Understanding and Preventing *Clostridium difficile*
What is *Clostridium difficile*?

- Anaerobic gram-positive, spore-forming rod bacterium
- A major cause of antibiotic-associated diarrhea
- Causes a range of symptoms, from asymptomatic colonization to life-threatening disease
- The elderly are at highest risk for morbidity and mortality from *C. difficile* infection
- Key prevention measures: hand hygiene and appropriate antibiotic use
Important Risk Factors

- **Antibiotic exposure is the major risk factor**
  - > 90% of health-care associated *C. difficile* infection occurs during or after recent antibiotic therapy
  - All antibiotics increase the risk of *C. difficile* infection
    - Clindamycin, cephalosporins, penicillins, and fluoroquinolones are most-often associated with *C. difficile* infection

- **Age > 65 years**

- **Nasogastic or gastostomy feeding tubes**

- **Anti-ulcer medications such as proton-pump inhibitors**
Development of Infection

- Usually a sequence of events cause *C. difficile* infection (the order is important)
  1. Systemic antibiotics disrupt normal bowel flora
  2. Exposure to *C. difficile* spores
  3. Presence of host susceptibility factors

- Up to 20% of patients with *C. difficile* infection suffer a recurrence
Transmission

- Spread through the fecal-oral route

- Environmental transmission is common
  - Contaminated hands of healthcare workers
  - Contaminated objects (commodes, telephones, thermometers)

- Environmental decontamination can be difficult since *C. difficile* produces spores, which are difficult to kill
  - Spores can survive for months on environmental surfaces because they are resistant to many commonly used disinfectants
Clinical Symptoms

- Watery diarrhea is the most common clinical symptom
  - Grossly bloody stools are uncommon

- Other symptoms: fever, lower abdominal pain, nausea, and anorexia

- WBC (>20,000), high fever, elevated creatinine, profuse diarrhea and abdominal pain may be signs of progressive or severe disease (e.g., sepsis, dehydration, peritonitis, paralytic ileus, toxic megacolon)
Colonization

- Colonization is more common than symptomatic infection
  - Most people who have *C. difficile* in their stool do not develop any symptoms

- Colonization should not be treated with antibiotics
  - Unnecessary antibiotic use can lead to antibiotic resistance, toxicity, and adverse drug reactions

- People without clinical symptoms should not be tested
  - Only loose or watery stools should be tested unless ileus is suspected
Treatment

- Stop the antibiotic if possible!
  - No other treatment may be needed in mild cases

- Metronidazole is recommended as first-line therapy for most cases of mild-to-moderate disease

- Provide fluid and electrolyte repletion as needed

- Do not give anti-peristaltics or opiates

- Monitor clinical status closely
Infection Prevention

- Use antibiotics only when clinically indicated

- Perform hand hygiene: healthcare worker’s hands are a major *C. difficile* transmission route
  - Use soap and water instead of alcohol-based hand rubs when caring for persons with *C. difficile* infection; *C. difficile* spores are not killed by alcohol

- Wear gloves or gown according to infection control policies

- Clean / disinfect the environment:
  - Use 1:10 bleach solution or EPA-registered cleaner/disinfectant
  - Do not share patient care items (e.g., rectal thermometers)
Conclusions

- *C. difficile* is a major cause of antibiotic-associated diarrhea.

- The elderly are at highest risk for morbidity and mortality from *C. difficile* infection.

- Key prevention measures include hand hygiene and judicious antibiotic use.