Objectives

- Describe the characteristics of Clostridium difficile (C. difficile) organism
- Discuss when to test for C. difficile
- Discuss strategies to prevent C. difficile infection

National Nursing Home Quality Care Collaborative Change Package

- Change Bundle: Prevention of C. difficile Infections in Nursing Homes
C. difficile – the organism

- First detected in 1935
- Identified in 1978 as primary cause of antibiotic associated diarrhea
- Toxin variant known as B1/NAP/027 emerged in 2002 which has an increased severity of disease
- Causes Clostridium difficile Infection (CDI) – infectious bacterial diarrhea

C. difficile – the organism

Spore forming bacillus – why is that important?
- Ability to form spores enables C. difficile to survive for longer than five months on contaminated surfaces in the healthcare environment
  - If prior room occupant had C. difficile, there is 2.5 increase in risk to next occupant
- Very small infectious dose needed to cause illness (five spores)
- Special products are needed for cleaning/disinfection

C. difficile colonization

Colonization: the presence, growth, and multiplication of the organism without observable clinical symptoms
- Other bacteria in the gut keep the C. difficile in check
**C. difficile colonization**

- Antibiotics or other agents kill large amounts of “normal biome” and allow *C. difficile* bacteria to take over
- “20-50 percent of nursing home residents are colonized at any point”

  Dr. John Haran, University of Massachusetts Medical School

**C. difficile – the organism**

- Produces toxins which cause diarrhea and colitis in susceptible patients whose normal colonic bacterial flora has been disrupted by prior antimicrobial treatment (usually quite recent)
- Clindamycin – chief culprit in past
- Third generation cephalosporins – have supplanted Clindamycin as highest risk
- Fluoroquinolones – emerging trend, associated with more severe strain of *C. difficile*

**...exposure to antibiotics**

- Residents remain at risk for developing CDI for at least two months after antibiotic treatment
- How are these residents monitored?

  75 percent of residents with Nursing Home (NH) onset CDI received antibiotics

  Hunter et al. Open Forum Infect Dis. 2016 18;3(1)
Occasionally, a person develops *C. difficile* without exposure to antibiotics – thought to be caused by disruption of gastrointestinal flora by another cause such as:

- Antacid therapy
- Proton pump inhibitors
- Chemotherapy
- Tube feedings

*C. difficile* – the organism

- Direct and Indirect transmission possible
  - Direct – person to person
  - Indirect – person to environment to person
    — medical equipment, bed railing, bathroom fixture etc.

*C. difficile* – the organism

- Transmission occurs via fecal-oral route
- Very small infectious dose needed (five spores)
- Incubation period is a median of only two to three days after ingestion
C. difficile classification

- Healthcare associated
  - Hospital, nursing home, assisted living (nosocomial), person resides in communal setting
- Community associated
  - Antibiotic prescribed in clinic, person resides in community
- Main risk factor for developing C. difficile is exposure to antibiotics

Risk factors for development of CDI

- Failure of immune defenses
- Use of antibiotics (longer antibiotic exposure carries higher risk) within last 30 days
- Older age: 65 and older
- Comorbidities – especially renal failure

Risk factors for development of CDI

- Weakened immune system
- Use of gastric acid suppressant medications such as Prevacid or Prilosec (increased risk 1.7 times)

British Journal of Pharmacology
Diagnostic Studies

• Testing should **only** be ordered on symptomatic residents
  - **At least three** unformed stools in a 24 hour period
    - Increase from baseline with no other identified cause
      (Resident not on laxative, tube feedings, chemotherapy, proton pump inhibitors, antacid therapy etc.)
  • Repeat testing following a negative test is not recommended, current testing is very sensitive

Diagnostic Studies

• *C. difficile* toxin is very unstable, the toxin degrades at room temperature and may be undetectable within two hours of collection of a stool specimen.
  • False negative test results can occur when specimens are not properly handled and promptly tested.
  • Follow your laboratory’s directions for collection and need for refrigeration.

Diagnostic Studies

• Does the laboratory reject formed stools sent for *C. difficile* testing?
  • Does the laboratory reject duplicate stools (e.g. within seven days) if negative?
**Diagnostic Studies**

- Do not perform “test of cure”
  - Presence of toxin (positive test) after successful treatment does not predict recurrence
  - Current testing is very sensitive
- Not recommended to test for relapse of diarrhea
  - Assume it is *C. difficile*
  - Consider Infectious Disease consult
    — May indicate need to change treatment

**Treatment**

- Discontinue any current antibiotics if possible.
- Metronidazole is typically initial drug of choice for mild to moderate disease
- Oral vancomycin is preferred for more severe disease or failure with metronidazole

**Treatment**

- Fidaxomicin may be used for those with recurrent infections for whom metronidazole and vancomycin have not worked
- Drugs to slow or stop diarrhea (loperamide) may worsen *C. difficile* disease and are not recommended
Prognosis

• After first treatment with metronidazole or vancomycin – recurrence occurs about 20 percent of time
• Recurrence increases to 40-60 percent with subsequent recurrences

Treatment

• Role of probiotics being given when resident is on antibiotics is unclear
  • Centers for Disease Control (CDC) states more study is needed
  • May be contraindicated if resident is severely immunocompromised
• Fecal transplant may be considered when resident has had multiple recurrences of CDI.
  • Replaces normal healthy colon flora that was wiped out by antibiotics

Polling question

Do you know your rate of facility onset CDI?

• Yes
• No
CDI Burden

- CDI affects 500,000 people in the United States each year
- One of the most common and costly healthcare-associated infections (HAIs)
  - CDI costs exceed 3 billion in extra healthcare costs annually (Average cost for an inpatient CDI greater than $35,000)
  - 92 percent of deaths from *C. difficile* occur among persons 65 years of age and older

APIC Guide to Preventing *Clostridium difficile* Infections

CDI Burden

- CDI by the numbers – US burden
  - 29,300 deaths within 30 days of diagnosis
  - Incidence is higher among females, whites and persons over 65 years of age
  - For individuals 65 and older, the mortality rate was 55 deaths/100,000 in 2011, seventeenth leading cause of death.

CDI Burden

- Not just hospital onset…
  - One-third to greater than one-half of health-care onset CDI cases begin in long term care.
  - Nursing home onset – 263,000 cases, 16,500 deaths annually (Elixhauser (AHRO) and Jhung CDC)
  - 80 percent of cases occurred within 30 days of hospital discharge
  - Eight percent died within 30 days of event
CDI Burden – Long Term Care (LTC) and Hospitals Share Patients and Infections

- 35 percent of CDI patients discharged from hospital will be admitted to NH
- 66 percent of NH residents who developed CDI after admission had been recently discharged from hospital
- 26 percent of NH residents with CDI are hospitalized

(Dr. Dumyati, Rochester Emerging Infection Program)

How do we stop the development and spread of *C. difficile*?

Multimodal – “bundle” approach

Infection Prevention

- C. difficile Control
- Environment
- Antibiotic Stewardship

Infection Prevention Measures – Hand Hygiene

Soap and water (S&W) is the preferred method for hand hygiene (HH) for increased gastrointestinal illness (GI) illness
- Remember neither S&W or alcohol based hand rub (ABHR) kill spores
  - It is the physical action, friction and rinsing, that makes S&W more effective
  - Performing HH correctly is important
- How does change to S&W affect hand hygiene compliance?
- What are your options in your facility?
5 moments of Hand Hygiene

Your 5 Moments for Hand Hygiene

1. Contact with patient
2. Contact with patient’s environment
3. Before food preparation
4. After patient contact
5. After caring for patient

Infection Prevention Measures – Hand Hygiene

- Monitoring process
  - Who does it?
  - How often?
- Feedback to staff
  - Immediate feedback when indicated
    - Non-verbal sign
  - Posting of facility wide data
- Efforts to improve compliance
  - Feedback, contests, etc.

Resident Hand Hygiene

Does resident understand need for HH to prevent transmission by fecal/oral route?
- Before meals
- After using restroom or bedside commode

Does resident need assistance with HH?
  - Do you monitor if assistance is given?
Polling question

My facility has a policy/process to place residents in Contact Isolation when they exhibit GI symptoms (loose stools above baseline)

• Yes
• No

Infection Prevention Measures – Contact Precautions

• Presumptive Contact Precautions for all residents with new diarrhea above baseline
• Private room vs. Cohorting if possible
  • Spatial separation / privacy curtain
  • Which resident uses commode?
  • Risk assessment, cohorting, who to move etc.
• Signage is posted
• Supplies are available in convenient locations
• Dedicated or disposable equipment

Infection Prevention Measures – Contact Precautions

Staff don gown and gloves for resident contact
• Put on gown and glove prior to room entry
• Remove gown and glove before exiting room
• If cohorting is needed, change gown and gloves and perform HH after caring for one resident and prior to providing care to next resident
Infection Prevention Measures – Contact Precautions

- Have adequate supplies readily available
- Change gloves immediately if visibly soiled and perform hand hygiene

Discontinue precautions once diarrhea resolves

Polling question

My facility monitors gown/glove use and gives feedback to staff?

- Yes
- No

Education

- Resident and family education can promote cooperation and compliance with Contact Precautions and Hand Hygiene.
- Consistency of staff practices
Polling question

My facility has educational materials that are given to residents and family when *C. difficile* is suspected/identified?


- Yes
- No

Infection Prevention Measures – Environmental Cleaning / Disinfection

- **Cleaning**: physical removal of visible contamination (organisms) on a surface and the step that should precede disinfection
- **Disinfection**: process used to kill or render pathogenic organisms inactive. An important factor in the disinfection process involves the time the disinfectant spends on the surface being disinfected (contact time).

  2-step process

  - Environmental Protection Agency (EPA) approved products which kill spores, such as bleach, to be used to clean surfaces and equipment that stays in room as well as any equipment moving in and out of room
  - K List: https://www.epa.gov/pesticide-registration/list-k-epas-registered-antimicrobial-products-effective-against-clostridium
Infection Prevention Measures – Environmental Cleaning / Disinfection – product

- Ensure that staff allow adequate contact time
- Right product **AND** right concentration
- If using wipes, instruct staff on how large an area can be disinfected with a single wipe e.g. Wipe is changed when unable to achieve appropriate wet contact times or visibly soiled

Infection Prevention Measures – Environmental Cleaning / Disinfection – equipment

- Frequency of cleaning/disinfecting high touch areas
  - Daily, discharge, or fixed intervals during stay?
  - Carts, bedrails, bedside table, stethoscope, thermometers, telephones, remote controls etc.
  - Manufacturer recommendations for agent used

Environmental Cleaning / Disinfection – equipment

- Clean and disinfect computers, key boards, phones, iPads, etc. (mobile/fixed) on regular schedule
- Handle linen as little as possible, bag for transport, hold away from body when carrying...
Environmental Cleaning / Disinfection – Room cleaning

- Clear expectations and written policies
- Thoroughness vs. “Trash and Dash”
- Family and visitors present – can interfere with process
- Items (clutter) can interfere with process

Infection Prevention Measures – Environmental Cleaning / Disinfection

- Dedicated resident equipment
- Clean all equipment as it is removed from room
- “Orphan” equipment – everyone thinks someone else cleans it
- Study assessing thoroughness of cleaning – 49 percent of surfaces cleaned

(Carling P. AJIC 2013;S20-S25)

Ambulation

If resident is cognitively able to follow instruction, diarrhea is contained and they clean their hands with soap and water, and don clean clothing, and assistive devices such as walkers have been cleaned/disinfected, can they leave room for activities, therapy, meals etc.?
Ambulation

• Balance between infection prevention and maximizing resident’s rehabilitation goals, promoting independence and preserving dignity
• Resident to participate in group activities when possible

APIC Guide to Preventing C. difficile Infections

When can Contact Precautions be Discontinued?

Again some variability
• No diarrhea for 48 hours
• Concern for room contamination, have all surfaces been cleaned with EPA approved products which kill spores (not vegetative form)?
• Terminal cleaning vs. emptying trash

Outbreak control

• Ability to ambulate outside of room
• Time frame for removal of Contact Isolation
• Frequency of cleaning/disinfection – resident room
• Frequency of cleaning/disinfection – public areas
Antibiotic Stewardship

- Antibiotics are most frequently prescribed medication in long term care (LTC)
- 70 percent of residents received one of more courses of systemic antibiotics each year
- 40-75 percent of antibiotics may be unnecessary or inappropriate
- Harms, including CDI, are significant for the frail and older residents

Role of Antibiotic Stewardship in prevention of *C. difficile*

- Prevent exposure to antibiotic
- When an antibiotic is indicated:
  - targeted antibiotic vs. broad spectrum
  - Minimize duration

Next Webinars

**What is an Antibiotic Stewardship Program?**
- August 15, 2017

**Antibiotic Stewardship – Where do I Start?**
- August 22, 2017

More information, including registration, can be found at: [https://www.lsqin.org/initiatives/nursing-home-quality/ls4/](https://www.lsqin.org/initiatives/nursing-home-quality/ls4/)
Progress

Among national acute care hospitals:

• Rates had been increasing (tripling since 2000)
• Eight percent decrease in *C. difficile* infections between 2011 and 2014
  • National and State Healthcare Associated Infections Progress Report CDC

Despite this progress, more work is needed to ensure our residents are safe.

Other Learning Opportunities

http://www.qioprogram.org/nursing-home-training-sessions

Preparation for August 15 webinar

Watch the five minute video:

**CDC Expert Commentary: The Core Elements of Antibiotic Stewardship for Nursing Homes.**
Resources

- Treating and Preventing *C. difficile* Infections
  - Agency for Healthcare Research and Quality
- *C. difficile* series - Nimalie Stone, MD, MS
  - Division of Healthcare Quality Promotion, National Center for Emerging and Zoonotic Infectious Diseases, CDC
- Clostridium difficile Infection
  - Association for Professionals in Infection Control (APIC)
  - text of Infection Control & Epidemiology
- Early Diagnosis, Prevention, and Treatment of Clostridium difficile: Update
  - Agency for Healthcare Research and Quality

Questions

Diane Dohm MT, IP, CIC
Nursing Home Project Specialist
ddohm@metastar.com
608-441-8263