Antimicrobial & Diagnostic Stewardship Practices in Prevention of Urinary Tract Infections

Philadelphia Department of Public Health
Healthcare-Associated Infections and Antimicrobial Resistance Program

Department of Public Health
CITY OF PHILADELPHIA

APIC CONSULTING

Disclosure & Acknowledgement

I have no actual or potential conflict of interest in relation to this program or presentation.

This presentation was developed by the Association for Infection Prevention and Control (APIC) Consulting Services with the aid of Paul M. Gentile, MPH, CIC, FAPIC.

Objectives

The learner will be able to:

1. Describe the significance of Antibiotic Stewardship (AS) regarding urinary tract infections (UTI).
2. Understand the differences between antimicrobial stewardship and diagnostic stewardship in preventing UTIs.
3. Apply diagnostic guidelines for managing UTIs in a long-term healthcare setting.

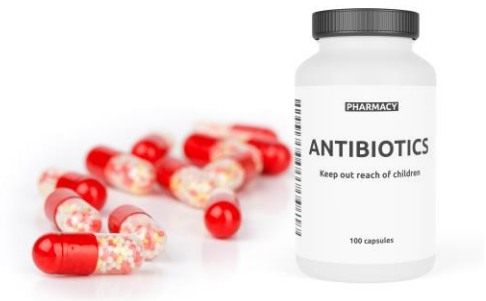
What is Antimicrobial Stewardship?

- Antibiotics versus Antimicrobials
- Improving and optimizing drug selection, dosage, and duration while minimizing resident harm
- Measurements for improvement:
  - Antimicrobial Use (AU)
  - Antimicrobial Resistance or selection (AR)

Antimicrobial Stewardship & Diagnostic Stewardship

Antimicrobial Stewardship:

Correct dose for the appropriate amount of time



Diagnostic Stewardship:

Appropriate diagnostic test at the appropriate time.

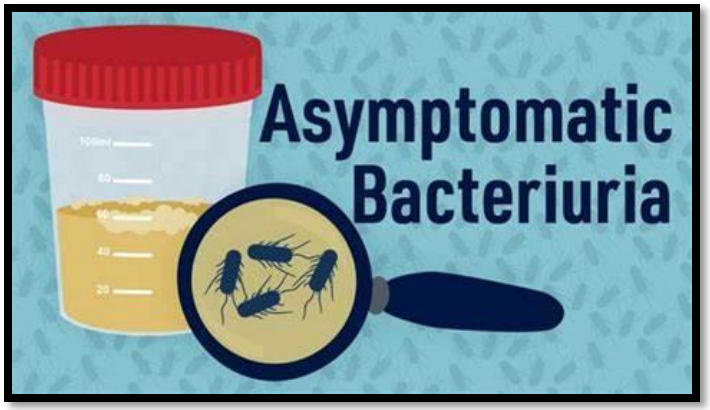
Antimicrobial Stewardship Standard of Care

- Centers for Medicare & Medicaid - §F881- Antibiotic Stewardship Program
- The Joint Commission (TJC) - Make antibiotic stewardship an organizational priority through support of its antibiotic stewardship program
- Healthcare-Associated Infections and Antimicrobial Resistance (HAI/AR) Program- Philadelphia Department of Health

Asymptomatic Bacteriuria (ASB)

Bacteria are present in urine, but the individual shows no signs or symptoms of an infection:

- 75%-90% of ASB are colonization
- Treatment is not recommended
- 20-83% receive unneeded antimicrobials
- ASB treatment is associated with AR



Urinary Tract Infection (UTI) Prevention

Urinary Tract Infection

- Infection of the urinary system
- Bacteria from the skin or rectum enter the urethra
- Different types of Infections
- Common organisms
  - *Escherichia*
  - *Enterobacter*
  - *Klebsiella*

Catheter-Associated Urinary Tract Infections (CAUTI)

- Develops after or during placement of an indwelling urinary catheter (IUC)
- Signs/Symptoms of UTI are present
- Leads to adverse events
- Increased IUC dwell time leads to greater risk of infection
- Requires treatment of antimicrobials

Device Necessity Daily Review

Appropriate Use

- Urinary retention/obstruction
- Perioperative use for selected surgeries
- To assist with the healing of open wounds
- End-of-life care
- Critically ill and needs strict measurements of intake and output

Inappropriate Use

- Urinary output
- Incontinence
- Prolonged post-operative use
- Transferring of patient

Urine Diagnostic Stewardship

Cultures are appropriate when:

- Clinical signs/symptoms (e.g., fever, rigors, costovertebral angle pain/tenderness, acute hematuria, flank pain, pelvic discomfort) suggestive of a UTI.
- Clinical signs/symptoms suggestive of sepsis with no alternative source.

Cultures are discouraged if:

- No presence of clinical signs/symptoms,
- Non-urologic surgical procedure, or
- Isolated temperatures or elevated white blood cells

Urine Diagnostic Stewardship UTI SBAR

Suspected UTI **SBAR**

Complete this form before contacting the resident's physician.

Date/Time _____

Nursing Home Name _____

Resident Name _____ Date of Birth _____

Physician/NP/PA _____ Phone _____

Fax _____

Nurse _____ Facility Phone _____

Submitted by ☐ Phone ☐ Fax ☐ In Person ☐ Other _____

S Situation

I am contacting you about a suspected UTI for the above resident.

Vital Signs BP _____/_____ HR _____ Resp. rate _____ Temp. _____

B Background

Active diagnoses or other symptoms (especially, bladder, kidney/genitourinary conditions)

Specify _____

☐ No ☐ Yes The resident has an indwelling catheter

☐ No ☐ Yes Patient is on dialysis

☐ No ☐ Yes The resident is incontinent **If yes,** new/worsening? ☐ No ☐ Yes

☐ No ☐ Yes Advance directives for limiting treatment related to antibiotics and/or hospitalizations

Specify _____

☐ No ☐ Yes Medication Allergies

Specify _____

☐ No ☐ Yes The resident is on Warfarin (Coumadin®)

AHRQ Agency for Healthcare Research and Quality Advancing Excellence in Health Care ● www.ahrq.gov

HAIs

www.ahrq.gov/NH-ASPGuide · June 2014
AHRQ Pub. No. 14-0010-2-EF

Nursing Home Name _____ Facility Fax _____

Resident Name _____

A Assessment Input (check all boxes that apply)

Resident WITH indwelling catheter
The criteria are met to initiate antibiotics if one of the below are selected

No Yes
☐ ☐ Fever of 100°F (38°C) or repeated temperatures of 99°F (37°C)*
☐ ☐ New back or flank pain
☐ ☐ Acute pain
☐ ☐ Rigors /shaking chills
☐ ☐ New dramatic change in mental status
☐ ☐ Hypotension (significant change from baseline BP or a systolic BP <90)

Resident WITHOUT indwelling catheter
Criteria are met if one of the three situations are met

No Yes
☐ ☐ 1. Acute dysuria alone

OR

☐ ☐ 2. Single temperature of 100°F (38°C)
and at least one new or worsening of the following:
☐ urgency ☐ suprapubic pain
☐ frequency ☐ gross hematuria
☐ back or flank pain ☐ urinary incontinence

OR

☐ ☐ 3. No fever, but two or more of the following symptoms:
☐ urgency ☐ suprapubic pain
☐ frequency ☐ gross hematuria
☐ incontinence

Nurses: Please check box to indicate whether or not criteria are met

☐ **Nursing home protocol criteria are met.** Resident may require UA with C&S or an antibiotic.†

☐ **Nursing home protocol criteria are NOT met.** The resident does NOT need an immediate prescription for an antibiotic, but may need additional observation.††

R Request for Physician/NP/PA Orders

Orders were provided by clinician through ☐ Phone ☐ Fax ☐ In Person ☐ Other _____

☐ Order UA

☐ Urine culture

☐ Encourage _____ ounces of liquid intake _____ times daily until urine is light yellow in color.

☐ Record fluid intake.

☐ Assess vital signs for _____ days, including temp, every _____ hours for _____ hours.

☐ Notify Physician/NP/PA if symptoms worsen or if unresolved in _____ hours.

☐ Initiate the following antibiotic

Antibiotic: _____ Dose: _____ Route: _____ Duration: _____

☐ No ☐ Yes Pharmacist to adjust for renal function

☐ Other _____

Physician/NP/PA signature _____ Date/Time _____

Telephone order received by _____ Date/Time _____

Family/POA notified (name) _____ Date/Time _____

* For residents that regularly run a lower temperature, use a temperature of 2°F (1°C) above the baseline as a definition of a fever.
† This is according to our understanding of best practices and our facility protocols. Minimum criteria for a UTI is at least 1 of 3 criteria listed in box.
†† This is according to our understanding of best practices and our facility protocols. The information is insufficient to indicate an active UTI infection.

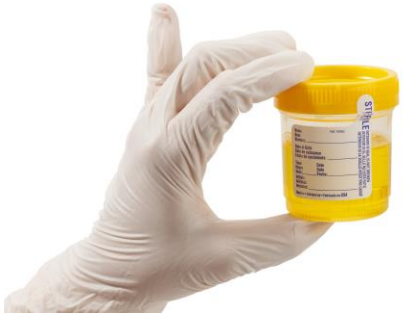
Obtaining a Urine Specimen

Avoid contamination:

- After pericares, collect a voided or "clean catch" using a sterile urine cup
- Straight catheterization
- Device in place, collect urine from the sampling port using an aseptic technique - Never obtain from a drainage bag or by disconnecting the IUC
- Transport specimen as soon as possible

Obtaining a Urine Specimen

Reject Specimen if:



- Not appropriately labeled with resident identifiers
- Missing site and date of collection
- The sample is leaking
- Not in an appropriate container
- Sample is old
- Sample is left at room temperature for greater than 1 hour

Urine Culture and Signs and Symptoms

National Criteria:

- McGeer Criteria
- NHSN LTCF UTI
- Loeb Minimum Criteria

Suspected Urinary Tract Infection

NO indwelling catheter:

- Acute dysuria

or

- Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature)

and at least one of the following:

New or worsening:

- Urgency
- Frequency
- Suprapubic pain
- Gross hematuria
- Costovertebral angle tenderness
- Urinary incontinence

Loeb Minimum Criteria

WITH indwelling catheter (Foley or suprapubic):

- *At least one* of the following:
  - Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature)
  - New costovertebral tenderness
  - Rigors
  - New onset of delirium

Note: Foul smelling or cloudy urine is not a valid indication for initiating antibiotics. Asymptomatic bacteriuria should not be treated with antibiotics.

AHRQ UTI Treatment Recommendations

Diagnosis

- **First, ask about SYMPTOMS**
  - Acute cystitis: dysuria, frequency, urgency, suprapubic pain
  - Pyelonephritis: fever, flank pain
  - Catheter-associated UTI (CAUTI): subrapubic pain and fever; patients with catheters may not report dysuria, frequency, or urgency
- If symptoms are present, obtain a urinalysis (UA) and culture
  - A positive UA shows evidence of inflammation (e.g., elevated white blood cells)
  - A positive urine culture is defined as ≥10,000–100,000 cfu/mL of a urinary pathogen (≥ 1,000 in patients with urinary catheters)
- If a chronic indwelling catheter is in place, remove and replace it before sending UA and culture
- Do not start antibiotics in patients with a positive UA and/or culture until asking about symptoms

Treatment

Uncomplicated acute cystitis	Nitrofurantoin or cephalosporin: 5 days Trimethoprim/sulfamethoxazole (TMP/SMX): 3 days
Uncomplicated pyelonephritis	Fluoroquinolone: 5–7 days TMP/SMX or oral cephalosporin:10–14 days (shorter course if early response)
Complicated UTI (including CAUTI)	3 days if lower tract CAUTI in women ≤ 65 years if catheter is removed/not replaced 7 days if prompt resolution of symptoms 10–14 days if delayed response, obstruction, or other urologic abnormality

Antibiotic Time Out

Appropriate Antibiotic Use

- Resident meets Loeb Minimum Criteria
- Signs/symptoms improving
- Reasons antibiotic prescribed
- Resident risk factors

Red Flags

- Continue with a broad-spectrum antibiotic
- Antibiotic is ordered for more than seven days
- Antibiotic inconsistent with organism sensitivities
- There is no stop date on the antibiotic order
- No labs are available
- IV route
- Resident has a penicillin allergy

Measures of Antimicrobial Prescribing

- Antimicrobial starts - number of new antimicrobials administered after a resident is admitted to a facility.
  - number of new antibiotic prescriptions/total number of resident days) X 1,000
- Days of Therapy (DOT) - each day that a resident receives a single antibiotic.
  - total days of therapy/total monthly resident days) X 1,000
- Analyze trends and determine the facility's goal
  - Has a given measure resulted in a reduction of antimicrobial use

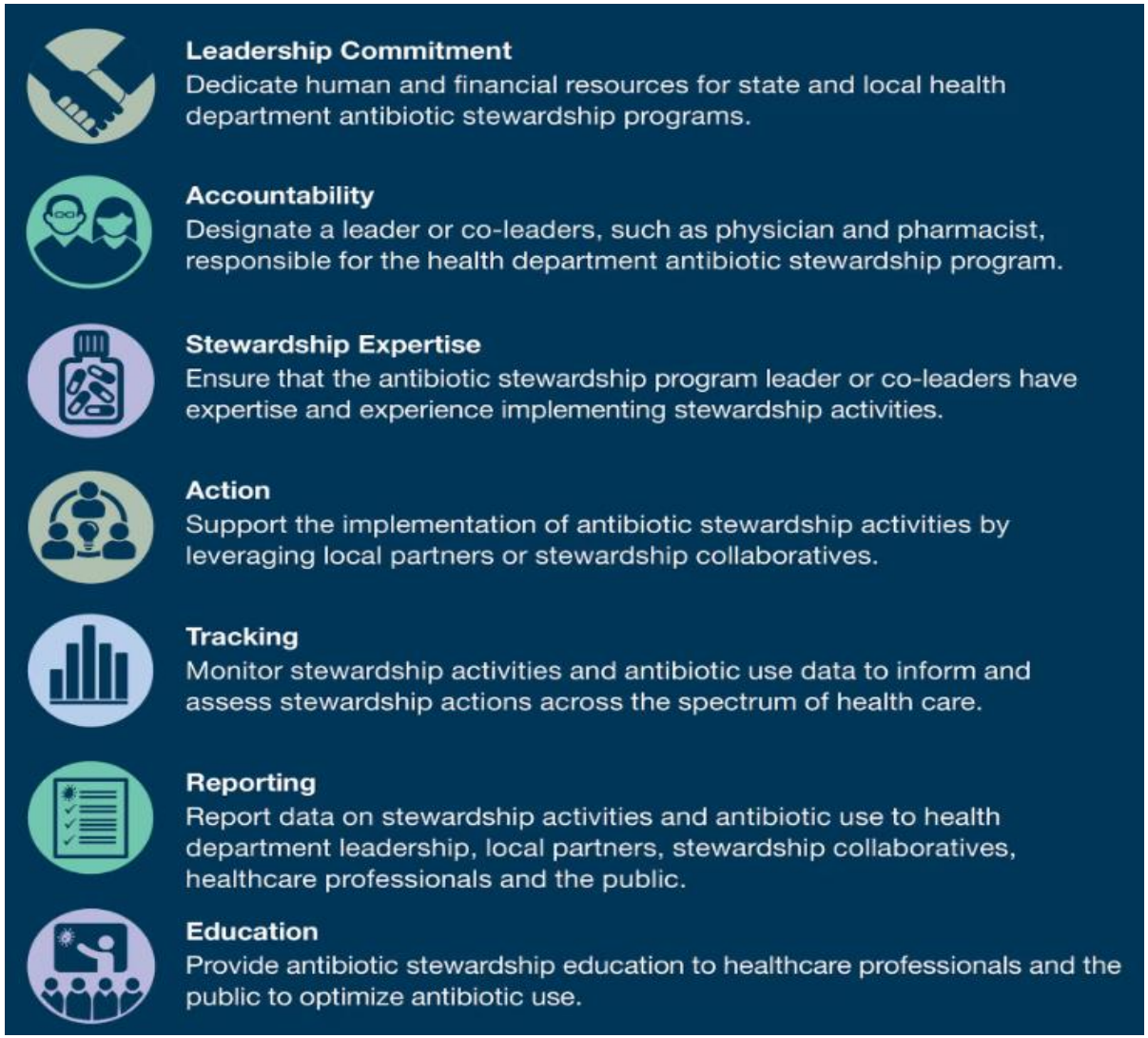
Antibiograms

- Overall profile of organism susceptibility to a specific antimicrobial
- Tracks resistance patterns over time
- Guides providers' decisions based on the suspected source and pathogen

Nursing Home Name/Clinical Laboratory Name
Antibiogram for dd/mm/yyyy to dd/mm/yyyy

	Gram Negative				Gram Positive			
Antibiotic Tested	*Escherichia coli*	*Klebsiella pneumoniae*	*Proteus mirabilis*	*Pseudomonas aeruginosa*	*Staphylococcus aureus* Non-MRSA	*Staphylococcus aureus* MRSA †	*Staphylococcus* coag. Neg	*Enterococcus sp*
# of Isolates‡	165	75	39	33	10*	35	18	68
Oral or Oral Equivalent					**Oral or Oral Equivalent**			
Ampicillin	46%	0%	62%		50%	0%	50%	96%
Amox/Clav	77%	96%	100%					
Cefazolin	70%	93%	88%		100%	0%	50%	
Cefoxitin	82%	100%	100%					
Ceftriaxone	85%	79%	92%					
Ciprofloxacin	58%	79%	62%	56%		0%	0%	47%
Levofloxacin	59%	79%	62%	57%	33%	20%	0%	64%
Nitrofurantoin	100%	0%	0%		100%	100%	100%	100%
TMP/SMX	64%	79%	54%		67%	100%	100%	
Tetracycline	64%	60%	0%		100%	100%	80%	38%
Oxacillin					100%	0%	50%	
Clindamycin					50%	50%	100%	
Erythromycin					50%	0%	0%	
Linezolid					100%	100%		100%
IV Only					**IV Only**			
PIP/TAZ	98%	96%	100%	100%				
Cefepime	89%	95%	92%	91%				
Ceftazidime				91%				
Gentamicin	85%	83%	92%	91%	100%	100%	67%	
Imipenem	100%	100%	100%	71%				
Vancomycin					100%	100%	100%	100%

Core Elements of AS



Tools, Resources, and References

PDPH **U**rinary Tract Infection-**F**ocused **A**ntibiotic **S**tewardship **T**oolkit (U-FAST)
https://hip.phila.gov/document/3798/U_FAST_Toolkit_.pdf/

1	**Asymptomatic bacteriuria** • One-page guide to managing residents with positive urine cultures and NO symptoms of UTI	Use this guide to provide stewardship education to bedside nursing staff and prescribers* in your facility. Consider posting the guide around areas where staff may be working	AHRQ
2	**Approaching a suspected UTI** • Guide to appropriate workup for residents with signs and symptoms of UTIs • 4x6 pocket cards, and 8x11 poster included	Distribute the pocket cards for prescribers to carry during rounds for easy access. Consider posting the 8x11 version around touchdown spaces or other areas where prescribers may be working	AHRQ – 8x11 AHRQ – 4x6
3	**Nursing SBAR for suspected UTI** • Communication tool to structure UTI discussion when nursing is contacting prescribers	Review the form with bedside nurses as part of training or annual education. Request that the form be filled out and kept in medical record during all resident encounters for suspected UTI.	AHRQ
4	**Collecting urine cultures** • One-page guide to proper technique for urine culture collection in residents with & without catheters	Distribute this guide to bedside nursing staff who are involved in the collection of urine cultures. Consider including it with nursing training or annual education, and/or posting it around nursing stations	AHRQ
5	**Diagnosis and treatment of UTIs** • Specific UTI diagnosis & treatment recommendations, including choice of antibiotic and duration	Distribute this guide to prescribers in your facility. Consider posting the around touchdown spaces or other areas where prescribers may be working	AHRQ
6	**Antibiotic timeout tool** • Protocol to reassess antibiotics after 48-72hrs based on the additional culture and clinical data available	Use this form routinely after all new antibiotic orders. Contact your electronic medical record provider (e.g., Point-Click-Care) to ask if it can be inserted as a user-defined alert. Consider tracking and reporting antibiotic timeout results at QAPI meetings.	RISE
7	**Talking to residents & family members about UTIs** • Talking points to respond to common questions from residents & family members about UTIs	Use this guide to provide stewardship education to bedside nursing staff and prescribers in your facility. Consider posting around areas where staff may be working.	AHRQ
8	**Resident/family educational pamphlet** • Trifold brochure for residents & families with answers to general FAQs around antibiotics	Keep copies of this pamphlet on the unit and provide as a resource to any resident or family member who has questions about antibiotics.	CDC
9	**Antibiotic commitment poster** • A public display of your community's commitment to antibiotic stewardship and accountability	Contact PDPH (HAI.PDPH@phila.gov) or your RISE team member to have poster customized for your facility, including company logo, electronic signatures, and/or pictures of facility leadership.	PDPH

**Prescriber* refers to any physician or advance practice provider who writes orders for medications (including antibiotics) in your facility

Tools, Resources, and References

PDPH U-FAST Toolkit for Urinary Tract Infection Stewardship
https://hip.phila.gov/document/3798/U_FAST_Toolkit_.pdf/

PDPH Antibiotic Stewardship Commitment Posters
https://hip.phila.gov/disease-control/healthcare-associated-infections-antibiotic-resistance/resource-library/Commitment-to-Antibiotic-Stewardship/

Agency for Healthcare Research and Quality (AHRQ) Nursing Home Antimicrobial Stewardship Guide
https://www.ahrq.gov/nhguide/index.html

Core Elements of Antibiotic Stewardship | Antibiotic Use | CDC
https://www.cdc.gov/antibiotic-use/core-elements/index.html

Antimicrobial Stewardship and Urinary Tract Infections
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4790395/

Tools, Resources, and References

PA DOH Toolkit for Response to Antimicrobial-Resistant Organisms in Healthcare Facilities

https://www.health.pa.gov/topics/Documents/Programs/HAIP-AS/HAI AR Toolkit.pdf

PA DOH Colonization Screening Toolkit for Antimicrobial-Resistant Organisms

FINAL Colonization Screening Toolkit 8 23 19.pdf (pa.gov)

Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria

https://www.jstor.org/stable/10.1086/667743

NHSN LTCF Component

https://www.cdc.gov/nhsn/LTC/index.html

Tools, Resources, and References

AHRQ Minimum Criteria for Antibiotics Tool
https://www.ahrq.gov/nhguide/toolkits/determine-whether-to-treat/antibiotic-tool.html

State Operations Manual Appendix PP - Guidance to Surveyors for Long Term Care Facilities Revised 02-03-2023
https://www.cms.gov/medicare/provider-enrollment-and-certification/guidanceforlawsandregulations/downloads/appendix-pp-state-operations-manual.pdf

Development of minimum criteria for the initiation of antibiotics in residents of long-term-care facilities: results of a consensus conference
https://pubmed.ncbi.nlm.nih.gov/11232875/

Tools, Resources, and References

AHRQ UTI One-Pager
https://www.ahrq.gov/sites/default/files/wysiwyg/antibiotic-use/best-practices/UTI-one-page.docx

Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019 Update by IDSA
https://www.idsociety.org/practice-guideline/asymptomatic-bacteriuria/

Suspected UTI SBAR
https://www.ahrq.gov/sites/default/files/wysiwyg/nhguide/4_TK1_T1-SBAR_UTI_Final.pdf

CDC Evaluation and Diagnosis of Penicillin Allergy for Healthcare Professionals
https://www.cdc.gov/antibiotic-use/clinicians/Penicillin-Allergy.html

For Questions, Please Contact:

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THANK YOU