items are cleaned and disinfected following the facility policies
  - Clean and contaminated equipment should be clearly identified

Nursing Intervention: Collaborate with Antibiotic Stewardship Team

- Review culture and sensitivity reports in real time
- Ensure patient is not on an antibiotic in which the cultured organism is resistant
- Support communication with pharmacy and physicians regarding results
Nursing Intervention: Communicate CDI Status When Transferring Within Facility

- Nursing has a key role in communicating CDI status for patients traveling within a facility
- Situation-Background-Assessment-Recommendation (SBAR), “ticket to ride”, transporter check list

Nursing Intervention: Enhance Communication Between Facilities

- Nursing has a key role in communicating CDI status for patients being transferred/discharged to other health care facilities
- Work with discharge planners and case management to communicate CDI onset, treatment, diarrhea status
- Provide nursing report/handoff including CDI history, date of onset, current/past treatment, diarrhea status
- Improve coordination to ensure patients with CDI continue appropriate treatment and that appropriate infection control precautions for CDI patients are maintained
Nursing Intervention: Participate in Local and Regional CDI Prevention Activities

Orange County CDI Prevention Collaborative Participant Facilities – June 2015
Summary

Nursing Actions and interventions are critical for the prevention of CDI, specifically

1. Early recognition of CDI signs and symptoms
2. Early initiation of contact precautions
3. Hand hygiene promotion/education and modeling behavior
4. Assist with environmental cleaning and disinfection
5. Collaborate with antibiotic stewardship team
6. Provide communication regarding a patient’s CDI status within the facility and when transferring/discharging

Questions?

Please contact: Teresa.Nelson@cdph.ca.gov

Thank you