C. difficile prevention and the SPARC Collaborative

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SPARC: The Basics

• Statewide Prevention and Reduction of *C. difficile* (SPARC)
• What: A statewide collaborative quality improvement project among public health, academics, and acute care hospitals working together to prevent and reduce *C. difficile* infections (CDI)

• Who:
  1) Maryland Department of Health (MDH)
  2) Johns Hopkins Hospital
  3) University of Maryland Medical System (UMMS)
  4) Maryland acute care hospitals
  5) NORC at the University of Chicago – collaborative implementation contractor
SPARC Collaborative Process

• Obtain hospital commitment to participate
• Identify key hospital stakeholders and leaders
• Complete pre-site visit gap assessment to identify strengths and opportunities for improvement
• Perform site visit with focus on information collected in gap assessment
  1. Environmental cleaning
  2. Diagnostic stewardship for common (non-CDI) infections
  3. Antibiotic stewardship
  4. CDI diagnostic stewardship
  5. Contact precautions and isolation
• Tailored interventions based on gap assessment and site visit findings
  • Might include recommended changes to EHR
• Data collection and analysis
• Webinars, office hours, collaborative meeting(s)

“5 Domains”
Diagnostic Stewardship

- Will the test result change how the patient is managed?
- How common is the disease in the population?
  - Positive predictive value
  - Negative predictive value
- What are the odds and consequences of a false positive?
- What are the odds and risks of a missed diagnosis?
C. difficile colonization

- May represent a non-toxigenic strain
- Some toxigenic strains may also cause asymptomatic colonization
- Unclear clinical and infection control implication
- Colonization rates are very high
  - 18-90% of infants under 1 are positive for C. difficile
  - 0-15% of healthy adults
  - 4-29% of hospitalized patients
  - 0-50% nursing home residents
C. difficile diagnostic stewardship

- PCR/NAAT testing for C. difficile is very sensitive (94-99%)
  - Repeat testing after a negative test is unnecessary
- PCR also may detect non-toxigenic strains/ colonized patients
  - Use of a toxin EIA as a confirmatory test for PCR positives
- Many things can cause diarrhea
  - Only test people who have diarrhea without other causes
- People without diarrhea may still test positive
  - Only test patients with diarrhea
When to order a *C. difficile* test?

- New onset of diarrhea
  - 3 or more liquid stools in a 24 hour period *WITHOUT* other causes or:
  - Increase in stool production over baseline (in patients with chronic diarrhea/colostomy)

- Other causes may include:
  - Laxative use
  - Tube feed
  - Chronic conditions
  - Other GI pathogens
Bristol Stool Chart: Only test the 7s

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Separate hard lumps</td>
<td>SEVERE CONSTIPATION</td>
</tr>
<tr>
<td>2</td>
<td>Lumpy and sausage like</td>
<td>MILD CONSTIPATION</td>
</tr>
<tr>
<td>3</td>
<td>A sausage shape with cracks in the surface</td>
<td>NORMAL</td>
</tr>
<tr>
<td>4</td>
<td>Like a smooth, soft sausage or snake</td>
<td>NORMAL</td>
</tr>
<tr>
<td>5</td>
<td>Soft blobs with clear-cut edges</td>
<td>LACKING FIBRE</td>
</tr>
<tr>
<td>6</td>
<td>Mushy consistency with ragged edges</td>
<td>MILD DIARRHEA</td>
</tr>
<tr>
<td>7</td>
<td>Liquid consistency with no solid pieces</td>
<td>SEVERE DIARRHEA</td>
</tr>
</tbody>
</table>
Strategies for Stewardship

- Laboratory rejection criteria
  - Lab will not test solid stool
  - Lab rejects multiple stools for the same patient within given time frame
- Built in tools in the electronic health record
  - Hard stop or best practices alert when ordering a C. difficile test
- Education and front line champions
  - Ensure that team ordering tests understands the criteria for C difficile infection versus colonization
  - Emphasize risks of inappropriate treatment
Risks of over-treatment

- Causes more *C. difficile* disease
  - Oral vancomycin or metronidazole can precipitate a *C. difficile* diarrheal illness
- Pressure for drug resistant bacteria in the gut
- Risks of adverse drug reactions to antibiotics
- Increased resources for patient isolation and contact precautions
- (not to mention that it makes your rates look high)
References


Antibiotic Stewardship - the Basics

Medicaid- and Medicaid-certified nursing homes must have an antibiotic stewardship program that includes antibiotic-use protocols and a system to monitor antibiotic use.

Stepping stones to compliance:
1. Seek out expertise
2. Focus on teamwork
3. Assess
4. Multidisciplinary task-force
5. Improve monitoring
Why Stewardship?

**CLOSTRIDIUM DIFFICILE INFECTION**

- **C. difficile contains endospores that can survive the acidity of the stomach and reach the large intestine.**
- **C. difficile flourishes within the colon.**
- **Toxins A & B cause mucosal damage.**
- **Pseudomembranous colitis:** Yellowish plaques form over damaged epithelium.

**Fever, crampy abdominal pain, diarrhea**

Most common infectious cause of nosocomial diarrhea.

The normal gut flora is altered by broad-spectrum antibiotics, most notably clindamycin, cephalosporins, ampicillin, amoxicillin, and fluoroquinolones.
Why Stewardship?

40-75% of antibiotics prescribed in nursing homes may be unnecessary or inappropriate.

**2003-2005**
- Fluoroquinolone use down 54%.
- C. diff infections down from 7.2 per 1000 to 3 per 1000.

**2005-2006**
- Antibiotic use down 54%.
- C. diff down 60%.

Stewardship Works!

1. Implement the 7 Core elements of Antibiotic Stewardship for LTC

https://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html

**Leadership commitment**
Demonstrate support and commitment to safe and appropriate antibiotic use in your facility

**Accountability**
Identify physician, nursing and pharmacy leads responsible for promoting and overseeing antibiotic stewardship activities in your facility

**Drug expertise**
Establish access to consultant pharmacists or other individuals with experience or training in antibiotic stewardship for your facility

**Action**
Implement at least one policy or practice to improve antibiotic use

**Tracking**
Monitor at least one process measure of antibiotic use and at least one outcome from antibiotic use in your facility

**Reporting**
Provide regular feedback on antibiotic use and resistance to prescribing clinicians, nursing staff and other relevant staff

**Education**
Provide resources to clinicians, nursing staff, residents and families about antibiotic resistance and opportunities for improving antibiotic use

MARYLAND Department of Health
## Getting practical

2. Assess the use of antibiotics that pose the highest risk for CDI

### Evaluate antibiotic treatment for common infections

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Name</td>
<td>Room #</td>
<td>Source</td>
<td>Organism</td>
<td>Cx Date</td>
<td>Date of sx onset</td>
<td>ABX</td>
<td>ABX Start Date</td>
<td>Urinary Catheter?</td>
<td>Catheter Placement Date</td>
<td>Catheter Placement Location</td>
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<tr>
<td>2</td>
<td>Joe Schmo</td>
<td>1</td>
<td>Urine</td>
<td>e. coli</td>
<td>11/19/2018</td>
<td>11/19/2018</td>
<td>Yes</td>
<td>Cipro</td>
<td>11/19/2018</td>
<td>Yes</td>
<td>11/15/2018</td>
<td>Onsite</td>
</tr>
<tr>
<td>4</td>
<td>Fanny Mae</td>
<td>29</td>
<td>Urine</td>
<td>e. faecalis</td>
<td>12/31/2018</td>
<td>12/31/2018</td>
<td>No</td>
<td>Gentamicin</td>
<td>12/31/2018</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7</td>
<td>Charles Run</td>
<td>23</td>
<td>Urine</td>
<td>e. faecalis</td>
<td>1/20/2019</td>
<td>1/19/2019</td>
<td>Yes</td>
<td>Macrobid</td>
<td>1/20/2019</td>
<td>Yes</td>
<td>1/15/2019</td>
<td>Onsite</td>
</tr>
</tbody>
</table>

What does this line list tell us about antibiotic treatment for UTIs
3. Develop and implement facility-specific treatment recommendations

- Include first and second line antibiotics in treatment recommendations.
- Use Facility or Regional antibiograms to help prescribers select the most appropriate therapy.

Maryland Regional Antibiogram
Getting practical

4. Use an SBAR to improve communication of suspected infections

Require nurses to complete an SBAR before contacting providers.

AHRQs Suspected UTI SBAR Toolkit
Overcoming the Opposition

- EDUCATE
  - Gain leadership support
  - Appoint multi-disciplinary front-line stewardship champions
  - Change the culture
  - Use a systems approach
  - Give them an antibiogram
  - Implement multi-disciplinary developed facility policies

“This is how I’ve always done it”

“But mom needs an antibiotic”

“This antibiotic has always worked for me”
References


