



## Tapping into Pharmacists for Antibiotic Stewardship in Long Term Care

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## Risk of Infection in the Elderly in Long Term Care Facility

- Age associated changes
- Multiple comorbid diseases
- Polypharmacy
- Malnourished
- Functional/cognitive impairment
- Invasive devices
- Residential nature of institution
- Visitors

Smith PW, et al. Am J Infect Control. 2008;36(7):504-535

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## Antibiotic Utilization in LTC

- Over the course of a year up to 70% of residents in LTC receive a course of systemic antibiotic therapy
- 77-88% of infections receive antibiotic treatment
- In US rate of 0.4-23.5 / 1,000 resident days
- 40-75% of antibiotic prescribed may be unnecessary or inappropriate
- In 2009 direct antibiotic cost in LTCF/Nursing homes totaled \$527 million
- Increase number of post-acute patients coming on antibiotic therapy

CDC. The Core Elements of Antibiotic Stewardship for Nursing Homes. Available at: <http://> Accessed Jan 30, 2016  
 Harris AM, et al Ann Intern Med. [Epub ahead of print 19 January 2016] doi:10.7326/M15-1840  
 Nicolle LE. Antimicrob Resist Infect Control. 2014; 3:6. doi:10.1186/2047-2994-3-6  
 Smith PW, et al. Am J Infect Control. 2008; 36(7):504-535

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## Antibiotic Over Prescribing: Common Clinical Situations and Alternative Therapy

Clinical Situation	Alternative Therapy to Antibiotics
Asymptomatic Bacteremia	Monitor vital signs, and for any symptoms
Cloudy/ Malodorous Urine	Scheduled toileting, perineal cleansing, increase fluid intake
Non-specific Symptoms → Test for UTI	Consider other factors/possible get UA
Upper Respiratory Infections	Supportive Therapy
Bronchitis without COPD	Symptomatic Treatment, Bronchodilators for those with wheezing/bothersome cough
Influenza without secondary infection	Antiviral therapy

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Khandelwal C, et al. Ann Longterm Care 2012;20(4):23-29



## Dangers of Inappropriate Antibiotic Use

- Adverse drug reactions
- Drug interactions
- Colonization with antibiotic resistant organism
- Infection with antibiotic resistant organism
- Secondary infections
- Financial burden

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CDC. The Core Elements of Antibiotic Stewardship for Nursing Homes. Available at: <http://www.cdc.gov/longtermcare/index.html>. Accessed Jan 30, 2016



## Definition of Antibiotic Stewardship

“ Refers to a set of commitments and actions designed to ‘optimize the treatment of infectious while reducing the adverse events associated with antibiotic use’”

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CDC. The Core Elements of Antibiotic Stewardship for Nursing Homes. Available at: <http://www.cdc.gov/longtermcare/index.html>. Accessed Feb 24, 2017



## Barriers to Antibiotic Stewardship in LTCF

- Providers are not in house
- Availability of laboratory services
- Diagnostic uncertainty
- Part time infection control professional
- Institutional exposure – home like environment
- Patient/Family expectations

Smith PW, et al. Am J Infect Control. 2008;36(7):504-535  
Nicolle LE. Clin Infect Dis. 2000;31:752-756  
Nicolle LE. Antimicrob Resist Infect Control. 2014;3:6. doi:10.1186/2047-2994-3-6  
Dyar OJ, et al. Clin Microbiol Infect. 2015; 21(1 ):10 – 19

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## Regulations in LTC

- Mega Rule
  - F-Tag 329: Unnecessary Medication
  - F-Tag 431 Pharmacy Services
  - F-Tag 441: Infection Control
- Pilot Survey

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## F-Tag 329: Unnecessary Drug

- Without adequate indication for its use
- Excessive dose (including a duplicate drug)
- Excessive duration
- Without adequate monitoring
- In the presence of adverse consequences which indicate the dose should be reduced or discontinued

Revision to State Operations Manual (SOM) Appendix PP - Incorporate revised Requirements of Participation for Medicare and Medicaid certified nursing facilities. Available at: <https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/2017Downloads/R168SOMA.pdf>. Accessed April 2, 2017

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## F-Tag 431 Pharmacy Services

- The facility must provide medication to the patient/resident
  - Routine
  - Emergency medication
- The facility must employ or obtain the services of a consultant pharmacist

Revision to State Operations Manual (SOM) Appendix PP - Incorporate revised Requirements of Participation for Medicare and Medicaid certified nursing facilities. Available at: <https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/2017Downloads/R168SOMA.pdf>. Accessed April 2, 2017

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## F-Tag 441 Infection Control

- By November 28, 2017 each LTC must have an antibiotic stewardship program that includes antibiotic use protocols and a system to monitor antibiotic use

Revision to State Operations Manual (SOM) Appendix PP - Incorporate revised Requirements of Participation for Medicare and Medicaid certified nursing facilities. Available at: <https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/2017Downloads/R168SOMA.pdf>. Accessed 11



## Survey and Infection Control Pilot Project

- Issued December 23, 2015
- Overview
  - 3 year pilot project
  - Goal to improve assessments of infection control and prevention regulations
- Details
  - Educational
  - No citations issues BUT if immediate jeopardy identified will notify CMS regional office
- Expected Outcomes
  - New surveyor infection control tools and survey processes

Centers for Medicare & Medicaid Services. Infection Control Pilot Project . Available at <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/Survey-CertificationGenInfo/Downloads/Survey-and-Cert-Letter-16-05.pdf> Accessed February 15, 2016 12



## Pilot Survey Antibiotic Stewardship

1. Facility has antibiotic stewardship program approved by governing body
2. Facility has identified clinical leaders in charge of antibiotic stewardship
3. Facility has written protocols on antibiotic prescribing
4. Facility uses assessment tools or algorithms for antibiotic use
5. Facility has report looking at antibiotic utilization in past 6 months

Infection Control Pilot: 2017 Update. Available at: <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/Downloads/Survey-and-Cert-Letter-17-09.pdf> . Accessed Mar 3, 2017

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## Pilot Survey Antibiotic Stewardship

6. Facility has an antibiogram
7. Facility gives providers feedback about their prescribing practices
8. Facility clinical leadership as provided education on stewardship to all nursing and clinical providers
9. Facilities has educational materials on antibiotics stewardship for residents/families

Infection Control Pilot: 2017 Update. Available at: <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/Downloads/Survey-and-Cert-Letter-17-09.pdf> . Accessed Mar 3, 2017

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## How to Initiate Antibiotic Stewardship in LTCF

- Implementation of the CDC Core Elements for Antibiotic Stewardship in Nursing Homes
  - Leadership Commitment
  - Accountability
  - **Drug Expertise**
  - Action
  - Tracking
  - Reporting
  - Education
- Recommended to start by implementing 1-2 strategies to start with and keep adding new strategies over time

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CDC. The Core Elements of Antibiotic Stewardship for Nursing Homes. Available at: <http://www.cdc.gov/longtermcare/index.html>. Accessed Jan 30, 2016



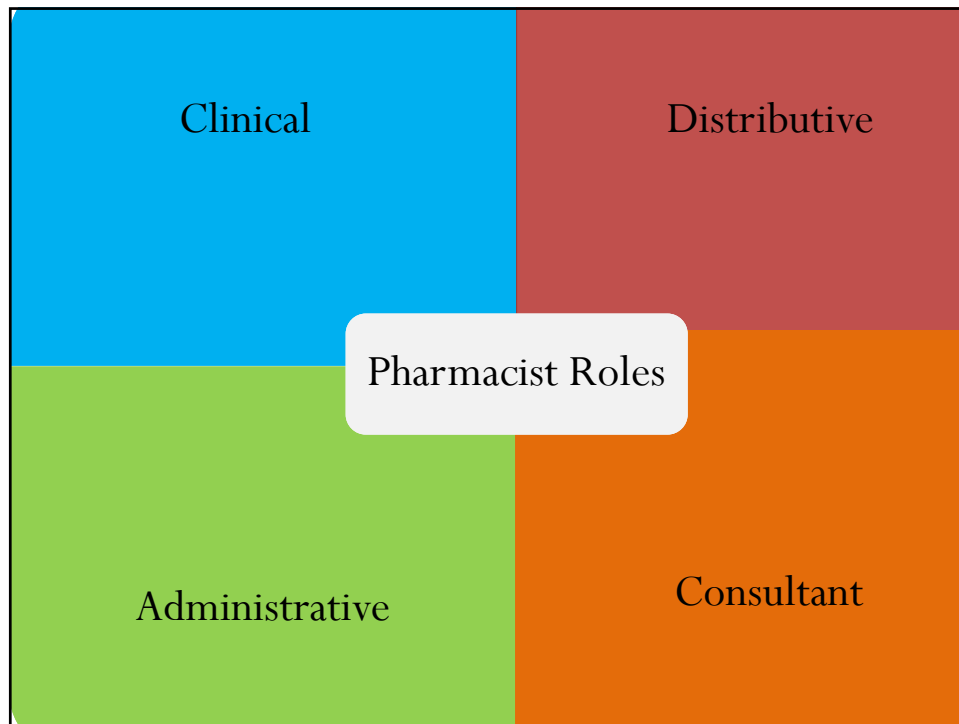
## Drug Expertise

- Nursing homes establish access to individuals with antibiotic expertise”
- “Work with a consultant pharmacist who has received specialized infectious disease training or antibiotic stewardship training”
  - Making a Difference in Infectious Disease (MAD-ID)
  - Society for Infectious Diseases Pharmacist antibiotic stewardship certificate program (SIDP)
  - ASCP Antibiotic Tool-Kit Training

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CDC. The Core Elements of Antibiotic Stewardship for Nursing Homes. Available at: <http://www.cdc.gov/longtermcare/index.html>. Accessed Feb 24, 2017





## Develop Policy and Procedure for Antimicrobial Stewardship

- One of the key first steps
- Establish leadership support
- Delineate your antibiotic stewardship champions roles

**SUBJECT: Antimicrobial Stewardship Program**

**Purpose:**

To form and maintain a committee that establishes and enforces commitments and actions designed to improve antimicrobial use with the goal of enhancing patient health outcomes, reducing resistance to antibiotics, and decreasing unnecessary cost.

**Policy:**

The facility will maintain an interdisciplinary antimicrobial stewardship program (ASP) that defines and provides guidance for optimal antimicrobial use.

**Procedure:**

1. The ASP and members will have accountability to the facilities Quality Assurance/Performance Improvement committee. The ASP will give updates quarterly to the QAPI committee.
2. The membership of the ASP will be comprised of at a minimum: the medical director, the director of pharmacy, and the infection control specialist.
  - a. The medical director will set the standard for antimicrobial prescribing
  - b. Infection control specialist will establish the standards for nursing:
    - Assessment
    - Monitoring and communication of changes in condition when an infection is suspected
  - c. The director of pharmacy will set standards for dispensing/consultant pharmacist to review antimicrobial orders upon dispensation/during monthly medication regimen review to ensure antimicrobials are appropriately ordered and monitored.
3. The members of the ASP will develop, educate and enforce protocols for use by the facility staff for appropriate identification and assessment of infections and treatment guidelines.
4. The members of the ASP committee will meet at least monthly to review collected data and facility trends, analyze performance, and develop action plans to improve antimicrobial use.

\*For more detailed responsibilities please refer to appendix 1 of this policy

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**Appendix 1: Duties of the Committee Members of Parker Jewish Antibiotic Stewardship Program**

Director of Pharmacy:

- Create an antimicrobial stewardship committee that sets standards for antibiotic prescribing practices at Parker Jewish Institute
- Coordinate with the antimicrobial stewardship team to have pharmacist provide in-service presentations to educate staff on antimicrobial stewardship programs put in place at Parker Jewish Institute with the nursing educator.
- Have dispensing pharmacist to review antimicrobial orders for appropriate dose, route, duration and indication when validating the order prior to dispensation
- Have consultant pharmacist during their medication regimen review any patient who had order for antimicrobials since past review to ensure ordered appropriately.
- Establish laboratory testing protocols to monitor for adverse effects and drug interactions related to use of antibiotics
- Review yearly antibiogram with appropriate individuals and ensure empiric antimicrobial therapy recommendations are updated based on resistance patterns
- Ensure emergency antimicrobials are available after hours to initiate appropriate antimicrobial therapy without delay

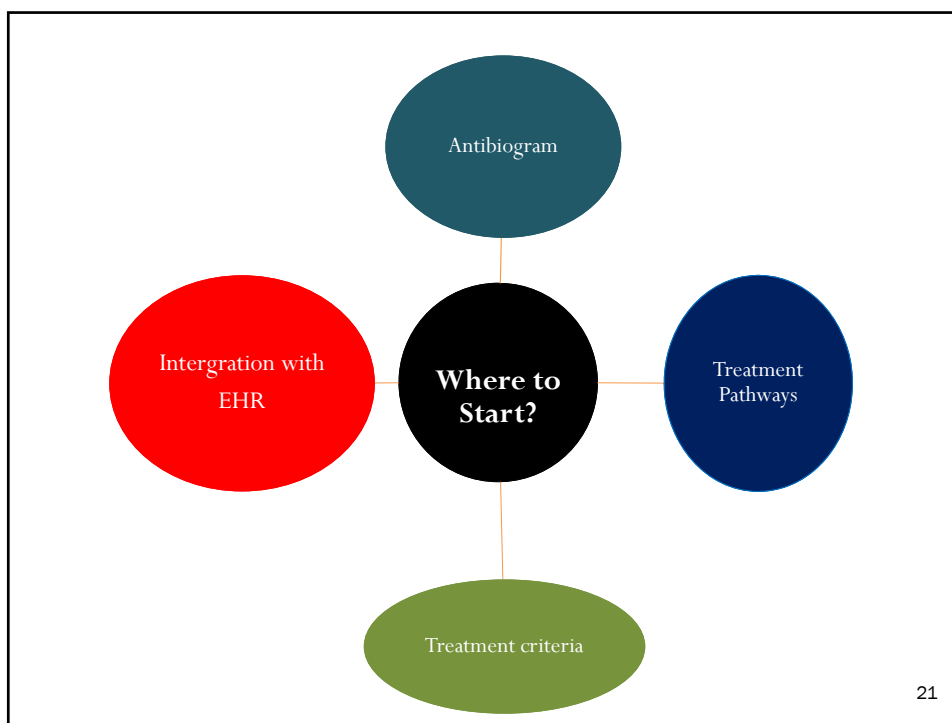

Infection Control Specialist

- Establish standards for nursing staff to assess, monitor and communicate changes in a resident's condition that could affect the need for antibiotics
- Use influence as a nursing leader to ensure antibiotics are only prescribed when appropriate
- Work with the nursing educator to educate the nursing staff about the importance of antibiotic stewardship and explain the policies in place to improve antibiotic use

Medical Director:

- Oversee the adherence to antibiotic prescribing practices
- Communicate antimicrobial use results to the providers
- Review antibiotic use data and ensure best practices are followed

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## Antibiogram

- Need to coordinate with laboratory
  - Create/provide data to create annual report showing organisms present in the specimen from your nursing home
  - Percent susceptibility of each organism to different antibiotics
- Why is this important
  - It is going to drive your empiric therapy
  - Will be the foundation to your antibiotic use protocols
  - Help to detect changes in resistance pattern
- Clinical Pearls to consider
  - Only applicable to specific nursing home
  - Other resident factors should still be considered for empiric therapy
  - Cautiously interpret any organism with less than 30 isolates

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## Antibiogram: How to Utilize It in Practice?

Gram (0)	# of residents	Aminoglycosides			B-Lactams			Cephalosporins			Quinolones	Others	
		Amikacin	Gentamicin	Tobramycin	Ampicillin	Imipenem	Piperacillin-tazobactam	Cefazolin	Cefoxitin	Ceftriaxone	Ceftazidime	Ciprofloxacin	Nitrofurantoin
<i>Escherichia coli</i>	37	100	100	100	100	100				100	75		
<i>Klebsiella sp *</i>	* 33	100	84.6	92.3	38.5	100	92.3	84.6	100	100	38.5		92.3
<i>Proteus sp</i>	31	71.4	57.1	71.4			85.7			57.1	57.1		28.6
<i>Pseudomonas aeruginosa †</i>	† 23	100	83.3	92.3	91.7		100		81.8	100	100		30.8
													69.2

Gram (+)	# of residents	Penicillins				Cephalosporins		Quinolones	Others							
		Penicillins	Ampicillin	Oxacillin	Methicillin	Cephalexin	Ceftriaxone	Ciprofloxacin	Moxifloxacin	Gentamicin	Linezolid	Rifampin	Tetracycline	TMPSMX	Vancomycin	Nitrofurantoin
<i>Staph aureus (all) †</i>	† 17	0	0	0	0		0	0	87.5	100	100	100	100	100	100	100
Methicilin Resistant (MRSA)	34	0	0	0	0		0	0	87.5	100	100	100	100	100	100	100
Methicilin Susceptible (MSSA)	0															
<i>Enterococcus sp *</i>	* 30	100	100				50		75				25		100	100

† This antibiogram uses 2 years of culture data for these organisms.  
 † Results based on fewer than 30 isolates are less reliable and should be interpreted with caution.

Concise Antibiogram Toolkit Getting Started. Available at: [https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/patient-safety-resources/resources/nh-aspguide/module2/toolkit1/cat\\_sources.pdf](https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/patient-safety-resources/resources/nh-aspguide/module2/toolkit1/cat_sources.pdf). Accessed on April 2, 2017



## Establishing Antibiotic Protocols and Policies

Treatment pathways for common infections

Antibiotic monitoring protocols

IV antibiotic dilution standards/rate of infusion reference

IV-PO conversion

Drug-Drug Interactions



## Necessity of Antibiotics: Loeb Criteria

- Based on expert opinion
- Established a minimum criteria to be met prior to initiating antibiotics in LTCFs
  - Urinary tract infections
  - Skin and soft tissue
  - Respiratory infections
  - Fever with no focus

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Loeb et al. Inf Control Hosp Epi. 2001; Feb 22(2): 120-4.



## Necessity of Antibiotics: Loeb Criteria

### Urinary Tract Infection – Minimum Criteria for initiation of Antibiotic (LOEB)

Acute Dysuria

OR

Fever > 100°F or 2.4°F above baseline and at least one of the following (new or worsening):

- Yes  No: Urinary incontinence
- Yes  No: Urgency
- Yes  No: Frequency
- Yes  No: Suprapubic pain
- Yes  No: Gross hematuria
- Yes  No: Costovertebral angle tenderness

Yes  No: Patient/resident meet minimum criteria for antibiotic initiation

Interventions and actions taken:

If patient/resident did not meet minimum criteria for antibiotic initiation and antibiotic started please document clinical rationale below:

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## Necessity of Antibiotics: Loeb Criteria

### Urinary Tract Infection (Indwelling Catheter) Minimum Criteria for initiation of Antibiotic (Loeb)

- At least 1 of the following
- Yes  No: Fever > 100°F or 2.4°F above baseline
  - Yes  No: New costovertebral tenderness
  - Yes  No: Rigors
  - Yes  No: New onset delirium

Yes  No: Patient/resident meet minimum criteria for antibiotic initiation

Interventions and actions taken:

If patient/resident did not meet minimum criteria for antibiotic initiation and antibiotic started please document clinical rationale below:

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## Treatment Pathway for Common Infections

### Empiric Antibiotic Therapy for UTI Without Pyelonephritis

<b>First Line Therapy</b>	Cephalexin PO
<b>Second Line Therapy</b>	Nitrofurantoin PO
<b>Third Line Therapy</b>	Bactrim DS PO
<b>Fourth Line Therapy</b>	Fosfomycin PO

### Empiric Antibiotic Therapy for UTI With Pyelonephritis

<b>First Line Therapy</b>	Ceftriaxone IVPB/IM
<b>Second Line Therapy</b>	Cefpodoxime PO
<b>PCN Allergy</b>	Aztreonam IVPB/IM

### Empiric Antibiotic Therapy for Complicated ESBL UTI history

<b>First Line Therapy</b>	Meropenem IVPB
<b>Second Line Therapy</b>	Ertapenem* IM

\*will not cover pseudomonas

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## Monitoring of Antibiotic Therapy

- Therapeutic Monitoring Orders
- Integration into EHR

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## Therapeutic Monitoring Order policy

- Purpose
  - In order to assist in the appropriate laboratory monitoring of medication therapy of residents pharmacists and New York State licensed pharmacy residents rounding on resident care units will be allowed to order such laboratory tests.

Medication/ Drug Classes	Laboratory Test
Amikacin, Gentamicin, Tobramycin	Peaks and Troughs (baseline at steady state and weekly for duration of therapy) SMA-7 (weekly for duration of therapy)
Vancomycin	Random level (baseline at steady state and weekly for duration of therapy) SMA-7 (weekly for duration of therapy)
Daptomycin	CPK (weekly for duration of therapy)
Linezolid	CBC (weekly for duration of therapy)
Warfarin	INR (Baseline, placed on interacting medication per policy, over 30 days since last INR)
Polymyxin B	SMA-7 (weekly for duration of therapy)

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## Impact of a Pharmacy Practice Collaborative Practice on Monitoring Vancomycin in a Long Term Care Facility

- Objectives:
  - **Primary objective:** Determine incidence of acute kidney injury in patients who received vancomycin a year before and a year after implementation therapeutic monitoring policy
  - **Secondary objectives:** Assess percentage of vancomycin troughs in therapeutic range and compliance with laboratory testing
- Inclusion Criteria:
  - 18 years or older
  - Received  $\geq 4$  doses of IV vancomycin
  - Drug levels were ordered
  - CrCl  $\geq 15$  mL/min utilizing Cockcroft-Gault
  - Not on hemodialysis

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Smith AP et al. Consult Pharm. 2016 Sep;31(9):505-10.



## Impact of a Pharmacy Practice Collaborative Practice on Monitoring Vancomycin in a Long Term Care Facility

**Table 1. RIFLE Criteria**

Risk	SCr increase 1.5x baseline or GFR decrease by greater than 25%
Injury	SCr increase 2x baseline or GFR decrease by greater than 50%
Failure	SCr increase 3x baseline or GFR decrease by greater than 75% or SCr of $> 4$
Loss	Complete loss of renal function for longer than 4 weeks
End-Stage Renal Disease	Complete loss of renal function for at least 3 months

**Abbreviations:** GFR = Glomerular filtration rate, SCr = Serum creatinine.

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Smith AP et al. Consult Pharm. 2016 Sep;31(9):505-10.





## Impact of a Pharmacy Practice Collaborative Practice on Monitoring Vancomycin in a Long Term Care Facility

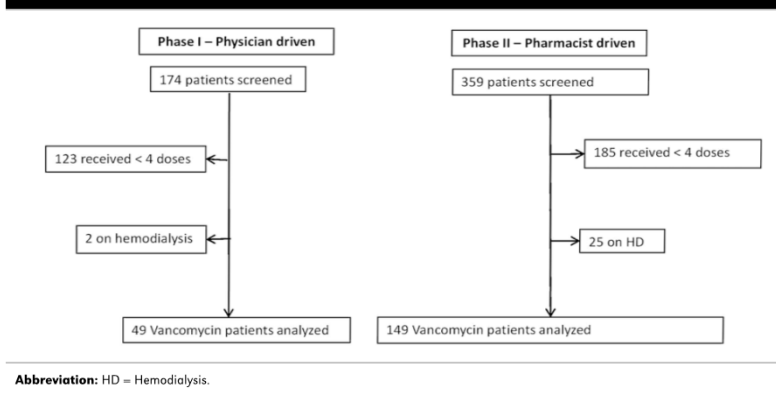
**Table 2. Compliance with Monitoring Vancomycin Level Scenarios**

Scenario	Compliance if:
Vancomycin initiated outside the nursing facility	Level obtained weekly
Vancomycin initiated in the nursing facility	Level obtained between fourth and sixth doses, then weekly
Vancomycin dose adjusted in the nursing facility	Level obtained between fourth and sixth doses, then weekly



## Impact of a Pharmacy Practice Collaborative Practice on Monitoring Vancomycin in a Long Term Care Facility

**Figure 1. Patient Recruitment Flowchart**





## Impact of a Pharmacy Practice Collaborative Practice on Monitoring Vancomycin in a Long Term Care Facility

- Baseline Characteristics:

**Table 3. Baseline Characteristics**

Variable	Preprotocol (n = 49)	Postprotocol (n = 149)	P-Value
Age (yr), mean ± SD	72.6 ± 13.5	68.8 ± 17.2	0.120
Male gender, %	40.8	56.5	0.056
BMI (kg/m <sup>2</sup> ), mean ± SD	28.4 ± 7.9	26.9 ± 9	0.276
BUN (mg/dL), mean ± SD	28.0 ± 20.3	26.9 ± 16.9	0.734
SCr (mg/dL), mean ± SD	0.7 ± 0.38	0.9 ± 0.46	0.065
WBC count (x10 <sup>3</sup> /mm <sup>3</sup> ), mean ± SD	10.0 ± 3.6	10.7 ± 4.6	0.231
Neutrophils (%), mean ± SD	68.3 ± 14.5	70.1 ± 11.1	0.432

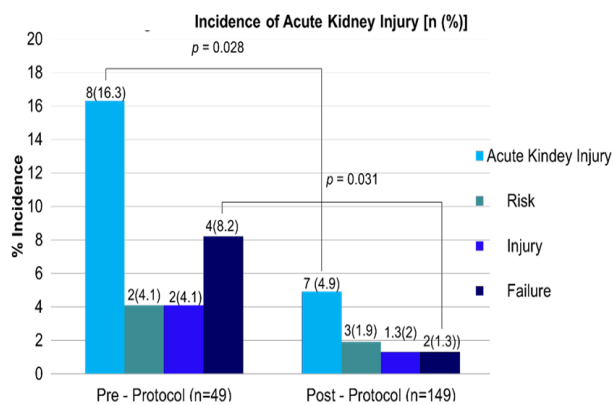
**Abbreviations:** BMI = Body mass index, BUN = Blood urea nitrogen, SCr = Serum creatinine, SD = Standard deviation, WBC = White blood cell.

Smith AP et al. Consult Pharm. 2016 Sep;31(9):505-10.

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## Impact of a Pharmacy Practice Collaborative Practice on Monitoring Vancomycin in a Long Term Care Facility



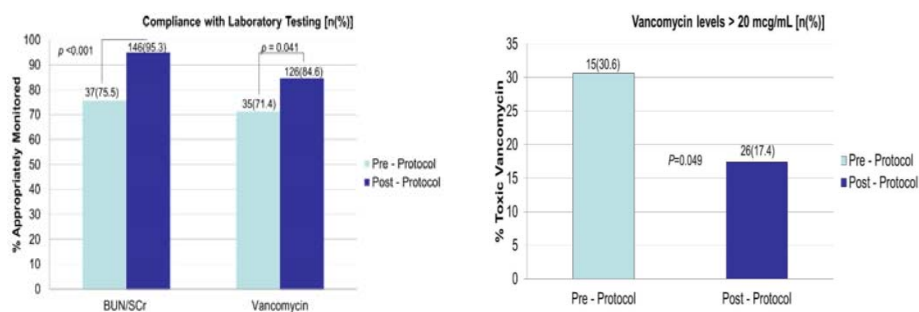
Smith AP et al. Consult Pharm. 2016 Sep;31(9):505-10.

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## Impact of a Pharmacy Practice Collaborative Practice on Monitoring Vancomycin in a Long Term Care Facility

- Results



Smith AP et al. Consult Pharm. 2016 Sep;31(9):505-10.

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## Impact of a Pharmacy Practice Collaborative Practice on Monitoring Vancomycin in a Long Term Care Facility

- Limitations to implementation
- Requires having in house clinical pharmacist/ pharmacy residents
- Time consuming – physically going to paper chart

**Can We Use Technology to Aid in Monitoring?**

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## Integration of Lab Monitoring in EHR on monitoring

- 303 bed community hospital
- Implemented whenever vancomycin is ordered automatic orders generate for:
  - Vancomycin trough
  - Vancomycin reminder trough
- Patient Groups:
  - Pre-implementation
  - Post-implementation
- Secondary Outcome of Interest
  - Percent in whom a level was ordered

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## Integration of Lab Monitoring in EHR on monitoring

- Results
  - Prior to implementation 207/228 had vancomycin level ordered (90.8%)
  - Post-implementation 199/199 had vancomycin

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## Integration of Lab Monitoring in EHR on monitoring

PHARMACY POLICY AND PROCEDURE MANUAL

SUBJECT: ANTIBIOTIC THERAPEUTIC MONITORING ORDERS

**Purpose:**

To assist in the appropriate laboratory monitoring of antibiotic therapy of patients/residents residing in Parker Jewish Institute

**Policy:**

The facility will maintain a list of antibiotics that will have the laboratory test attached to the order, but that will require a license pharmacist validating the antibiotic to schedule optimal timing of the attached laboratory test. This policy applies only to antibiotics and associated laboratory test as listed in Table 1.

**Procedure:**

1. The provider will order the antibiotic. It is the responsibility of the provider to use the antibiotic order that is built in the SigmaCare library with the attached laboratory order.
2. The pharmacist will validate the antibiotic order in pharmacy system.
3. The pharmacist validating the antibiotic order will schedule the correct timing for the associated laboratory test to be drawn as listed in Table 1 in the SigmaCare system.

Table 1.

Drug	Laboratory Test
Vancomycin IVPB	Vancomycin trough level and BMP at steady state (Morning before 4 <sup>th</sup> dose; if 4 <sup>th</sup> dose in the evening then laboratory test should be schedule before the 5 <sup>th</sup> dose) Vancomycin Level and BMP weekly after steady state draw (Patient/Residents on vanomcycin IVPB > 7 days)

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## How Can Pharmacy Assist in Initiating Antibiotic Stewardship in LTCF?

- Dispensing/Vendor pharmacist can ensure appropriate antibiotic therapy
  - Requiring all antibiotic orders to have:
    - Dose
    - Duration (Stop Date)
    - Specific indication
  - Review medication that available off hours
  - Assist with selection of antibiotics in patient with allergies

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## Patient Case Utilizing Dispensing Pharmacist

- 80 y/o female noted to have order for levofloxacin 500mg PO Stat and daily for 7 days for complicated UTI
- Demographic Data:
  - Height = 5 feet 4 inches
  - Weight 141.9 pounds
  - SrCr: 2.7

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## Patient Case Utilizing Dispensing Pharmacist

- Patient CrCl ~14.35 mL/min
- Recommended dose of complicated UTI
  - 250 mg once daily for 10 days
  - 750 mg once daily for 5 days
- Renal dose adjustment (CrCl 10-19 mL/min)
  - 250mg daily – 250mg every 48 hours (except in uncomplicated UTI)
  - 750mg daily – administer 750mg initial dose followed by 500mg every 48 hours

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Lexicomp Online®, Lexi-Drugs®, Hudson, Ohio: Lexi-Comp, Inc.; Accessed on Feb 13, 2016.



## Utilizing MRR for Antibiotic Stewardship

- Review antibiotic prescriptions during medication regimen reviews
  - New Admission
  - Monthly Medication Regimen Review
- Medication Regimen Review
  - Appropriate indication
  - Untreated indication
  - Improper medication selection
  - Appropriate dose
  - Adverse reactions
  - Drug interactions

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Clark TR, et al. Consult Pharm. 2010 Dec;25(12):788-90, 795-7, 801-2



## Patient Case New Admission MRR

- Reason For Admission
  - 33Y/O male admitted to acute secondary to cardiac arrest
- PMH
  - Seizures, sigmoid volvulus, HTN, TBI, asthma, craniotomy, hydrocephalus, VP shunt, GT, tracheostomy
- Course in Hospital
  - Patient started on vancomycin, cefepime, and metronidazole for pneumonia
  - Patient was treated inpatient for 4 days and then send back to the nursing home

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## Patient Case New Admission MRR

- Discharge Medication List
  - Docusate 300mg GT QHS
  - Ergocalciferol 50,000 units GT once weekly
  - Famotidine 20mg GT QAM
  - Heparin 5,000 units subcutaneously Q8H
  - Levetiracetam 1,000mg Q12H
  - Metoprolol tartrate 12.5mg GT Q12H
  - Amlodipine 10mg GT QAM
  - Phenytoin 200mg GT Q12H
  - Ipratropium- albuterol 0.5-2.5mg 1 vial via nebulizer Q6H PRN shortness of breath

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## Patient Case New Admission MRR

Any concerns about  
patient's medication  
regimen?

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## Patient Case: De-escalation?

- Patient was started on broad spectrum antibiotic therapy for UTI for 7 days, cultures come back on the 3<sup>rd</sup> day of therapy and noted that organism is pan sensitive. What would you do?:

Continue broad spectrum as the patient is improving

VS

Change to narrow spectrum agent for remainder of the course

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## Creating References for the Nursing Home Staff

- Renal dose adjustments
- IV to PO conversions
- IV admixture/administration reference
- Common drug interaction reference

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## Report to QAPI

- Report on antibiotic utilization trends:
  - Optimization of antibiotic orders
    - Orders having specific indication
    - Optimal Agent/Dose/Duration
  - Optimization of antibiotic selection
    - De-escalation of therapy
    - Bug-Drug Match

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## Report to QAPI: Utilization of Antibiotics

- Prevalence of antibiotic use
  - $(\% \text{ of resident on antibiotic using antibiotics} / \# \text{ residents in facility}) \times 100$
- Rate of new antibiotic starts
  - $(\text{Number of new antibiotic starts} / \text{total number of resident days}) \times 1000$
  - Can be further broken down if want into short vs long stay, type of infection
- Total Antibiotic days of therapy
  - $(\text{Total monthly days of therapy} / \text{total monthly resident days}) \times 1000$
- Percent of new admissions on antibiotics
  - $(\# \text{ new admissions on antibiotics} / \# \text{ new admissions}) \times 100$

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# Educate! Educate! Educate!

- Provide in-services to educate staff on antimicrobial stewardship protocols and procedures put into place at your institution
  - Common infections in LTC
  - Criteria for initiation of antimicrobials
  - Treatment options
  - Drug-Drug interactions
  - Appropriate monitoring
- Speak at resident/family council
  - Appropriate antibiotic use- and dangerous of inappropriate use
  - Vaccination

**What You Need to Know About Antibiotics in a Nursing Home**

**What are antibiotics?**  
Antibiotics are drugs used to treat infections caused by bacteria. They do not work to relieve pain or fever, but they do kill most cases of bacteria.

**When are antibiotics necessary?**  
They are given when someone has an infection that needs to be treated. They are not given for viral infections, such as the common cold, flu, or most cases of sinusitis.

**What is antibiotic stewardship?**  
Antibiotic stewardship is a set of interventions and actions designed to make sure patients receive the right drug, at the right amount, for the right amount of time, and with the right support. Improving antibiotic use will reduce the risk of antibiotic resistance and other antibiotic-related problems.

**Why is improving antibiotic prescribing practices important for nursing homes?**  
Nursing homes tend to have a higher risk of antibiotic resistance because of the presence of many different types of antibiotic-resistant bacteria, such as methicillin-resistant staphylococci, vancomycin-resistant enterococci, and carbapenem-resistant enterobacteriaceae. Improving antibiotic prescribing practices in nursing homes can help reduce the risk of antibiotic resistance and other antibiotic-related problems.

**Can taking antibiotics be harmful?**  
Antibiotics do not kill all bacteria. Some bacteria are not killed by antibiotics. Some bacteria can become resistant to antibiotics. Antibiotic resistance can lead to antibiotic-resistant infections that are harder to treat. Antibiotics can also cause side effects, such as diarrhea, nausea, and allergic reactions. It is important to use antibiotics only when they are truly needed and to follow the directions of your healthcare provider.

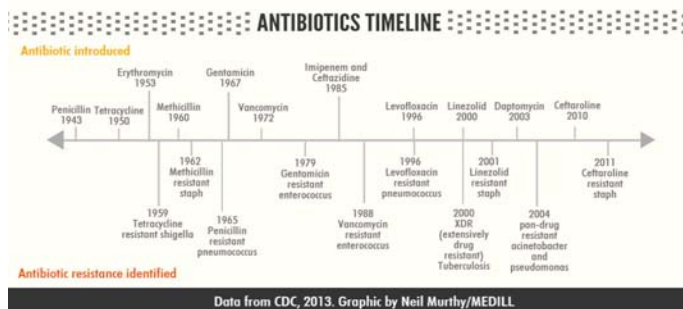
**Learn more about antibiotic resistance and stewardship at [www.cdc.gov/antibiotic-use](http://www.cdc.gov/antibiotic-use).**

**Created by CDC**



# Education: Antibiotic Resistance

- ~ 2 million Americans have antibiotic resistant infection in a year
- ~23,000 of them will die



Starving off superbugs-the battle against antibiotic resistance. Available at: <http://chicago-mosaic.medill.northwestern.edu/antibiotic-resistance-superbugs/> 54  
 Accessed April 4, 2017



## Summary

- The majority of residents in LTCF will have at least 1 course of system antibiotic use during the course of the year
- A large proportion of this antibiotic utilization is unnecessary and inappropriate
- Pharmacist working in the LTCF setting can help to ensure optimal antibiotic pharmacotherapy and compliance with regulations by assisting in development of antibiotic stewardship practices at the institutions they practice

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# Questions ?

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