

National Academy of Sciences
Committee on the Health and Economic Effects of Antimicrobial Resistance
January 7, 2021

Antibiotic Stewardship in Nursing Homes: Barriers & Opportunities

Christopher J. Crnich, MD PhD
Associate Professor
Department of Medicine, Division of Infectious Diseases
University of Wisconsin School of Medicine and Public Health
Madison, WI

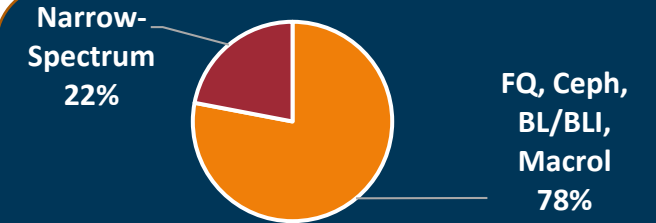
Why Antibiotic Use in NHs Matters



Up to **70%** of skilled nursing facility residents will receive **one or more** courses of systemic antibiotics in a year



~50% of antibiotics started in skilled nursing facilities are **unnecessary**



A majority of antibiotics prescribed in skilled nursing facilities **are broad-spectrum**

50% < 7d > 50%

Half of antibiotic course for treatment of common infections are prescribed for **more than a week.**

Why Antibiotic Use in NHs Matters

HARMS AT INDIVIDUAL LEVEL

ADE

- 20% of all adverse drug events (ADEs) in nursing homes caused by antibiotics
- Antibiotic-associated ADEs are one of the most common reasons for transfer to ER

CDI

- *C. difficile* infection (CDI) is a life-threatening intestinal disease caused by antibiotics
- 12% of nursing home residents treated inappropriately for UTI develop CDI

ARO

- ~50% of nursing residents are colonized with antibiotic-resistant organisms (AROs)
- Antibiotic exposure is the single most important risk factor for ARO colonization

HARMS AT FACILITY LEVEL



Residents in nursing homes with higher antibiotic use have a **24% increased risk** of antibiotic-related harm



Antibiotics account for **1/3 of all survey penalties** for inappropriate medication use in Wisconsin nursing homes

HARMS AT POPULATION LEVEL

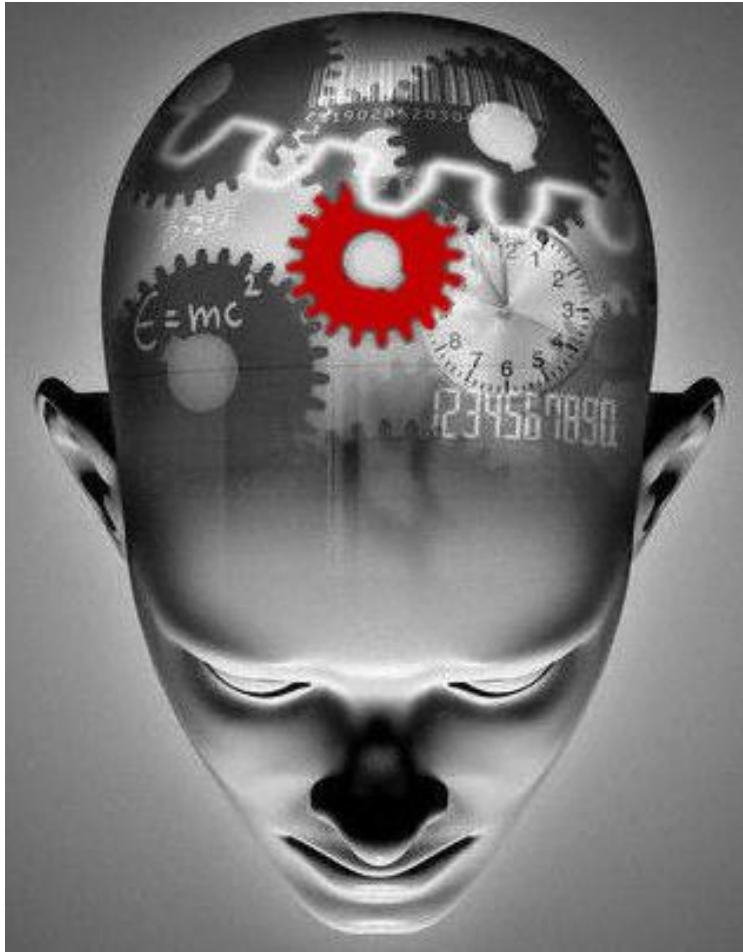


- Half of the residents transferred to the hospital are colonized with *C. difficile* and/or antibiotic-resistant bacteria which may be spread to others
- Nursing homes have been repeatedly implicated in the regional spread of resistance
- Mathematical models suggest that antibiotic resistance cannot be controlled in hospitals without controlling resistance in nursing homes

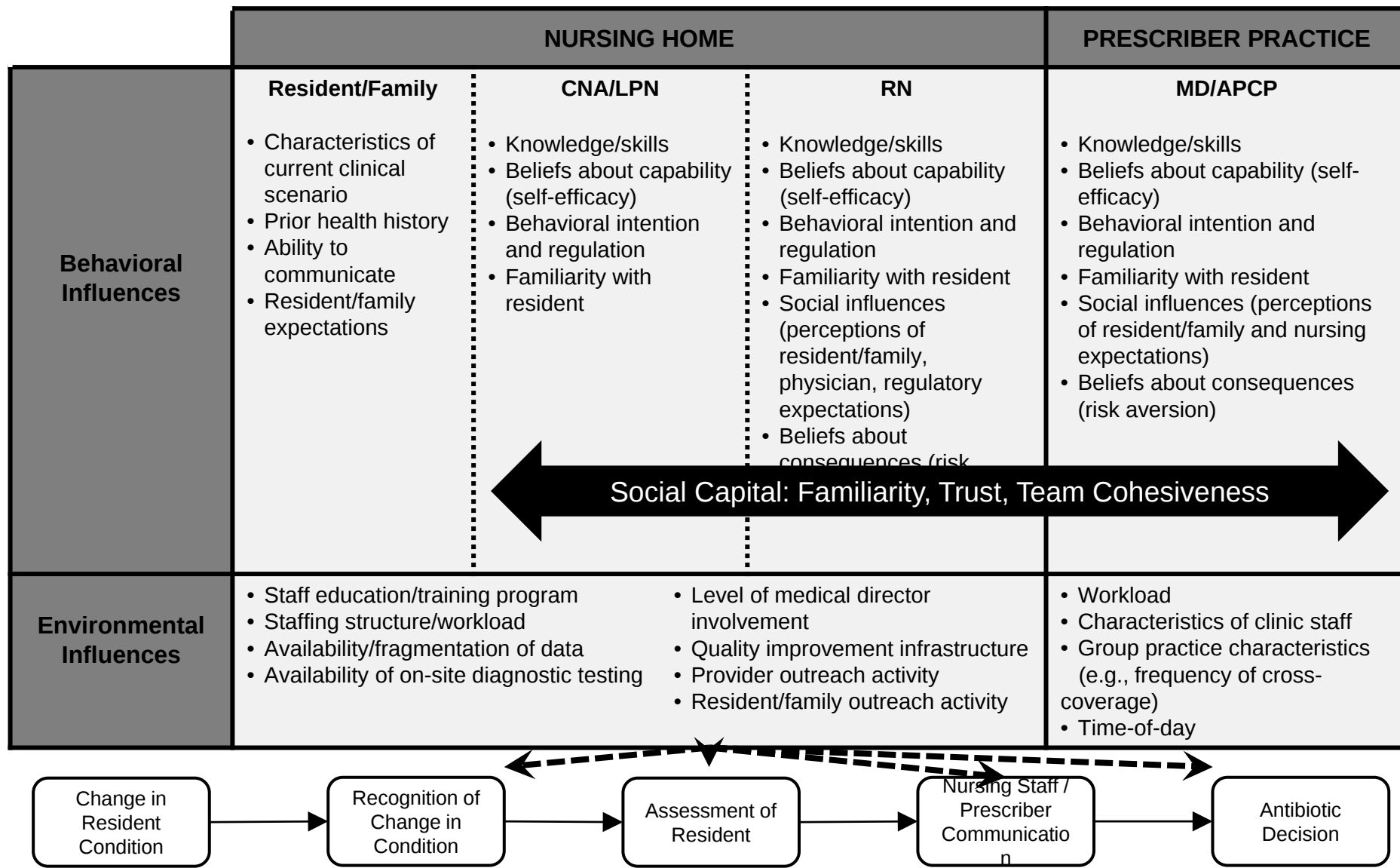


School of Medicine
and Public Health
UNIVERSITY OF WISCONSIN-MADISON

Factors Influencing Treatment Threshold



- Complexity
- Uncertainty
- Risk
- Social
- Context



Our Government and Public Health Authorities Are Concerned



NATIONAL ACTION PLAN TO PREVENT HEALTH CARE-ASSOCIATED INFECTIONS: ROAD MAP TO ELIMINATION
APRIL 2013

CHAPTER 8: LONG-TERM CARE FACILITIES

NATIONAL ACTION PLAN FOR COMBATING ANTIBIOTIC-RESISTANT BACTERIA

MARCH 2015



DEPARTMENT OF HEALTH AND HUMAN SERVICES

Centers for Medicare & Medicaid
Services

42 CFR Parts 405, 431, 447, 482, 483,
485, 488, and 489

[CMS-3260-F]

RIN 0938-AR61

Medicare and Medicaid Programs;
Reform of Requirements for Long-
Term Care Facilities

AGENCY: Centers for Medicare &
Medicaid Services (CMS), HHS.

ACTION: Final rule.



School of Medicine
and Public Health
UNIVERSITY OF WISCONSIN-MADISON

Regulatory Overview

- NHs are required to be "certified" in order to receive reimbursement from Medicare and Medicaid (majority are dually certified).
- Certification is renewed annually and involves an on-site inspection by team of surveyors.
- OBRA 87 led to the development of process standards that facilities must demonstrate during their inspection in order to remain certified
- 1991 introduced the MDS-derived outcome (QM/QI) measures
- Survey-identified deficiencies
 - Assigned to a specific category (F-tag)
 - Assigned a level of severity ("1" = no actual harm with potential for minimal harm → "4" = immediate jeopardy to resident health and/or safety)
 - Assigned scope (isolated, pattern, widespread)
 - All identified deficiencies require corrective action and may result in fines or denial of recertification (i.e., closure)

CMS Mega-Rule

- 2016

- Sweeping change to regulations
 - Moved vaccination regs under IC regs
 - Focus expanded to include interrupting transmission in addition to preventing infections
 - Must follow national standards (NHSN or McGeer)
 - Facilities are required to base their IPCP program based on an annual facility assessment
 - Facilities must employ and designate an individual for responsibility the IPCP who has received specific training in IP&C
 - §483.80(a)(3): The facility IPCP must include an antibiotic stewardship program that includes antibiotic use protocols and a system to monitor antibiotic use.

Interpretive guidance is 702 pages (IC-related sections 49 pages)

<https://www.federalregister.gov/documents/2016/10/04/2016-23503/medicare-and-medicaid-programs-reform-of-requirements-for-long-term-care-facilities>

https://www.ahcancal.org/facility_operations/Documents/SC17-36.03.Appendix%20PP%20with%20Final%20IGs.pdf

CMS Mega-Rule

- 2016

- Sweeping change to regulations
 - Moved vaccination regs under IC regs
 - Focus expanded to include interrupting transmission in addition to preventing infections
 - Must follow national standards (NHSN or McGeer)
 - Facilities are required to base their IPCP program based on an annual facility assessment

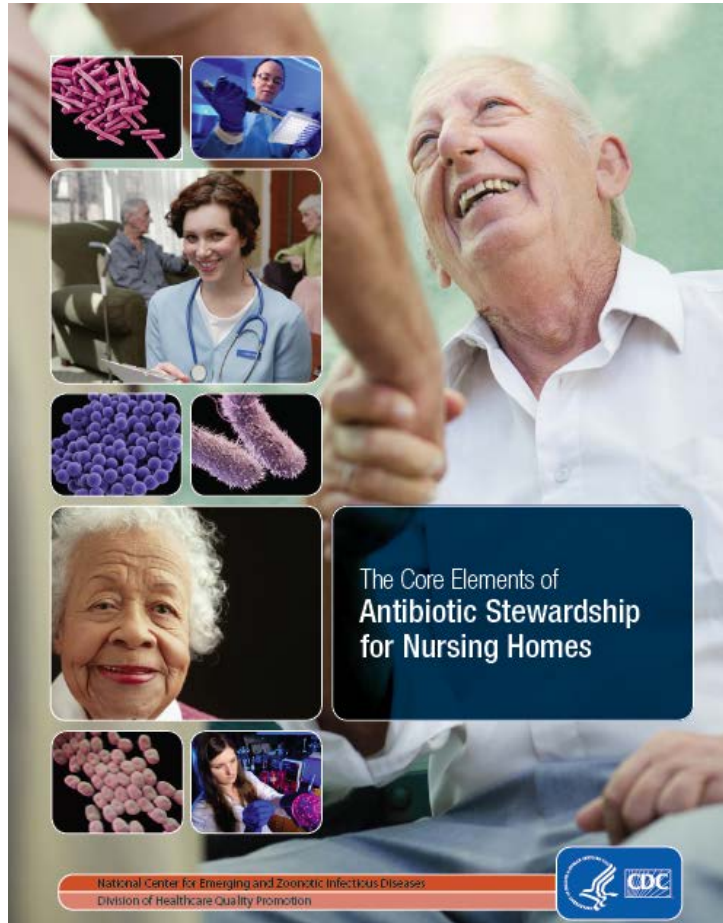
11/2019 • Facilities must employ and designate an individual for responsibility the IPCP who has received specific training in IP&C

11/2017 • **§483.80(a)(3): The facility IPCP must include an antibiotic stewardship program that includes antibiotic use protocols and a system to monitor antibiotic use.**

<https://www.federalregister.gov/documents/2016/10/04/2016-23503/medicare-and-medicaid-programs-reform-of-requirements-for-long-term-care-facilities>

https://www.ahcancal.org/facility_operations/Documents/SC17-36.03.Appendix%20PP%20with%20Final%20IGs.pdf

Regs Modeled on CDC Core Elements



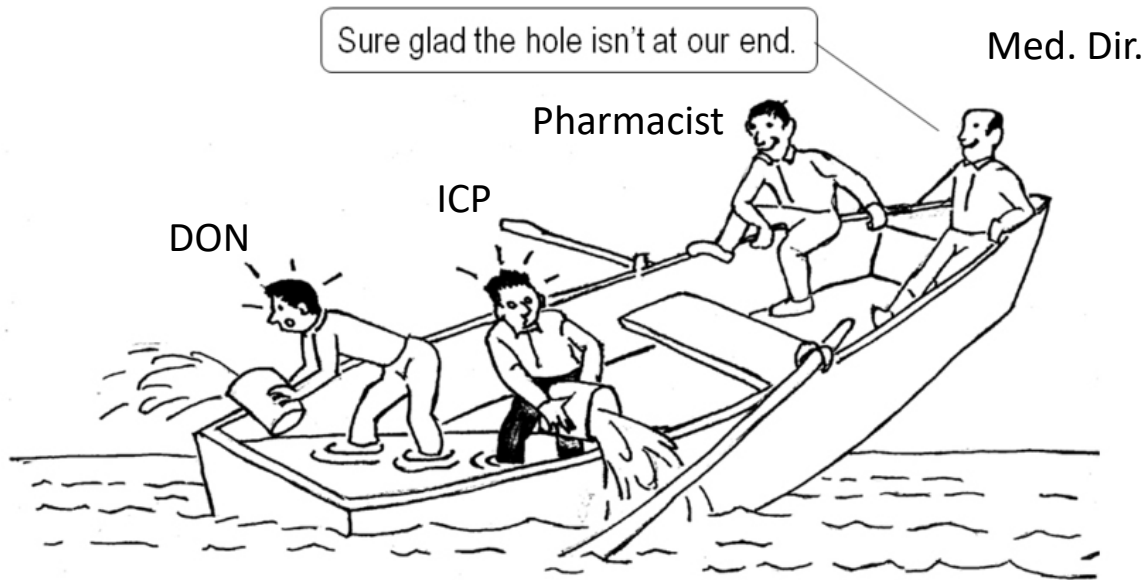
- **Leadership commitment**
Demonstrate support and commitment to safe and appropriate antibiotic use in your facility
- **Accountability**
Identify physician, nursing and pharmacy leads responsible for promoting and overseeing antibiotic stewardship activities in your facility
- **Drug expertise**
Establish 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



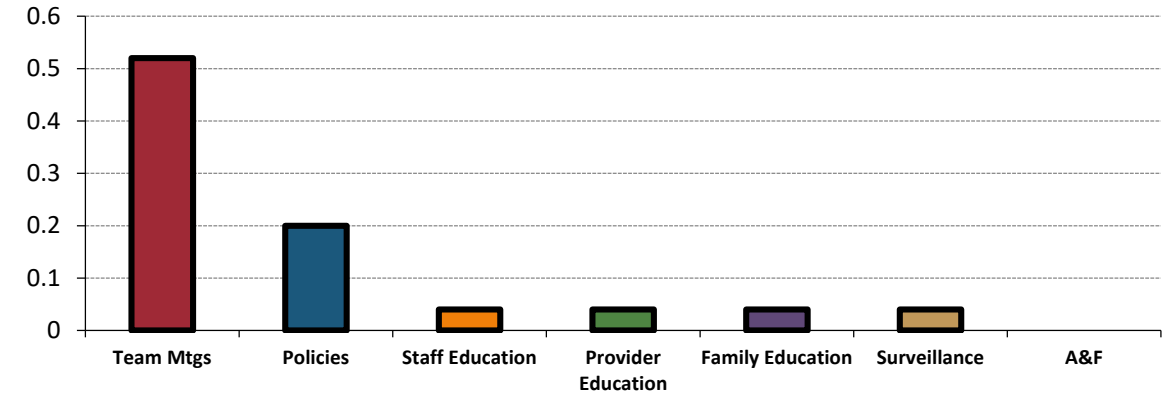
Checklist for Core Elements of Antibiotic Stewardship in Nursing Homes



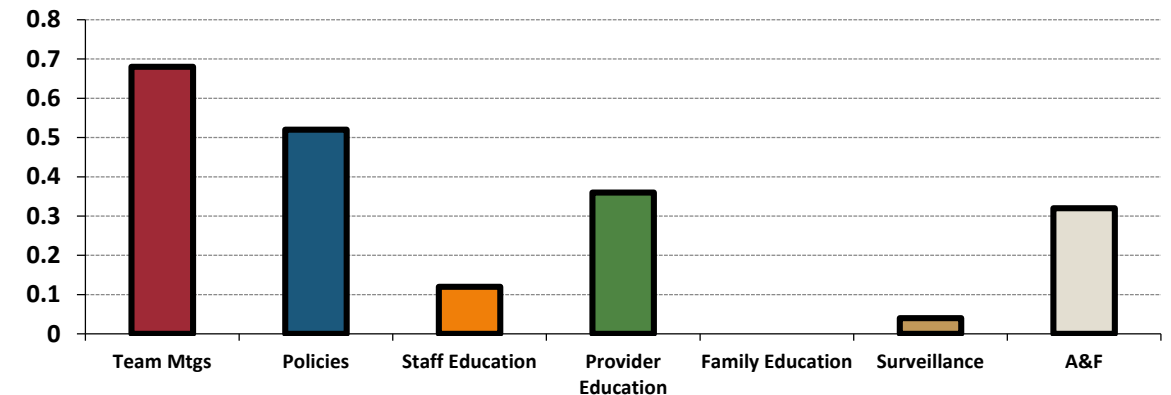
Engage the Medical Director & Pharmacist



Which of the following stewardship activities is the facility pharmacist engaged in?



Which of the following stewardship activities is the medical director engaged in?



Crnich et al. *IDWeek* 2015

Taylor et al. *IDWeek* 2016

How Can the Medical Director Help?

- Role modeling
- Active participant in QAPI meeting
 - Review antibiotic utilization data
 - Review antibiotic-related outcomes
- Review/development of policies and protocols
- Involved in staff and provider educational activities
- Involved in management of the “negative deviants”

How Can the Medical Director Help?

- Role modeling
- Active participant in QAPI meeting
 - Review antibiotic utilization data
 - Review antibiotic-related outcomes
- Review/development of policies and protocols
- Involved in staff and provider educational activities
- Involved in management of the “negative deviants”

NO SYMPTOMS OF UTI

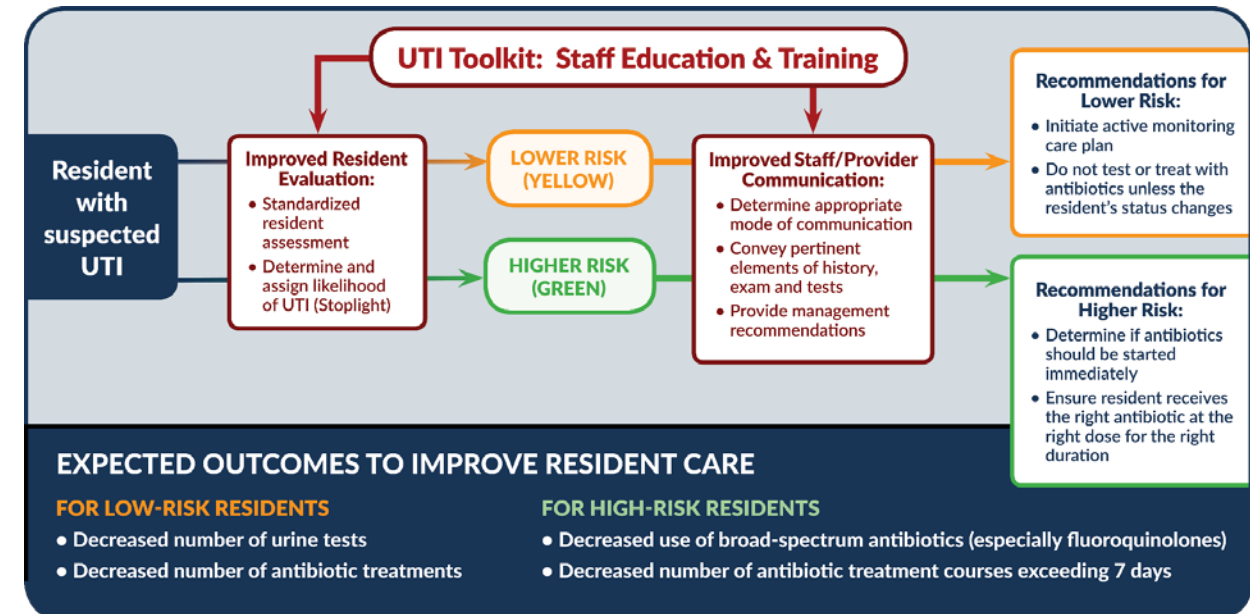
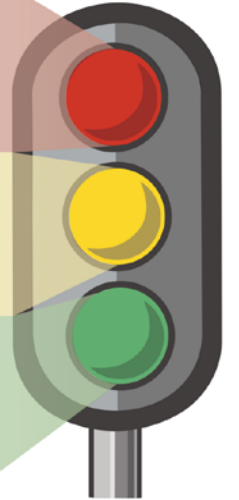
- Don't test or culture the urine
- Don't treat with antibiotics
- Don't treat even if urine tests are abnormal

ISOLATED NON-LOCALIZING SIGNS/SYMPTOMS

- Initiate active monitoring temporary care plan*
- Don't test the urine and don't treat with antibiotics initially
- Consider testing and treatment with antibiotics if symptoms not improving or localizing signs/symptoms develop

LOCALIZING SIGNS/SYMPTOMS

- Test if symptoms are severe or not resolving during monitoring
- Evaluate need for immediate antibiotic therapy and/or transfer to higher level of care if warning signs are present



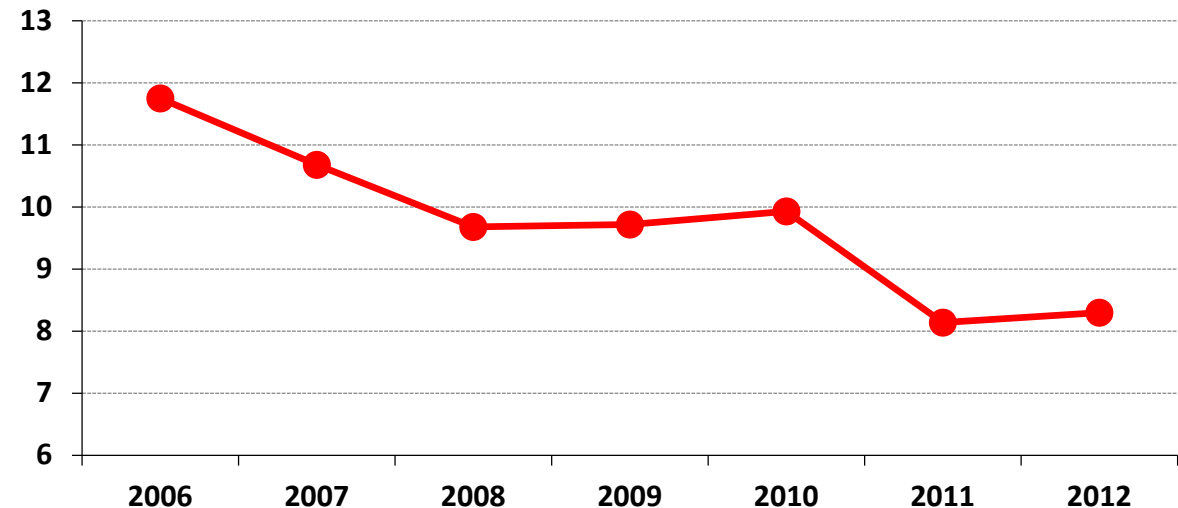
Ford et al. *JAMA Netw Open* 2019;
2(9): e199526

How Can the Medical Director Help?

- Role modeling
- Active participant in QAPI meeting
 - Review antibiotic utilization data
 - Review antibiotic-related outcomes
- Review/development of policies and protocols
- Involved in staff and provider educational activities
- Involved in management of the “negative deviants”

- A MRSA outbreak in a 147-bed NH in WI led to an intensive review of facility microbiology and antibiotic prescribing data
- Review of urinary antibiogram identified
 - 31/100 (27%) all isolates were *Enterococcus* sp.
 - 87% of *E. coli* resistant to ciprofloxacin
- Facility embarked on several interventions:
 - Provided staff with antibiogram results
 - Guideline-concordant prescribing tracked by facility staff
 - Medical director sent out letters to outlier providers

Abx Starts per 1,000 Resident-Days



The Pew Charitable Trusts – A path to better antibiotic stewardship, 2016

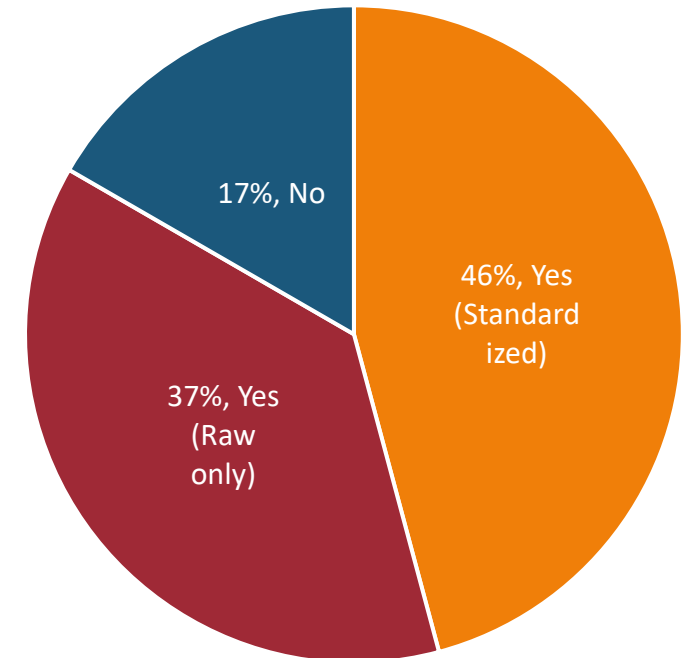
How Can the Pharmacist Help?

- Active participant in QAPI meeting
 - Review antibiotic utilization data
 - Review antibiotic-related outcomes
- Review/development of treatment protocols
- Play an active role in tracking and reporting of antibiotic utilization
- Play an active role in identification of potentially inappropriate antibiotic use & provision of recommendations for modification to providers

How Can the Pharmacist Help?

- Active participant in QAPI meeting
 - Review antibiotic utilization data
 - Review antibiotic-related outcomes
- Review/development of treatment protocols
- Play an active role in tracking and reporting of antibiotic utilization
- Play an active role in identification of potentially inappropriate antibiotic use & provision of recommendations for modification to providers

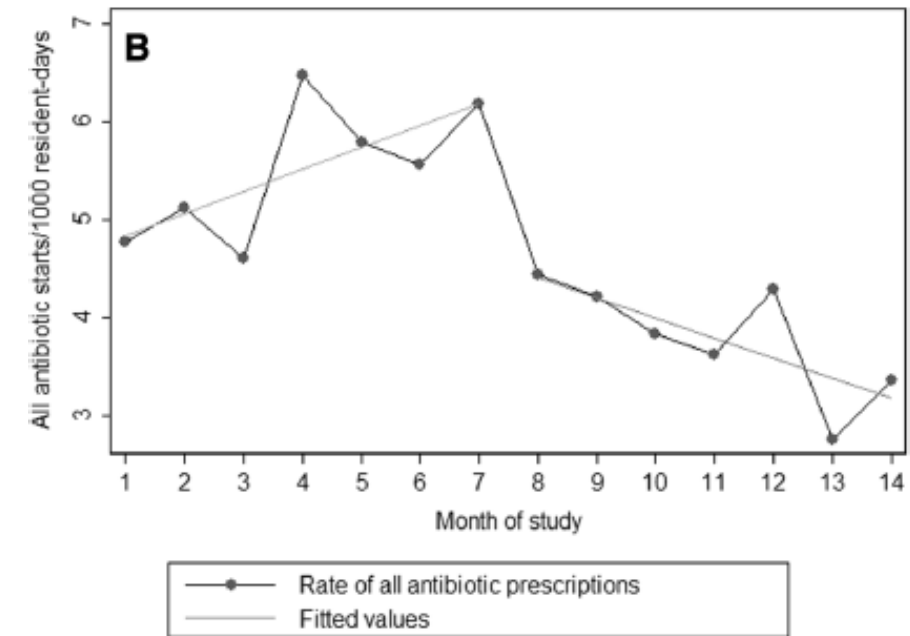
Is antibiotic use data trended at your facility?



Crnich et al. *IDWeek* 2015

How Can the Pharmacist Help?

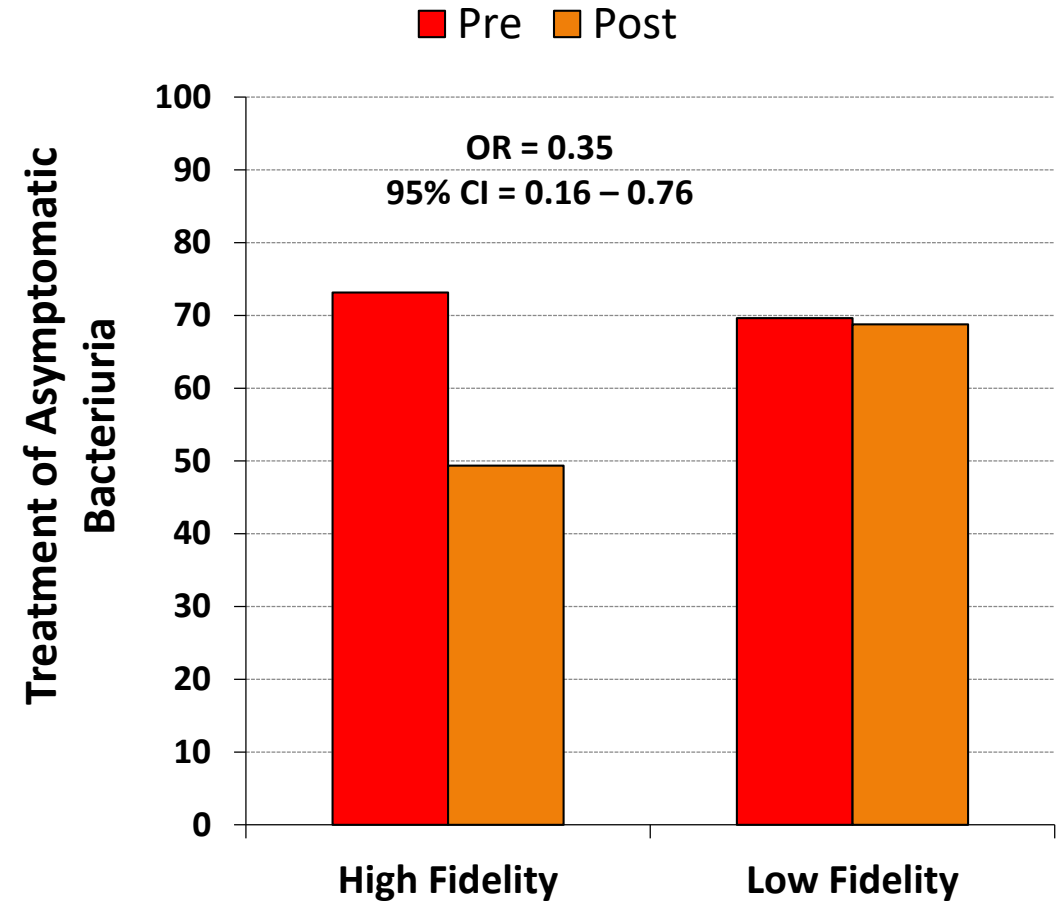
- Active participant in QAPI meeting
 - Review antibiotic utilization data
 - Review antibiotic-related outcomes
- Review/development of treatment protocols
- Play an active role in tracking and reporting of antibiotic utilization
- Play an active role in identification of potentially inappropriate antibiotic use & provision of recommendations for modification to providers



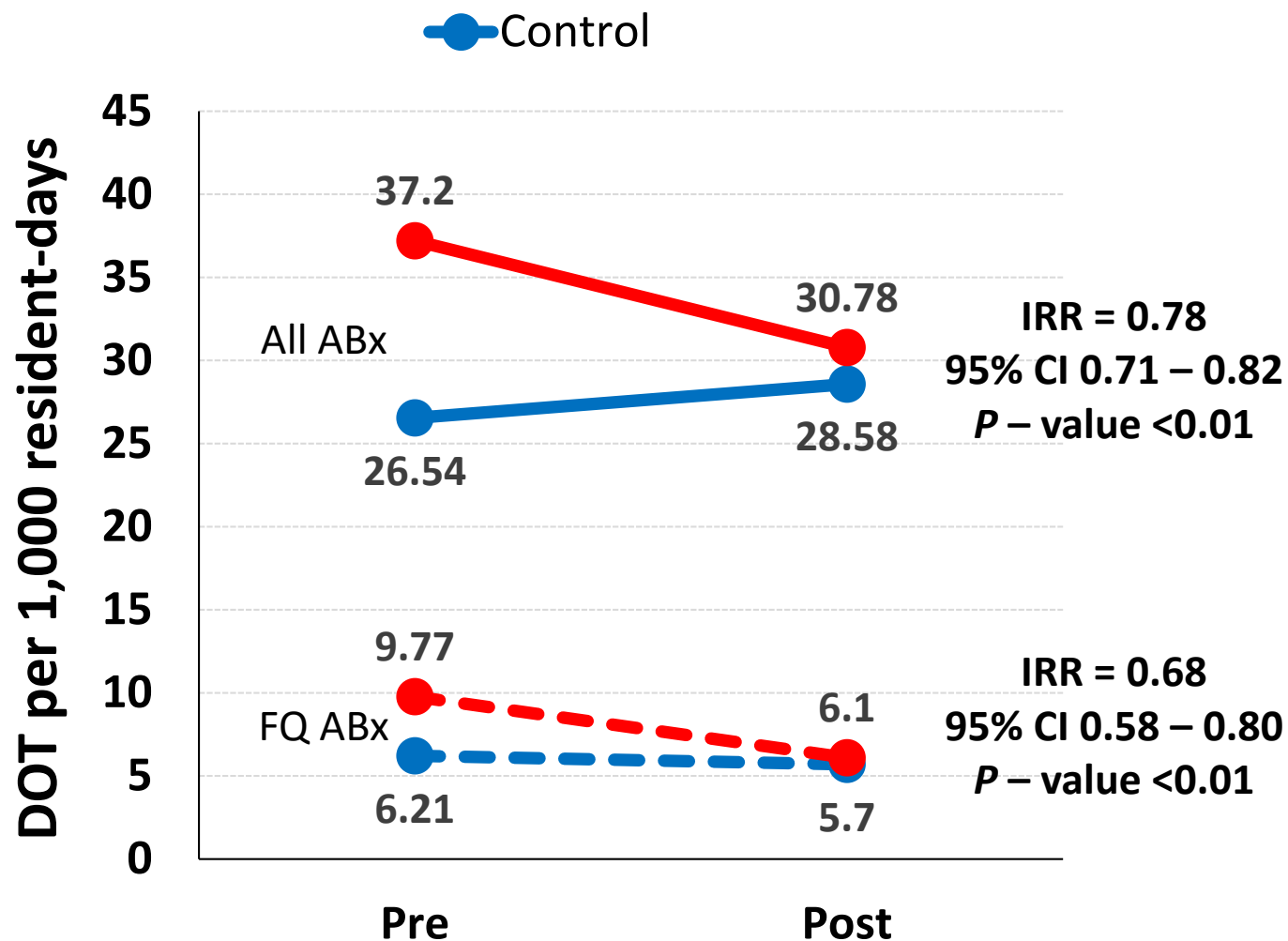
Doernberg et al. *Antimicrob Res Infect Control* 2015; 4(1): p. 54

Enhance Nursing Staff/Provider Communication

- Quasi-experimental study in 12 NHs in Texas
- Intervention focused on operationalizing Loeb study (2005) into a communication tool
- Implementation stratified by intensity
 - Control (n = 4)
 - Low-intensity (n = 4)
 - High-intensity (n = 4)



Use Delayed Action & Abx Timeout Protocols



Outcome Measure	aIRR	95% CI
Abx Rx for cystitis	0.73	0.51 – 0.91
Abx Rx for any UTI	0.83	0.70 – 0.99
CDI	0.35	0.19 – 0.64
Hospitalizations	0.95	0.75 – 1.19
Deaths	0.92	0.73 – 1.16

Nace et al. *JAMA Intern Med* 2020; 180(7): 944-51

Target Education at Providers & Staff

Table 3. Random Assignment and Treatment with Parenteral Antibiotics According to Guideline

	Random Assignment of SNFs	
	Multi-Disciplinary Training	Physician-Only Training
	(% of episodes with guideline indication)	
Preintervention	50% (10/20)	64.5% (69/107)
Postintervention	81.8%* (18/22)	69% (29/42)

*P = .06.

SNF = skilled nursing facility.

Naughton et al. *J Am Geriatr Soc* 2001; 49(8): 1020-4



Brief report

Results of a Veterans Affairs employee education program on antimicrobial stewardship for older adults

Barbara Heath MSN^a, Jaime Bernhardt BA^b, Thomas J. Michalski BS^b, Christopher J. Crnich MD, PhD^c, Rebekah Moehring MD, MPH^d, Kenneth E. Schmader MD^d, Danielle Olds RN, MPH, PhD^{e,1}, Patricia A. Higgins RN, PhD^{a,1}, Robin L.P. Jump MD, PhD^{a,g,h,*}

^aGeriatric Research Education and Clinical Center, Cleveland, OH

^bEmployee Education System, Louis Stokes Cleveland Veterans Affairs Medical Center, Cleveland, OH

^cGeriatric Research Education and Clinical Center, William S. Middleton Memorial Veterans Hospital and University of Wisconsin, Madison, WI

^dGeriatric Research Education and Clinical Center, Durham Veterans Affairs Medical Center and Duke University, Durham, NC

^eQuality Scholars Program, Louis Stokes Cleveland Veterans Affairs Medical Center, Cleveland, OH

^fFrances Payne Bolton School of Nursing, Case Western Reserve University, Cleveland, OH

^gDivision of Infectious Diseases and HIV Medicine, Department of Medicine, Case Western Reserve University, Cleveland, OH

^hInfectious Disease Section, Medical Division, Louis Stokes Cleveland Veterans Affairs Medical Center, Cleveland, OH

- Focus on treatment of common infections (PUS)
- Emphasize alternatives to problematic antibiotics in older adults (e.g., fluoroquinolones, macrolides, clindamycin, TMP/SMX)
- Emphasize benefits of short-course therapy (most infections can be treated with ≤7 days of therapy)
- Nursing education:
[https://www.coursesites.com/webapps/Bb-sites-course-creation-BBLEARN/courseHomepage.htmlx?course_id= 3489311](https://www.coursesites.com/webapps/Bb-sites-course-creation-BBLEARN/courseHomepage.htmlx?course_id=3489311)
- Provider education: MedPortal Curriculum
https://dx.doi.org/10.15766%2Fmep_2374-8265.10754

Thank You



See Table 1
for good list of additional resources



JAMDA

journal homepage: www.jamda.com



Special Article

Template for an Antibiotic Stewardship Policy for Post-Acute and Long-Term Care Settings

Robin L.P. Jump MD, PhD ^{a,b,*}, Swati Gaur MD, MBA, CMD ^c, Morgan J. Katz MD ^d, Christopher J. Crnich MD, PhD ^{e,f}, Ghinwa Dumyati MD ^g, Muhammad S. Ashraf MBBS ^h, Elizabeth Frentzel MPH ⁱ, Steven J. Schweon RN, MPH, MSN, CIC, HEM ^j, Philip Sloane MD, MPH ^k, David Nace MD, MPH, CMD ^l on behalf of the Infection Advisory Committee for AMDA—The Society of Post-Acute and Long-Term Care Medicine



School of Medicine
and Public Health

UNIVERSITY OF WISCONSIN-MADISON