What is C. diff?

- *Clostridium difficile* bacteria
- Many different types (strains)
- Pathogenic strains = capable of causing illness
- Non-pathogenic strains
- Found everywhere in the environment
- Colonizes 3-5% of adults without causing symptoms
Why is *C. diff* a problematic pathogen?

- Produces toxins
- Produces spores
- Naturally highly resistant to antibiotics
- Some strains have evolved additional antibiotic resistance
What are toxins?

- Chemicals produced by the bacteria that damage cells
- Toxins are produced by the living (vegetative) bacteria
- A
- B
- Binary (sometimes)
What are spores?

- Spores are like seeds
- Not really “alive”
- Have potential to grow into living bacteria (germinate)
- Spores are extremely resistant
  - Boiling, freezing, drying [5]
  - Stomach acid
  - Most common hospital-grade disinfectants
- *Clostridium* spores from Greenland ice cores from a depth of 834 m (4,000 years old) started to germinate within the first 5 min [4]
What are the two forms of C. diff?

- Vegetative
  - Living
  - Easy to kill

- Spore
  - Not really “alive”
  - Almost indestructible
  - Germinate and grow into vegetative C. diff
How bad can *C. diff* infection get?

- Asymptomatic colonization
- Mild to moderate diarrhea
- Pseudomemranous colitis
- Toxic dilation of the colon (megacolon)
- Sepsis
- Death

Colitis

Megacolon
What is the role of antibiotics?

- Most *Clostridium difficile* infections (CDI) are associated with antibiotic use.
- Antibiotics kill the normal gut bacteria, clearing the way for the resistant *C. diff* to flourish.
- Even a single dose of antibiotics increases the risk of CDI [2].
- People remain at increased risk for CDI for at least 3 months after they have stopped antibiotic treatment [2].
What are the other risk factors?

- Immunosuppressive therapy post-transplant
- Proton pump inhibitors
- Bowel disease and bowel surgery
- Chemotherapy
- Hospitalization
How is *C. diff* spread?

- Fecal oral route (ingestion of spores)
- Inadequate hand hygiene
- Inadequate environmental cleaning
- Sloppy handling of bedpans and commodes
- Direct or indirect contact with contaminated surfaces or objects
When should I suspect *C. diff*?

- **DIARRHEA**
- **Liquid stool**
  - Lab will only test liquid stool that takes the shape of the container
- 3 or more episodes of diarrhea within a 24h period
  - Unusual for the person, no known cause
- Other symptoms: fever, loss of appetite, nausea, and abdominal pain/tenderness
What are my immediate actions?

- Isolate resident
- Initiate contact precautions
- Obtain a sample
- Send sample to lab for analysis

- Every case of *C. diff* is top priority
- The spores are extremely persistent and you can’t give them a chance to accumulate in the environment (bioburden)
What are the additional interventions for CDI?

- Residents isolated while symptomatic
- Contact precautions
  - Signs
  - Gloves and gown
  - Direct care minimum (Any staff touching anything in the room)
- Gloves and gown removed in the room
  - Large garbage can with foot pedal (no-touch) [3]
- Dedicated toilet or commode
- If bedpans are used, they should be disposable
- Bedpan cleaning wands or toilet taps should not be used
- Dedicated equipment where possible
  - Sling for mechanical lift
- Soiled linen into no-touch receptacle at point of use [3]
What are the environmental cleaning requirements?

- Special SPORICIDAL cleaning products are essential
- Sporicides:
  - Sodium hypochlorite (bleach) solution at 5000 parts per million chlorine (10 min contact time)
  - Hydrogen peroxide enhanced action formulation at 4.5% concentration (10 min contact time)
- Fresh bucket and mop head for each CDI room
What are the environmental cleaning requirements?

- Twice daily cleaning and disinfection of the room and bathroom with a sporicide
- If a commode is used, twice daily cleaning with a sporicide
- Cleaning of shared equipment with a sporicide after every use
  - Mechanical lift
  - BP machine
- Items used to clean the bathroom must be disinfected before use in another room
- Dedicated toilet brush (discarded after)
What are the environmental cleaning requirements?

- Consider showers instead of baths
- Last bath of the day, then disinfect tub with sporicide
  - Standard tub disinfectants are not sporicidal
- Rooms should be cleaned last if possible
- Discharge = double clean
- Audit – Who is responsible for cleaning each item / surface?
How should I manage *C. diff* in a multi-bed room?

- One resident assigned to the toilet
- Physical separation
- Curtains drawn between beds at all times
- Dedicated toilet or commode for each individual with diarrhea
- Laundry hamper, PPE cart and garbage as close as possible
What about hand hygiene?

• Hands that are visibly soiled must be washed with soap and water
• Always use ABHR following the four moments of hand hygiene
• After removing gloves staff should use ABHR (unless a dedicated hand hygiene sink is available)
• When caring for a resident with CDI, also wash with soap and water periodically throughout the day
  – Alcohol does not kill C. diff spores
• Staff and visitors should not use resident sinks for hand hygiene
• Educate the resident on the importance of hand washing
  – Help the resident wash their hands if necessary
When do I discontinue Contact Precautions?

- For lab confirmed CDI:
  - After a MINIMUM of 48 hours of “normal” stools, by the ICP
  - Contact Precautions are not discontinued until the room and bathroom have been terminally cleaned
  - We do not re-test stool (no test for cure)
- For suspected CDI:
  - Consult with ICP
  - 2 negative EIA toxin test or 1 negative molecular (PCR) test
- Relapse
  - Relapse of CDI is common
  - 30%
What is the role of education?

- Education is a key component in C. diff management
- Educate the resident, visitors, and staff
- Resident
  - Hand hygiene
  - PIDAC Annex C: Sample Patient Information
- Visitors
  - Hand hygiene
  - PPE (same as staff)
  - Not eating or drinking in resident's room
  - Not visiting other residents
  - Not using the resident’s bathroom
When do I have an outbreak?

- Every case of *C. diff* is top priority
- Legally required to report outbreaks
- If you have more than one case of CDI at a time, please call Public Health to discuss IPAC measures
- Multiple cases of CDI on a unit = additional cleaning requirements
References


Photo References

- http://www.examiner.com/slideshow/c-diff#slide=6
- http://upload.wikimedia.org/wikipedia/commons/thumb/2/29/C_Diff_ToxB_2BVM.png/618px-C_Diff_ToxB_2BVM.png
Questions?