Proud to be a NURSE ANTIBIOTIC STEWARD

Clostridioides difficile 101
For Nurses

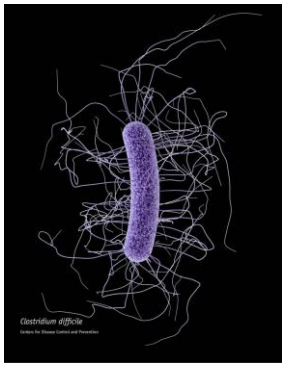
Department of Antimicrobial Stewardship
The Johns Hopkins Hospital
Johns Hopkins University School of Medicine

Valeria Fabre, MD
Sara E. Cosgrove MD, MS

JOHNS HOPKINS MEDICINE

Proud to be a NURSE ANTIBIOTIC STEWARD

Clostridioides difficile



- A bacteria that lives in the gut with a spore form and a vegetative form
- Fecal-oral transmission
- Spores are hardy and survive in the hospital environment
- Colonic infection results when the spore form vegetates and the resulting bacteria produce toxins that lead to inflammation

JOHNS HOPKINS MEDICINE

Crobach M et al. Clinical Microbiology Reviews Mar 2018, 31 (2) e00021-17

Proud to be a NURSE ANTIBIOTIC STEWARD

C. difficile Infection

- Clinical presentation:
  - Mild diarrhea, may resolve with stopping antibiotic
  - Diarrhea with abdominal cramps and fever
  - Above presentation that continues to ileus or toxic megacolon
- For the purpose of treatment:
  - Non-severe: white blood cell count ≤15000 cells/mL and serum creatinine level <1.5 mg/dL
  - Severe: white blood cell count of ≥15000 cells/mL or a serum creatinine level >1.5 mg/dL
  - Fulminant: Hypotension or shock, ileus, toxic megacolon

- McDonald, C. L. et al. 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*, Volume 66, Issue 7, 1 April 2018, Pages e1–e48
- Lindsay M. Daniels & Wesley D. Kufel (2018) Clinical review of *Clostridium difficile* infection: an update on treatment and prevention, Expert Opinion on Pharmacotherapy, 19:16, 1759-1769

JOHNS HOPKINS MEDICINE

C. difficile Colonization

- Patients can be colonized with *C. difficile* without active infection (e.g., no diarrhea)
  - Infants
  - Up to 15% of healthy adults
  - ~30% of patients at hospital admission
  - Up to 45% of long-term care residents
- Risk factors:
  - Chronic dialysis
  - Recent hospitalization
  - Immunosuppression
  - Gastric acid suppressants
  - Antibiotic use
- May persist for several months

Crobach M et al. Clinical Microbiology Reviews Mar 2018, 31 (2)

Recommendations for *C. difficile* Testing

- Patients with 3 or more unexplained and new onset unformed stools in 24 hours
  - Most patients with *C. difficile* diarrhea have persistent and frequent diarrheal episodes
  - Rarely, patients can develop very severe colitis that leads to ileus; these patients will not have diarrhea but will have systemic illness and abdominal pain and distension

McDonald, C. L. et al. 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*, Volume 66, Issue 7, 1 April 2018

Proud to be a NURSE ANTIBIOTIC STEWARD

Recommendations for *C. difficile* Testing

- Other causes of loose stools in hospitalized patients
  - Laxatives
  - Enteral tube feeding
  - Chemotherapy
  - Immunosuppressants: mycophenolate, sirolimus, tacrolimus, methotrexate
  - Chronic bowel disease: inflammatory bowel disease, celiac disease, pancreatic insufficiency

- It is estimated that only 30% of hospitalized patients with antibiotic-associated diarrhea will have CDI

- McDonald, C. L. et al. 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*, Volume 66, Issue 7, 1 April 2018
- Krones E. and Hogenauer C. Diarrhea inthe Immunocompromised Patient. Gastroenterol Clin N Am 41 (2012) 677–701

JOHNS HOPKINS MEDICINE

Proud to be a NURSE ANTIBIOTIC STEWARD

Stool Color/Odor are not Correlated with *C. difficile* Infection

- Green discoloration of stool is not associated with *C. difficile* infection (CDI)
  - 84 stool samples included, 4 from CDI cases
  - Samples were imaged and a color score was given
  - Green/greenish color was more common in control cases

- Smell of stool is not correlated with CDI
  - 18 nurses sniffed 10 stool samples (5 positive and 5 negative for *C. difficile)*
    - ~50% of nurses had >10 years of work experience
    - 61% felt confident in their the ability to detect *C. difficile* based on odor
  - No one performed better than chance

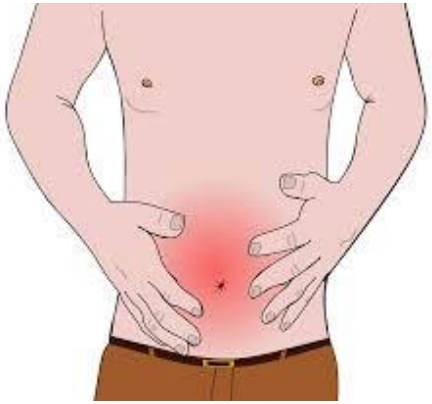
JOHNS HOPKINS MEDICINE

- Rao K, et al. The nose knows not: poor predictive value of stool sample odor for detection of Clostridium difficile. *Clin Infect Dis*. 2013;56(4):615–616.
- Sugimoto H, et al. Assessment of stool color in Clostridioides difficile infection: A pilot study. Infection Control & Hospital Epidemiology, (2019) 40: 832–833

Proud to be a NURSE ANTIBIOTIC STEWARD

Risk Factors for *C. difficile* Infection

- Antibiotics (active or recent exposure)
  - Clindamycin
  - Fluoroquinolones
  - Ampicillin or Amoxicillin
  - Cephalosporins
- Host factors (e.g., age, immunosuppression)
- Duration of hospitalization
- Chemotherapy



JOHNS HOPKINS MEDICINE

Clinical vignette

A 65 yo woman is admitted to the hospital with acute cholecystitis. She undergoes cholecystectomy. On post-operative day 3 she develops 3 lose stools. Abdominal exam is unremarkable except for mild tenderness over the incision site. She is afebrile. Her white count is mildly elevated but unchanged from admission. *What is the correct next step?:*

a) Test for *C. difficile* right away
b) Call a colleague to inspect the stool with you, then decide
c) Stop laxatives and re-evaluate need for further work up in 72 hours

Proud to be a NURSE ANTIBIOTIC STEWARD

Tips to Avoid Inappropriate *C. difficile* Testing

1. Don't test patients for *C. difficile* if they had < 3 unformed stools in the past day
2. Don't test patients who received laxatives within the past 48 hours (stop laxatives and monitor)
3. Don't test patients in whom diarrhea has an alternative explanation (e.g., laxatives, tube feedings) in the absence of evidence of disease (persistent diarrhea, abdominal pain, leukocytosis, fever)
4. Don't retest within 7 days
5. Don't test for cure
6. Don't test based on smell or color of stool

JOHNS HOPKINS MEDICINE