Clostridium difficile: What have we learned?

Emily Nelson, Nursing Home Project Specialist
Diane Dohm MT, IP, CIC Project Specialist

WI HAI’s In LTC 2017 Spring Conference
May 18, 2017

Objectives

• Discuss the burden of *C difficile* Infection (CDI) occurring in Wisconsin Long Term Care (LTC) facility participating in the initiative
• Review prevention measures to reduce the transmission of *C difficile*
• Review the core elements of Antibiotic Stewardship related to reduction of CDI
C. difficile – the organism

C. difficile

• First detected in 1935
• Identified in 1978 as primary cause of antibiotic associated diarrhea and pseudomembranous colitis in patients treated with antibiotics
  • Inflammatory condition of the colon that develops in response to the toxins produced by the organism
• Toxin variant known as B1/NAP/027 emerged in 2002, increased severity of disease
C. difficile (Transmission)

Spore forming bacillus
- Ability to form spores enables *C. difficile* to survive for > five months on contaminated surfaces in the healthcare environment
- Direct and Indirect transmission possibility
- Very small infectious dose (five spores)
- Transmission occurs via fecal-oral route
- Incubation period is a median of only two to three days after ingestion

C. difficile (Latrogenic)

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

Residents remain at risk for developing CDI for at least two months after antibiotic treatment
C. difficile

- Role of probiotics – needs more study, no recommendations (CDC, APIC, SHEA)
  - No harm?
  - Fungemia secondary to use of the probiotic in severely immunocompromised
    

- Surveillance
  - Include admissions on treatment for C. difficile on worksheet

Diagnostic Studies

- Testing should only be ordered on symptomatic residents
  - At least three unformed stools in a 24 hour period
  - Increase from baseline, 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

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

CDI Burden

- 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
- *C. difficile* has replaced Methicillin Resistant Staph Aureus (MRSA) as the most common HAI
- 92 percent of deaths from *C. difficile* occur among persons 65 years of age and older
CDI Burden

CDI by the numbers – US burden

- 453,000 cases
- Not just hospital onset….
- Over half of the 15,000 cases of CDI in Illinois hospitals reported to NHSN in 2015 were community onset (Illinois Department of Public Health)
- Nursing home onset – 263,000 cases, 16,500 deaths annually (Elixhauser (AHRQ) and Jhung CDC)
CDI Burden – LTC and Hospitals Share Patients and Infections

- 35 percent of CDI patients discharged to NH
- 66 percent of NH residents who developed CDI were recently discharged from hospital
- 26 percent of NH residents with CDI hospitalized

(Dr. Dumyati, Rochester Emerging Infection Program)

Hospitals ↔ Nursing Homes

How do we work together?
- Communication
- Inter-facility Infection Control Transfer Form
- [https://www.cdc.gov/hai/pdfs/toolkits/InfectionControlTransferFormExample1.pdf](https://www.cdc.gov/hai/pdfs/toolkits/InfectionControlTransferFormExample1.pdf)
C difficile – What is the Burden in Wisconsin LTC facilities? Currently no National Baseline

LS-QIN/MetaStar Nursing Home C difficile Initiative

Participants in the initiative are submitting data to CDC via National Healthcare Safety Network (NHSN)

65 Wisconsin LTC facilities are actively participating and have entered data including resident days, number of admissions, number of admissions on treatment for C. difficile at time of admission and number of positive tests (events) on residents
Creation of National Baseline for Long Term Care Facilities

- Wisconsin data will be combined with data from LTC facilities reporting across the nation to determine a national baseline for comparison
- This baseline will likely not be released until early 2019
- What is the preliminary data from participating Wisconsin LTC facilities showing?

Preliminary Wisconsin Data

***Limitations: Small sample size, 6 month time frame, data is self reported and not validated.
- 65 facilities reported data
- October 2016 – March 2017
- Average number beds: 92 (range 28-210)
- Average number admissions/month: 1049
- Average number of those admissions being treated for CDI at time of admission: 2 percent
Preliminary Wisconsin Data
October 2016 – March 2017

- Total Resident days: 644,013
- Number of positive tests (events): 43
- Rate of infection per 10,000 resident days
  - 0.67 per 10,000 resident days
- What does this mean?
- Baseline allows facility to measure progress over time and compare to group average
- No national comparison yet

Comparison to Hospital Data

Nationally: The reported incidence of *C. difficile* colitis among hospitalized inpatients ranges from 3.8 to 9.5 cases per 10,000 patient days.

*Cleveland Clinic Disease Management, February 2013*

Wisconsin (preliminary data provided by Wisconsin Department of Health Services)

- 2015 inpatient CDI incidence rate (Hospital onset) 7.59 per 10,000 patient days
- 2016 inpatient CDI incidence rate: 7.36 per 10,000 patient days
Preliminary Wisconsin Data –
Current Status of Antibiotic Stewardship Practices

- Facilities have antibiotic “time out” in place: 42 percent
- Facilities receive antibiogram from the laboratory that performs cultures/susceptibility testing: 46 percent
- Facilities have policy in place that requires indication for antibiotic when ordered: 63 percent
- Facilities have provided education to clinicians and staff: 78 percent
- Facilities have access to individuals with expertise in antibiotic stewardship: 74 percent

Status of Antibiotic Stewardship in Participating Nursing Homes

- Facility has written statement of support from leadership: 59 percent
- Facilities had stewardship leader: 88 percent
  - Ideally not just IP: 12 percent
- Antibiotic use and resistance data is reviewed by leadership in quality assurance/performance improvement committee meetings: 90 percent
- Antibiotic usage information is given to providers: 63 percent
Status of Antibiotic Stewardship in Participating Nursing Homes

How does this compare to your facility?

First “snapshot” of Wisconsin data for LTC!

Please remember:

***Limitations: Small sample size, 6 month time frame, data is self reported and not validated

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

- Infection Prevention
- C difficile Control
- Environment
- Antibiotic Stewardship
Infection Prevention & Environmental Measures to Reduce the Transmission of *C. difficile*

Infection Prevention Measures – Hand Hygiene

Is soap and water (S&W) the preferred method for hand hygiene (HH)?
- 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
- How does change to S&W affect HH compliance?
- What are your options in your facility?
Infection Prevention Measures – Hand Hygiene

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

Infection Prevention Measures – Contact Precautions

- Presumptive Contact Precautions for all residents with new diarrhea
- Private room vs. Cohorting if necessary
  - Spatial separation / privacy curtain
  - Which resident uses commode?
  - Risk assessment, cohorting, who to move etc.
- Signage is posted
- Dedicated or disposable equipment
Infection Prevention Measures – Contact Precautions

Staff don gown and gloves for resident cares
  • 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
  • Have adequate supplies readily available
  • Change gloves immediately if visibly soiled

Monitoring & Feedback of gown/glove use to staff?

Education

• Resident and family education can promote cooperation and compliance with Contact Precautions and Hand Hygiene.
• Consistency of staff practices
• [https://www.dhs.wisconsin.gov/hai/10-33attach.pdf](https://www.dhs.wisconsin.gov/hai/10-33attach.pdf)
Infection Prevention Measures – 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 insert. An important factor in the disinfection process involves the time the disinfectant spends on the surface being disinfected (contact time).

2-step process

Infection Prevention Measures – Cleaning / Disinfection

- Environmental Protection Agency (EPA) approved products which kill spores, such as bleach, is 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](https://www.epa.gov/pesticide-registration/list-k-epas-registered-antimicrobial-products-effective-against-clostridium)
- Ensure that staff allow adequate contact time
- If using wipes, instruct staff on how large an area can be disinfected with a single wipe
Infection Prevention Measures – Cleaning / Disinfection

- Frequency of cleaning/disinfecting high touch areas
  - Carts, bedrails, bedside table, stethoscope, thermometers, telephones, remote controls etc.
- Are computers and keyboards (mobile/fixed) cleaned/disinfected on regular schedule? Phones, iPad
- Handle linen as little as possible, bag for transport

- Equipment going from resident to resident
- “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.?

- Balance between infection prevention and maximizing residents rehabilitation goals, promoting independence and preserving dignity
- Resident to participate in group activities when possible

APIC Guide to Preventing Clostridium 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
Changes during Outbreak?

- 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

- Most frequently prescribed medication in LTC
- 70 percent of residents received one or 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

Antibiotic Stewardship

Antibiotic Stewardship

- Antibiotic Stewardship refers to a set of commitments and activities designed to “optimize the treatment of infections while reducing the adverse events associated with antibiotic use”

CDC Core Elements of Antibiotic Stewardship for Nursing Homes

- Implementation of Antibiotic Stewardship is a long-term commitment to a process consisting of many steps.

CDC Seven Core elements of Antibiotic Stewardship in LTC

1. Leadership commitment
2. Accountability through identification of leaders responsible for promoting and overseeing stewardship
3. Expertise in antibiotic use and stewardship available to providers in facility
4. Action to implement recommended policies such as antibiotic “time-out” *
CDC Seven Core elements of Antibiotic Stewardship in LTC

5. Tracking measures of antibiotic use *
6. Reporting data on antibiotic prescribing *
7. Education for clinicians, nursing staff, residents and families about antibiotic resistance and opportunities for improving use. *

*First steps – any size facility

Leadership Commitment

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

- Written statement
- Share with staff, residents and families
- Include stewardship related duties in job description for medical director, clinical nurse lead(s) and consultant pharmacists.
- Does leadership support efforts when providers push back?
Leadership Commitment

- Communicate the facility’s expectations about use of antibiotics and the monitoring and enforcement of stewardship policies with providers and nursing staff
- Create a culture which promotes antibiotic stewardship through messaging, education and celebrating improvement

Accountability

Identify lead(s) responsible for promoting and overseeing antibiotic stewardship activities in your facility
- Team approach
- May include provider champion, pharmacy support, administration, Infection Prevention and Control, front line nursing staff etc.
- Should not just be responsibility of Infection Control
Accountability

Medical Director
- Empowered to set standards for antibiotic prescribing practices for all clinical providers credentialed to deliver care in the facility and is accountable to oversee adherence to policy
- Should review antibiotic use data and ensure best practices are followed
- **Expectations included in contract**

Director of Nursing
- Sets standards for assessing, monitoring and communicating changes in residents’ condition

Nurses and Nurse aids
- Play key role in the decision-making process for starting an antibiotic (provide standard scripting to follow when alerting provider of change in resident condition)

Pharmacy
- provides medication regimen review and reports antibiotic use data to all stakeholders
Accountability

Infection Prevention & Control Officer
• Has key expertise and data to improve antibiotic use when they have training, dedicated time and resources to collect and analyze data to support antibiotic stewardship.

Laboratory
• Provides antibiogram (summary of antibiotic susceptibility patterns from organisms isolated in cultures) and alerts facility if certain multi-drug resistant organisms (MDRO) are identified.

Drug Expertise

Establish access to in-house or consultant pharmacists or other individual with experience or training in antibiotic stewardship for your facility.
• If you contract pharmacy services, make it part of the contract
• Partner with antibiotic stewardship leads at referring hospitals.
• Develop relationships with infectious disease consultants
**Action – One Step at a Time**

Implement at least one policy or practice to improve antibiotic use, once that practice is in place, implement another

- Antibiotic time-out
- Requiring providers to document reason for antibiotic order when placing order
- Tracking antibiotic starts in your facility
- Appendix A – Core elements of Antibiotic Stewardship for Nursing Homes

**Tracking**

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

- Process measure: tracking how and why antibiotics are prescribed
- Outcome measure: tracking the adverse outcomes (CDI rates)
- Appendix B – Core elements of Antibiotic Stewardship for Nursing Homes
Reporting

Provide consistent feedback on antibiotic use and resistance to prescribing clinicians, nursing staff and other relevant staff such as pharmacy etc.

- Maintains awareness
- Acceptance of feedback may help change prescribing behavior

Education

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

- Flyers, pocket guides, newsletters, emails
- Interactive, face to face workshops has the strongest evidence for improving medication prescribing practices
- Working with residents and their families will reduce their requests for inappropriate antibiotics
Education


Antibiotic Stewardship

- Timely and appropriate initiation of Antibiotics
- Appropriate administration and de-escalation
- Data monitoring, feedback
  - Utilization
  - Antibiogram: know your Resistance
  - CDI rates
Challenges to Implementing Antibiotic Stewardship

• Limited on-site physician or pharmacist presence
  • Decisions are often made over the phone based on the assessments communicated by front-line staff
  • Communication must be concise and should include option of “watchful waiting”; continued monitoring is not “doing nothing”
  • Scripting for staff for consistency

Challenges to implementing Antibiotic Stewardship

• Delays in obtaining labs, radiologic testing and microbiology results
  • Emphasis on symptoms, vitals, change from resident’s baseline
  • Resident and Family expectations for antibiotics to be given
    • Initial and annual (?) education on dangers associated with unnecessary antibiotics
Challenges to implementing Antibiotic Stewardship

Changing prescribing antibiotics from a “just in case” attitude to “only when needed” mind set

• Resistance
• Lack of new antibiotics

Also changing mind set to “shorter courses” of antibiotics

Philip Stone, McKnight's Long Term Care News

Where do I start?

Most important thing is to start!
What step(s) can you start today?

• Track antibiotic use and resistance (antibiogram)
• Provide that data to providers, leadership, staff
• Provide education to providers and nursing staff
• Provide education to residents and families
Next Steps

- Engage leadership
- Initiate antibiotic “time out”
- Require indication for antibiotic when ordering
- Work with your partners
- Build relationships

How can I use QAPI Reduce C. difficile Infections?

**QAPI Elements**

1. Design and Scope
2. Governance and Leadership
3. Feedback, Data Analysis and Monitoring
4. Performance Improvement Projects (PIP)
5. Systematic Analysis and Systemic Action
What is QAPI?
Quality Assurance vs. Performance Improvement

Elements of QAPI: Design and Scope

- Ongoing and comprehensive
- All departments
- Always include: clinical care, quality of life and resident choice
- Emphasis on autonomy and choice in daily life
Elements of QAPI: Governance and Leadership

- Governing body involves input from residents, all staff, and resident representatives
- Ensures resources exist to support QAPI efforts
- QAPI is a priority
- Set expectations regarding safety, rights, respect, and quality
- Create atmosphere where staff are accountable as well as comfortable to report opportunities for improvement

https://www.lsqin.org/
Elements of QAPI: Feedback, Data Systems, and Monitoring

- Systems to monitor
- Draw data from multiple sources
- Actively incorporate input from staff, residents, and family
- Adverse event tracking
- Quality measures for benchmarking

Elements of QAPI: Performance Improvement Projects (PIPs)

- Concentrated effort on a particular concern area
  - Includes:
    - Gathering information
    - Intervening for improvement
    - Topic of PIPs varies
    - New Regulation requires at least one PIP per year (Phase 3, November 28, 2019)
Elements of QAPI: Systematic Analysis and Systemic Action

- Use of a systematic approach to fully understand the problem, its causes, and implications for change
  - Gather input from various sources
  - Root Cause Analysis
  - Looks at comprehensively across all systems to promote sustainment
  - Focus on continuous learning and continuous improvement

PIP: C difficile Reduction at Care Center ABC

- Diane, Facility Infection Prevention and Control Officer noted increase in facility onset C. difficile Infections (CDI) in April, 2017
- The rate of CDI had increased by 50 percent, per their data collected and entered into NHSN
PIP: C difficile Reduction at Care Center ABC

- IPCO, Diane, informed the medical director, NHA, and Director of Nursing
  - She proposed that this increase should be investigated as soon as possible
  - Diane set up a meeting with all department heads, the Medical Director, DON, some CNAs, three nurses and NHA to discuss the current state
  - Completed investigation in potential causes and agreed to two highly probable causes
  - Agreement to initiate a PIP
Completed a Fish Bone Diagram

PIP: C difficile Reduction at Care Center ABC

- PIP Meeting #1
  - April 1, 2017
- Team Composition
  - Diane, Infection Prevention & Control Officer
  - Sarah, Certified Nursing Assistant
  - Howie, Environmental Services
  - Dr. Brown, Medical Director
  - Marion, Resident on East Wing
PIP Guide

Benefits:
- One document to use during course of project
- Keeps notes and thoughts organized
- QAPI Tools:
  - SMART Goal: Specific-Measurable-Attainable-Relevant-Time Bound Goals
  - Root Cause Analysis (RCA)
  - Plan-Do-Study-Act (PDSA)
- [https://www.lsqin.org/initiatives/nursing-home-quality/essentials/](https://www.lsqin.org/initiatives/nursing-home-quality/essentials/)
Set a SMART Goal and “publicize” it

**SMART GOAL**

**Specific** Measurable **Attainable** **Relevant** **Time-Bound**

Care Center ABC will reduce the rate of facility onset *C. difficile* Infections from 10 percent to five percent by October 1, 2017.
PIP: C difficile Reduction at Care Center ABC

Strategy #1: Hand Hygiene Monitoring via iScrub App

• First, all employee education provided regarding hand hygiene
• Next iScrub App set up, equipment (one iPad), and training for pilot

iScrub App

• Free app to monitor hand hygiene for iPhone/iPad
• Can designate different locations, floors, halls, etc.
• Can record different job classes, physician, RN, MA, etc.
• Download data at the end of designated period (month)
iScrub App

- https://compepi.cs.uiowa.edu/iscrub/
- iScrub 1.5 Lite is a free hand hygiene application for the Apple iPhone/iPod Touch. You may download the app directly from the iTunes app store via your device or by clicking here and installing through iTunes.

iScrub App Main Menu
Locations

Staff Type
Strategy #1: Additional Data Source
General Observations by involved Resident, Marion

- Noted and reported hand hygiene not completed in dining room
- Noted and reported hand hygiene not completed consistently with cares (PM shift pattern)
- Noted and reported consistent completion of HH for residents before lunch but not supper
Strategy #1: Interventions and Results

- Pilot-Started small on East Wing
- Sarah trained two Champion CNAs from each shift to completed observations, others have expressed interests
- Bi-weekly newsletter, informed all staff of project and iScrub monitoring

Strategy #1: Results
West Wing
How often is HH not completed when indicated?

<table>
<thead>
<tr>
<th></th>
<th>May 2017</th>
<th>June 2017</th>
<th>July 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25%</td>
<td>23%</td>
<td>27%</td>
</tr>
</tbody>
</table>

Note: Diane provided West Wing HH education, 8/11/2017

<table>
<thead>
<tr>
<th></th>
<th>August</th>
<th>September</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20%</td>
<td>19%</td>
</tr>
</tbody>
</table>
PIP: C. *difficile* Reduction at Care Center ABC

CDI Infection Rate:

<table>
<thead>
<tr>
<th>Year</th>
<th>FACWIDEIN</th>
<th>Count</th>
<th>Total</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016M07</td>
<td></td>
<td>2</td>
<td>3894</td>
<td>5.136</td>
</tr>
<tr>
<td>2016M08</td>
<td></td>
<td>1</td>
<td>4025</td>
<td>2.484</td>
</tr>
</tbody>
</table>

Next Steps:
- Convene PIP Squad Members and discuss what went well, what can be improved, next steps
- In this PIP, decided to *Adopt* the iScrub app and process for all units in the facility
  - Adopt: Yup, it works! Let’s spread this practice
  - Adapt? It could work if we did ______
  - Abandon? No, this does not work at all. What else?? Re-group and continue discussion
Care Center ABC’s PIP: QAPI

Lake Superior Quality Innovation Network (QIN)

Resources on Website

- [https://www.lsqin.org/initiatives/nursing-home-quality/essentials/](https://www.lsqin.org/initiatives/nursing-home-quality/essentials/)
  - Fillable forms/tools
  - Videos
  - QAPI Resources
  - Clinical Webinars
Resources

- APIC Text of Infection Control & Epidemiology, Chapter 72, October 3, 2014
- CDC Vital Signs March 2012
- CDC Core Elements of Anti-biotic Stewardship for Nursing Homes 2014
- APIC Guide to Preventing *Clostridium difficile* Infections, 2013
- [https://www.cdc.gov/getsmart/index.html](https://www.cdc.gov/getsmart/index.html)

Questions?

Diane Dohm
ddohm@metastar.com
608-441-8263

Emily Nelson
enelson@metastar.com
608-441-8242

[www.metastar.com](http://www.metastar.com)
[https://www.ls Qin.org](https://www.ls Qin.org)
This material was prepared by the Lake Superior Quality Innovation Network, under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. The materials do not necessarily reflect CMS policy. 11SOW-WI-C2-17-57 052817