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341 Wellness Drive • Myrtle Beach, South Carolina 29579 • (843) 488.5550
Phone. (843) 488-5550 • Web. www.freeCE.com • Email. support@freeCE.com • Fax. (843) 488.5554

Clostridioides difficile in Long-Term Care: Improving Utilization of Evidence-based Guidelines, Clinical Trial Results, and Antibiotic Stewardship

Faculty

Brandon Bookstaver, PharmD, FCCP, FIDSA, BCPS
Associate Professor, Director of Residency & Fellowship Training, University of South Carolina College of Pharmacy

Clostridioides difficile disproportionately impacts elderly patients, including those in long-term care facilities (LTCFs) and is associated with significant morbidity and excess healthcare costs. The burden of *Clostridioides difficile* infection (CDI) continues to expand beyond the inpatient arena. Evidence-based clinical practice guidelines for CDI can be applied to patients in LTCFs to improve outcomes. This module will discuss application of CDI guidelines in LTCF patients including specific management decisions for initial and recurrent disease and stewardship strategies that can be applied to minimize the burden of CDI on LTCFs.

Learning Objectives

Pharmacist

1. Apply current Clostridioides difficile infection (CDI) management guidelines to long-term care patients
2. Recognize relevant, up-to-date, evidence for managing initial and recurrent CDI in long-term care patients
3. Identify antimicrobial stewardship strategies to minimize the burden of CDI in long-term care patients

Pharmacy Technician

1. Apply current Clostridioides difficile infection (CDI) management guidelines to long-term care patients
2. Recognize relevant, up-to-date, evidence for managing initial and recurrent CDI in long-term care patients
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Nurse

1. Apply current Clostridioides difficile infection (CDI) management guidelines to long-term care patients
2. Recognize relevant, up-to-date, evidence for managing initial and recurrent CDI in long-term care patients
3. Identify antimicrobial stewardship strategies to minimize the burden of CDI in long-term care patients

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Target Audience

Pharmacists, Pharmacy Technicians, Nurses

Universal Activity Number

Pharmacist	Pharmacy Technician	Nurse
0798-0000-20-146-H01-P	0798-0000-20-146-H01-T	0798-0000-20-146-H01-N

Credit Hours

1.0 Hours

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Knowledge-Based

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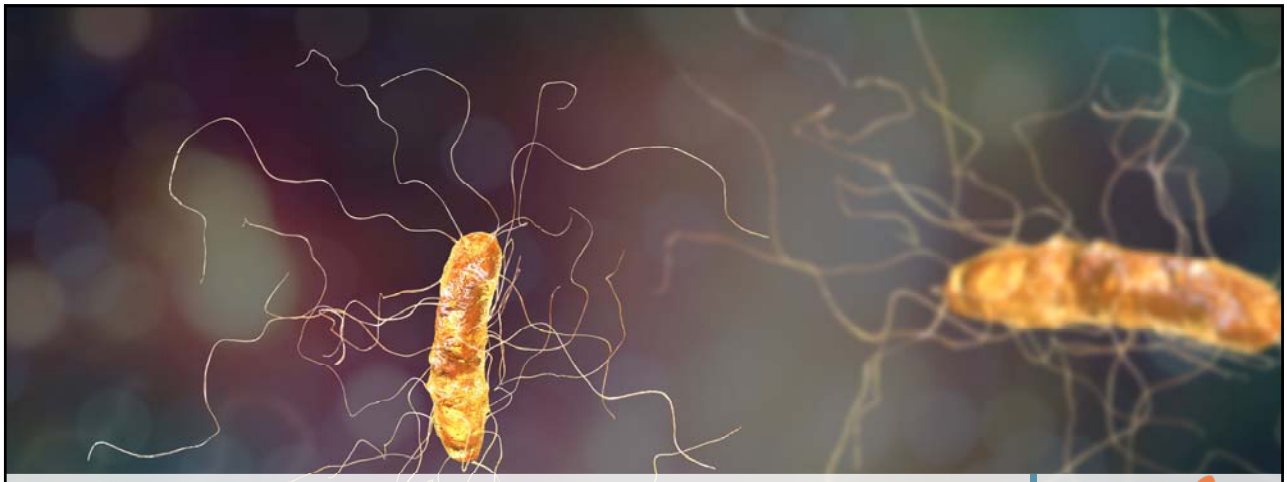

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1

Faculty Disclosure

- Brandon Bookstaver declares no existence of a financial interest in any amount related to the content of this activity.
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2

Learning Objectives

At the conclusion of this activity, participants should be better able to:

- Apply current *Clostridioides difficile* infection (CDI) management guidelines to long-term care patients
- Recognize relevant, up-to-date, evidence for managing initial and recurrent CDI in long-term care patients
- Identify antimicrobial stewardship strategies to minimize the burden of CDI in long-term care patients

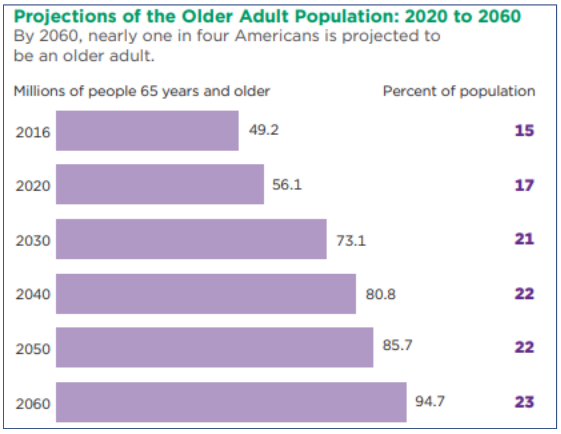
3

Age-Related Epidemiology and Pathophysiology

4

Population Projections and Long-term care

- Estimated that 12 million Americans over age of 65 require long-term care
  - 37% utilize facility
- Someone turning 65 today has 70% chance of needing long-term care
  - Women need care longer than men (3.7 years vs 2.2 years)
  - 20% will need care >5 years



Find your path forward. US Department of Health and Human Services. Available at: https://longtermcare.acl.gov/the-basics/how-much-care-will-you-need.html

Vespa J, et al. Demographic Turning Points for the United States. Available at: https://www.census.gov/library/publications/2020/demo/p25-1144.html

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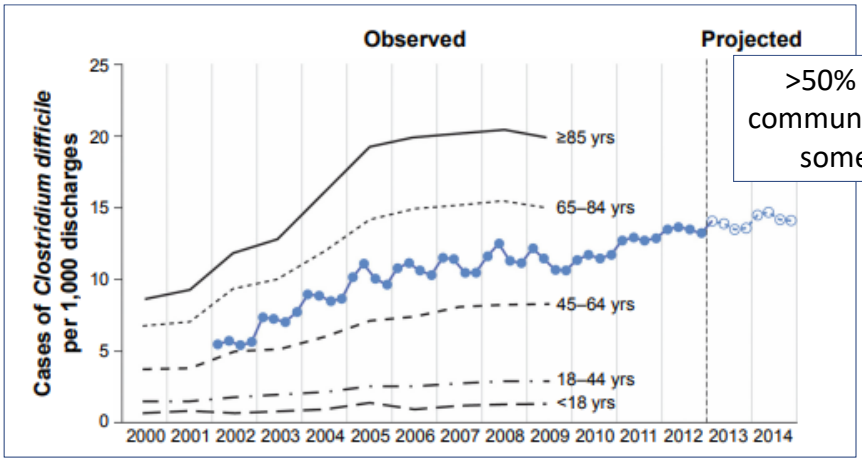
5

CDI Incidence by Age



>50% are now community onset in some states

Asempa TE, et al. Clin Interv Aging 2017;12:1799-1809.

Younas M, et al. Infection 2020;48:129-32.

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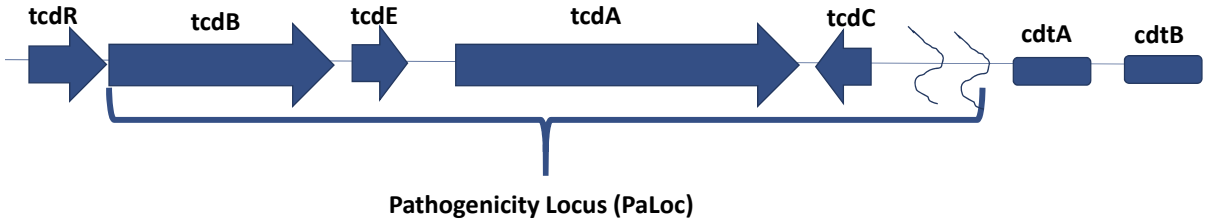
Clostridioides difficile Pathophysiology



Pathogenicity Locus (PaLoc)

- Exotoxins present
  - Toxin A = tcdA (enterotoxic)
  - Toxin B = tcdB (cytotoxic)
  - Binary toxin = cdt
- Ribotyping – >200 ribotypes identified
  - BI/NAP1/027 possibly hypervirulent and most studied in US/UK

Rupnik M, et al. J Clin Micro 2016;54:13-8.
Valiente E, et al. J Med Microbiol 2012;61:49-56.

7

Risk Factors Among LTCF Residents

8

CDI Risk Factors

Risk Factor	
Pharmacotherapy	Number and days of systemic concomitant antibiotic use
	High-risk antibiotics
	Proton-pump inhibitors and histamine type 2 blockers
Past/current health care exposure	Prior hospitalization
	Duration of hospitalization
	Long-term care residency
Host immunity	Lack of antibody response to *Clostridioides difficile*
	Comorbidities
Increasing	> 65 years and older
	Per-year increment over 18 years
CDI experience	Prior CDI

Asempa TE, et al. Clin Interv Aging 2017;12:1799-1809.

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Antibiotic Risk Factors

High Risk	Low(er) Risk
• Clindamycin • 2nd & 3rd Generation Cephalosporins • Fluoroquinolones • Carbapenems • Penicillins (+/- Beta-lactamase inhibitors)	• Tetracyclines • Vancomycin • Metronidazole • Linezolid • Nitrofurantoin • SMX/TMP (maybe ↑)

- Seddon MM, et al. Clin Infect Dis 2019;69:414-20
- Teng C, et al. Int J Med Sci 2019;16:630-5

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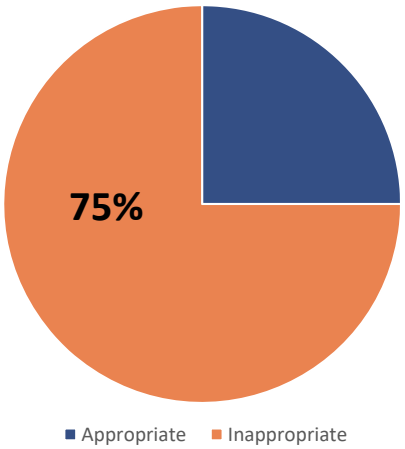
10

Antibiotic Use in Long-Term Care Facilities

- 50-70% nursing home residents receive an antibiotic course each year
- 11% of residents on an antibiotic at any point in time
- Most common indication…



Lim CJ, et al. Clin Interv Aging 2014;9:165-77.
Thompson ND, et al. J Am Med Direct Assoc 2016;17:1151-3.
CDC. Antibiotic Use Nursing Homes, 2017. Available at: https://www.cdc.gov/antibiotic-use/stewardship-report/nursing-homes.html

11

Antibiotic Use in Long-Term Care Facilities

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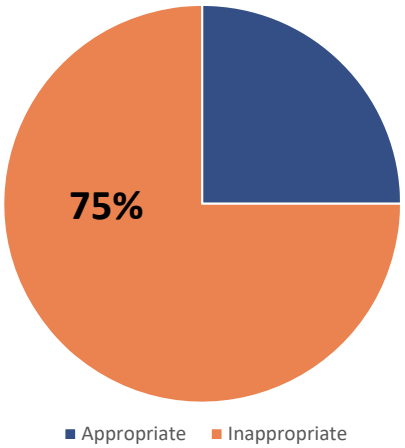
- 11% of residents on an antibiotic at any point in time
- Most common indication…

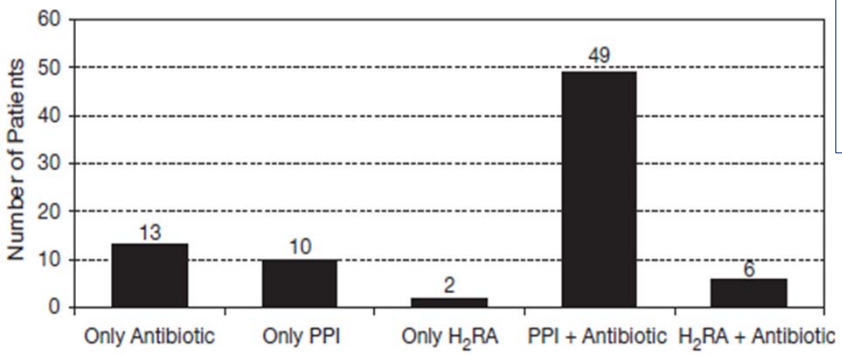
Urinary tract infection



Lim CJ, et al. Clin Interv Aging 2014;9:165-77.
Thompson ND, et al. J Am Med Direct Assoc 2016;17:1151-3.
CDC. Antibiotic Use Nursing Homes, 2017. Available at: https://www.cdc.gov/antibiotic-use/stewardship-report/nursing-homes.html

12

Proton Pump Inhibitor Use as Risk Factor



PPI are independent risk factors for CDI

Addition of PPI to antibiotics further increases risk

King RN, Lager SL. Pharmacotherapy. 2011;31:642-648

13

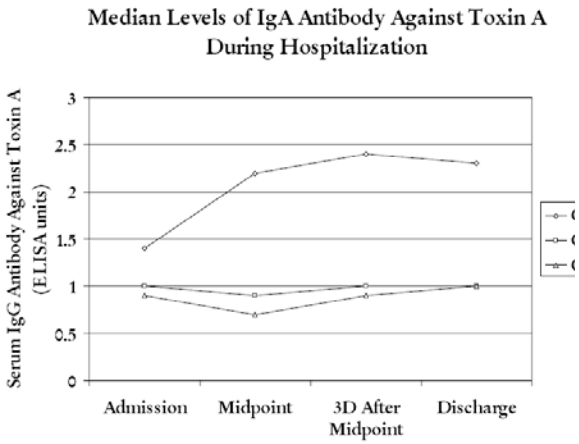
Proton Pump Inhibitor Use in LTC

- ~15-20% of patients may be receiving a PPI
- Lack of documentation for PPI indication is prevalent
- 50% of PPI users >75 years of age

Mwesige J, et al. JAMDA 2015;17:B14

14

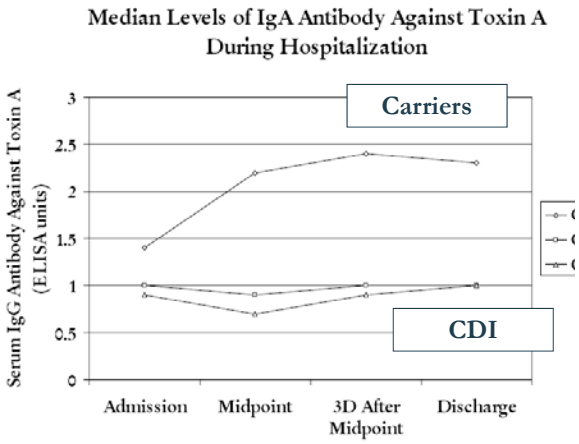
IgG Levels and the Elderly



Kyne et al. New Engl J Med 2000; 342: 390-397.

15

IgG Levels and the Elderly



Kyne et al. New Engl J Med 2000; 342: 390-397.

16

Increasing Risk by Age

- 2% increased risk of CDI each year incrementally after the age of 18
- Median age of death due to CDI ~82 years of age
- Decreased functional status has been shown to be an independent risk factor among the elderly
  - Dementia specifically associated with dysbiosis

Rao K, et al. J Am Geriatr Soc 2013;61:1738-42.
Asempa TE, et al. Clin Interv Aging 2017;12:1799-1809

17

Asymptomatic Colonization & Transmission in LTCF

- ~15-22% of LTCF residents are asymptomatic carriers of toxigenic *C. difficile*
- Facility outbreaks 5x likelihood of prevalent colonization among residents
- Up to 70% of LTCF CDI cases may be linked to asymptomatic carriers

Donskey CJ, et al. Infect Cont Hosp Epidemiol 2018;39:909-16.
Ziakas PD, et al. PLoS One 2015;10:e0117195
Metcalf D, et al. J Hosp Infect 2018;99.

18

BI/NAP1/O27 Ribotype in LTCF

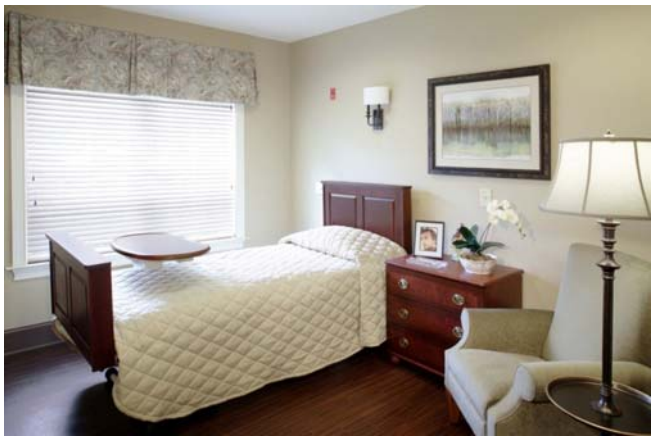
- Epidemic strain associated with outbreaks
  - Produces 16-23 times more Toxin A & B, TcdC deletion
- Almost all produce binary toxin – clinical relevance?
  - Linked to higher recurrence rates
  - Decreased response to some therapies (e.g. fidaxomicin)
  - Greater complications
- Antibiotic resistance patterns different
  - E.g. fluoroquinolone and macrolide resistance
- You won't typically know if patient has 027 ribotype or not – ribotyping rarely done in practice

McDonald et al. *Emerg Infect Dis.* 2006;12(3): 409-415.
Wieczorkiewicz et al. Antimicrob Agents Chemother. 2015 Nov 2;60(1):418-23.
Chakra C, et al. Clin Infect Dis 2015

19

Environmental Surfaces in LTCF and Microbial Burden

- Epidemiologically important pathogens (EIP) frequently recovered from areas of patient rooms
- MRSA followed by *C. difficile* were most common
- Infrequent in common areas



DiBiase L, et al. OFID 2018

20

Management of CDI

21

General Strategy for CDI Management

- Early diagnosis
- Implement isolation and infection control measures
- Initiate targeted antimicrobial therapy
- Discontinue or limit offending agent(s)

Chopra T (ed.) Clostridium difficile infection in long-term care facilities. 2020. doi: 10.1007/978-3-030-29772-5

22

Defining Severity in CDI

Variables	IDSA/SHEA Guideline Definitions
Non-severe (aka Mild/Moderate)	WBC<15,000 cells/mm^3 and SCr<1.5x pre-CDI level
Severe	WBC ≥15,000 cells/mm^3 or SCr ≥1.5x pre-CDI level *Age mentioned, but not spec.
Severe/ Complicated (Critically Ill)	Hypotension or shock, ileus, megacolon

- Albumin also a predictor of severe disease and delayed recovery
- Albumin 3.97 g/dL < 40 years of age compared to 3.58 g/dL in >80 years of age

- McDonald LC, et al. Clin Infect Dis 2018. 66 (7): e1-48.
- Cabreizo S, et al. Maturitas 2015;81:17-27.

23

Antibiotic Management of CDI

Variables	Treatment Recommendations
Non-severe (mild/mod)	Vancomycin (VAN) 125mg PO QID or Fidaxomicin (FDX) 200mg PO BID x 10 days (Metronidazole, MTR listed as alternative)
Severe	VAN 125mg PO QID or FDX 200mg PO BID x 10 days
Complicated/Critically Ill/ Fulminant disease	VAN 500mg PO QID plus MTR 500mg IV Q8hrs (Consider rectal VAN if ileus)
Recurrence	Initial – VAN taper; FDX course Multiple – VAN taper; VAN+rifaximin; FDX course; or Fecal microbiota transplant (if 3 CDI episode)

- McDonald LC, et al. Clin Infect Dis 2018. 66 (7): e1-48.

24

Antibiotic Comparison: Adverse Events & Drug-Interactions

Antibiotic	Adverse Events	Drug-drug interactions
Vancomycin	• Mostly benign therapy • Systemic distribution is minimal	• Cholestyramine
Fidaxomicin	• Mostly benign therapy • Caution in macrolide allergic patients	• None significant
Metronidazole	• Dysgeusia • Altered mental status • Less commonly peripheral neuropathies	• Warfarin • Ethanol, including ethanol containing products
Rifaximin	• Mostly benign therapy	• None significant
Bezlotoxumab	• Exacerbation of congestive heart failure • Infusion related reaction (rare)	• None significant known at this time

25

Vancomycin as First-Line Therapy

Trial	Comparator Treatment Groups	Endpoints	Outcomes
Zar F, et al. Clin Infect Dis 2007 Design: RCT	VAN 125mg PO QID (n=71) vs. MTR 250mg PO QID (n=79) x 10 days 54% severe	6-day clinical cure + negative Toxin assay	All: MTR 84% vs VAN 97% (p=0.006) Severe: MTR 76% vs VAN 97% (p=0.02)
Johnson S, et al. Clin Infect Dis 2014 Design: RCT (Combined analysis of 2 studies)	VAN 125mg PO QID (n=259) vs. MTR 375mg PO Q6hr (n=278) x 10 days ~29% severe	10-day clinical success (>48 consecutive hours)	All: MTR 72.7% vs. VAN 81.1% (p=0.02) Severe: MTR 66.3% vs. VAN 78.5% (p<0.01)

Zar F, et al. Clin Infect Dis 2007

Johnson S, et al. Clin Infect Dis 2014

26

Fidaxomicin

- Two, Phase 3 RCTs of fidaxomicin 200mg PO twice daily x 10 days vs. vancomycin 125mg PO QID x 10 days
  - Clinical cure: FDX 88% vs. VAN 87% (p=NS)
  - Cure plus no 28-day recurrence: FDX 71% vs. VAN 57% (p=0.0004)
  - No difference in recurrence among BI/NAP1/027 strains

Cornely OA, et al. Lancet Infect Dis. 2012; 12:281-9.
Louie TJ, et al. N Engl J Med. 2011; 364:422-31.
Louis TJ, et al. Clin Infect Dis 2012:55(Suppl 2):S132-S142.

27

Subgroup Comparison Between Vancomycin and Fidaxomicin in Phase III Studies

Clinical scenario [ref]	Clinical cure		Recurrence		Sustained clinical response	
	Fidaxomicin	Vancomycin	Fidaxomicin	Vancomycin	Fidaxomicin	Vancomycin
No previous episode of CDI [26,30]	87.6%	85.7%	12.9%	24.8%	76.3%	64.5%
Previous episode of CDI* [31]	93.7%	91.6%	19.7%	35.5%	N/A	N/A
≥65 years of age [26,30]	84.8%	84.5%	16.0%	29.3%	71.2%	59.7%
Concomitant antibiotic therapy* [32]	90.0%	79.4%	16.9%	29.2%	72.7%	59.4%
Oncology* [38]	97.3%	87.5%	14.1%	30.0%	83.6%	61.3%
NAP1/BI/027 strain* [39]	87.5%	85.8%	23.3%	31.3%	N/A	N/A
Non-NAP1/BI/027 strain* [39]	95.3%	93.2%	8.4%	25.3%	N/A	N/A

*Per protocol data, as opposed to modified intent-to-treat data. CDI: *Clostridium difficile* infection; N/A: data not available.

Bookstaver PB, et al. CML – Gastroenterology 2012;31(4):95–103.

28

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Bookstaver PB, et al. CML – Gastroenterology 2012;31(4):95–103.

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30

Duration of Therapy

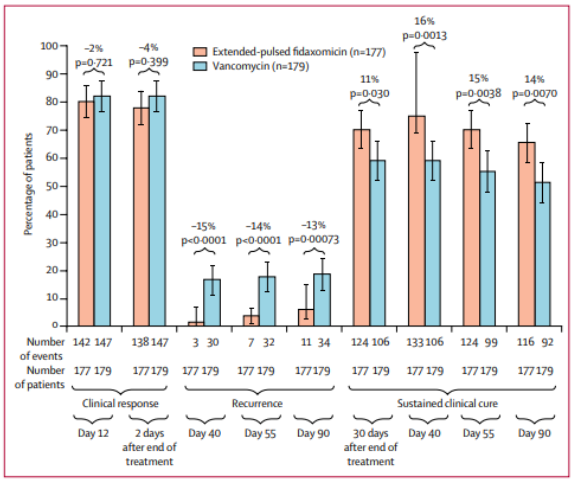
- Updated IDSA/SHEA guidelines recommend 10 days of therapy (prior was 10-14 days)
- Recall in nearly every randomized controlled trial, the durations were all 10 days
- Extended therapy for a primary CDI episode unlikely to benefit
- Are there any scenarios where you might consider extending therapy?

McDonald LC, et al. Clin Infect Dis 2018. 66 (7): e1-48.

31

Fidaxomicin – EXTENDed Treatment

- Randomized, open label trial compared extending therapy FDX vs. VAN in elderly (median age=75)
  - Only 2% nursing home prior to CDI
- FDX 200mg twice daily, days 1-5, then once daily on ALTERNATING days 7-25
- No difference in clinical cure
  - Numerical faster time to resolution (22h vs 34h, p=0.068) for VAN
- Recurrence significantly lower in FDX arm



Guery B, et al. Lancet Infect Dis 2018;18:296-307.

32

Scenario 1:
Concurrent Antibiotics & Prolonging Therapy

- Scenario: 75 y/o LTCF facility resident is diagnosed with CDI but is currently completing therapy with ciprofloxacin for pyelonephritis for 7 more days. Should we extend our oral vancomycin therapy for CDI for additional days given the high risk of recurrence for CDI?
- No clear benefit established in literature
- Big unknowns of how long to treat for CDI beyond 10 days? What dose to use?

- Ponce-Terashima R, et al. Presented at ID Week 2012. Availabe at: https://idsa.confex.com/idsa/2012/webprogram/Paper36736.html

33

Scenario 2a/2b:
Repeat Exposure to Antibiotics and Prophylaxis

Primary CDI

- 100 patients, n=50 received oral vancomycin prophylaxis and 50 did not receive anything for prevention of CDI
  - Oral vancomycin prophylaxis typically 125mg PO daily with systemic antibiotics and for 5 days after
  - 12% CDI in no prophylaxis arm vs. 0% in VAN prophylaxis (p=0.03)

Recurrent CDI

- 760 patients, n=193 received VAN prophylaxis and n=567 did not receive anything for prevention of recurrent CDI
  - 9.4% vs. 9.3% CDI recurrence at 90 days, no difference
  - May have impact in those with only 1 prior case

Johnson S, et al. Clin Infect Dis 2019;ciz966

Caroff DA, et al. Infect Control Hosp Epidemiol 2019;40:662-7.

34

Comparison of Primary Treatment Options

Variable	Vancomycin	Fidaxomicin
Guidelines	Preferred for non-severe/severe	Preferred for non-severe/severe
Toxicity & DDI	ADE: Minimal DDIx: Cholestyramine	ADE: Minimal; Macrolide allergy DDIx: None clinically significant
Dosing	Four times daily	Twice daily
Formulations	PO (reconstitutable suspension, capsules)	PO (tablets)
Cost	$$ - $$$	$$$$
Impact on clinical cure & recurrence	Equivalent cure rates to FDX; higher rates of CDI recurrence than FDX	Equivalent cure rates to VAN; lower rates of CDI recurrence than VAN
Impact on resistance & microbiome	Moderate impact on microbiome at CDI doses; no concern for resistance at this time; ? risk of VRE if used widely	Minimal impact on microbiome; no concern for resistance at this time

ADE= Adverse Drug Event; DDIx= Drug Interaction

35

Bezlotoxumab

- Monoclonal antibody designed to target Toxin B of *C. difficile*

Trial, Patient Pop	Study Arm	Primary Endpoint	Safety
MODIFY I *1452 pts, 19 countries* *Age ~65 years (47% < 65)* *47% MTR, 47% Vanc*	Bezlotoxumab 10mg/kg x 1 IV infusion vs placebo (all plus SOC)	12-week CDI recurrence Bez: 17.4% Placebo: 27.6% (*P*=0.0003)	ADE similar to placebo (mostly GI)
MODIFY II *1168 pts, 17 countries* *Age ~67 years* *46% MTR, 47% Vanc*	Bez 10mg/kg x 1 IV infusion vs both vs placebo (all plus SOC) 94% received within first 6 days of tx 67% inpatient/33% outpt.	12-week CDI recurrence Bez: 15.7% Placebo: 25.7% (*P*=0.0003)	ADE similar to placebo (mostly GI) – CHF*

*CHF exacerbation: BEZ: 12.7% (15/118) vs 4.8% (5/104)
Deaths in those with CHF: BEZ: 19.5% (23/118 vs 12.5% (13/104)

- Lancet ID, 2017
- Clin Infect Dis 2017

36

Use of Bezlotoxumab: RCT Compared to Real World

- Single dose, IV infusion always given as adjunct to primary therapy
- In RCTs, 90% of patients received in first 6 days
- Higher failure rates in outpatient vs. inpatient, compliance issue?
- Strong caution in patients with CHF
- Real-world experience in 200 patients
  - VAN 68%, FDX 30%; median time to bezlotoxumab was 13 days
  - Recurrence at 90 days was 15.9%, those w/ >2 recurrences nearly 3x likely

Hengel RL, et al. Open Forum Infect Dis 2020;ofaa097

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37

Managing CDI Recurrence with Extended Duration Vancomycin: Taper and Pulse Dose Regimens

- Taper dosing over 6-8 weeks versus pulse dosing
- Systematic review and analysis very limited comparative data
- Success rates vary widely from 26% to 100%
- Taper plus pulse regimens may be superior to pulse regimens alone

Sample Taper plus pulse dosing:
VAN 125mg PO QID x 14 days
VAN 125mg PO BID x 7 days
VAN 125mg PO daily x 7 days
VAN 125mg PO every 48 hours x 1 week
VAN 125mg PO every 72 hours x 1 week

TOTAL of 6 weeks

Murphy MM, et al. Ther Adv Infect Dis 2018;5:111-9.

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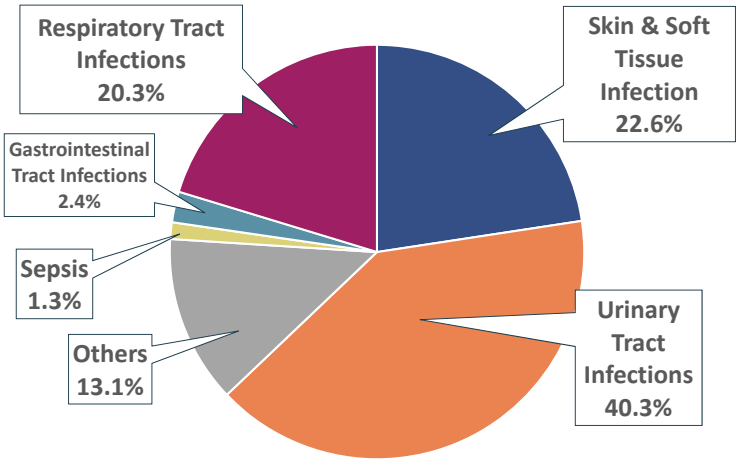
38

Stewardship Strategies to Mitigate CDI in LTCF

39

1. Steward the Commonly Encountered Infectious Diseases

- Protocol setup for UTI diagnosis
  - Altered mental status reconsidered as criteria
- Protocol first- and second-line antibiotics for commonly encountered disease states



- Chung P, et al. Open Forum Infect Dis 2019;:6 (Suppl 2)

40

2. Improve Duration of Therapy Targets

- CDC reported that incorrect duration of therapy (e.g. too long) was one the top 3 reasons for inappropriate antibiotic prescribing
- Short course therapy works, even in elderly
  - Limits microbiome disruption and ADE probability
- "Shorter is better"

CDC.gov. Antibiotic prescribing in long-term care facility.

Stewardship: Shorter=Better https://www.bradspellberg.com/shorter-is-better

41

3. Stewards of Proton Pump Inhibitors

- PPIs are independent risk factors for CDI as we previously discussed
- Prevalent use in LTCF
- PPI stewardship initiatives have reduced use by 20%
- Need indication documentation to help facilitate discontinuation

Mwesige J, et al. JAMDA 2015;17:B14

42

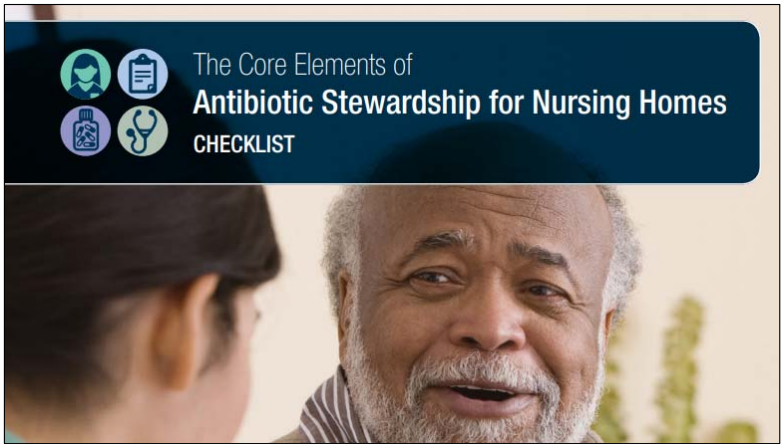
4. Implement CDC "Playbook" for LTCF Antimicrobial Stewardship

- Leadership commitment
- Accountability
- Drug expertise
- Policy & procedures
- Tracking & reporting
- Education

Core Elements of Antibiotic Stewardship in Nursing Home. Available at: https://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html

43

5. Utilize CDC Nursing Home Stewardship Checklist



Core Elements of Antibiotic Stewardship in Nursing Home. Available at: https://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html

44

Summary of Key Takeaways

- LTCF residents have significant modifiable and non-modifiable risk factors for CDI
- Vancomycin and fidaxomicin are considered IDSA guideline recommended treatment for CDI
- Stewardship strategies can be employed in LTCFs to improve antibiotic use and reduce CDI risk

45

Thank You

46

Activity Test

Clostridioides difficile in Long-Term Care: Improving Utilization of Evidence-based Guidelines, Clinical Trial Results, and Antibiotic Stewardship

Activity tests must be completed online at www.freeCE.com.
A passing grade of 70 or higher and completion of an online activity evaluation are required to earn credit.

1. According to clinical trial data, which of the following best describes the potential role of bezlotoxumab?
    a. Monotherapy for patients with at least 1 prior CDI case.
    b. Adjunctive therapy for patients at high risk for CDI recurrence.
    c. Monotherapy for patients hospitalized for fulminant disease.
    d. Adjunctive therapy for patients with persistent symptoms beyond the initial 5 days of antibiotic therapy.

2. In which of the following patients should bezlotoxumab be avoided?
    a. 76-year-old with uncontrolled diabetes mellitus.
    b. 81-year-old with congestive heart failure.
    c. 80-year-old with epilepsy.
    d. 72-year-old with stage III chronic kidney disease.

3. According to clinical trials, which of the following is true regarding the comparison of fidaxomicin with vancomycin?
    a. Fidaxomicin has improved 5-day clinical cure compared to vancomycin for initial CDI.
    b. Vancomycin has improved 5-day clinical cure compared to fidaxomicin for initial CDI.
    c. Fidaxomicin has reduced 28-day CDI recurrence compared to vancomycin.
    d. Vancomycin has reduced 28-day CDI recurrence compared to fidaxomicin.

4. A 74-year-old LTCF resident with a history of diabetes mellitus and macrolide allergy (anaphylaxis to clarithromycin) returns to LTCF following 5 days of treatment with oral vancomycin 125mg PO QID at a local inpatient facility for a diagnosis of CDI. The patient has experienced resolution of diarrhea. Which of the following actions should be taken at this time regarding CDI treatment?
    a. Discontinue treatment as patient has had diarrheal resolution following 5 days of treatment.
    b. Continue vancomycin at same dose to complete 10 days of therapy.
    c. Continue vancomycin but decrease frequency to twice daily to complete 2 weeks of therapy.
    d. Discontinue vancomycin, initiate probiotics to prevent recurrence.

5. A nurse practitioner is interested in discussing stewardship strategies with LTCF consultant pharmacist. The NP is particularly interested in which targets the LTCF should invest in first to help reduce the risk of CDI. Which of the following is the most appropriate response?
    a. Initiating diagnostic criteria for urinary tract infections
    b. Increase the antibiotic durations of therapy for UTIs and pneumonia treatments to ensure fewer recurrent infections
    c. Increase use of dual antibiotic therapy for acute bacterial skin and soft tissue infections
    d. Promote the use of proton pump inhibitor therapy in all residents

6. Which of the following antibiotics is in the moderate to high risk category for the development of Clostridioides difficile infection (CDI)?
    a. Sulfamethoxazole-trimethoprim
    b. Nitrofurantoin
    c. Ciprofloxacin
    d. Fosfomycin

7. Which of the following regimens would be most appropriate for an initial CDI case in a LTCF patient with no allergies?
    a. Metronidazole 500mg PO BID x 14 days
    b. Vancomycin 125mg PO QID x 10 days
    c. Fidaxomicin 200mg PO BID x 5 days
    d. Vancomycin 125mg PO QID plus Metronidazole 500mg PO TID x 10 days

8. A decline in use of which of the following medications may reduce the risk of CDI in LTCF patients?
    a. Diphenhydramine
    b. Metformin
    c. Omeprazole
    d. Digoxin

9. Which of the following regimens would be most appropriate for a patient with recurrent CDI?
    a. Metronidazole 500mg PO QID x 10 days
    b. Vancomycin 125mg PO QID x 14 days, followed by 4-week taper/pulse dosing
    c. Fidaxomicin 200mg PO BID x 5 days
    d. Vancomycin 125mg PO QID plus Metronidazole 500mg PO TID x 28 days

10. Which of the following strategies may positively impact CDI risk in a LTCF?
    a. Reducing average duration of cystitis treatment from 7 days to 3 days
    b. Increasing use of fluoroquinolones and cefdinir for upper respiratory tract infections
    c. Initiating protocol to change H2 blocker therapy to PPI
    d. Encourage use of broad-spectrum antibiotics for improved coverage