

UTI: An Opportunity for Antimicrobial Stewardship

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Project to Implementing Antimicrobial Stewardship in Nursing Homes-Funded by NYSDOH

Primary Objectives:

1. Implement antimicrobial stewardship programs in LTCF
2. Reduce the use of quinolones for the treatment of UTI and pneumonia
3. Reduce the overall incidence of CDI

Secondary Objective:

1. Monitor and report CDI through implementation and use of NHSN

Project Implementation

- Recruited 7 LTCF:
 - 4 large facilities
 - 3 hospital affiliated facilities
- Implementation of the antimicrobial stewardship intervention occurred successively at each of these LTCF
- Intervention was tailored to each LTCF context and needs

I. Stewardship Teams

Hospital Team

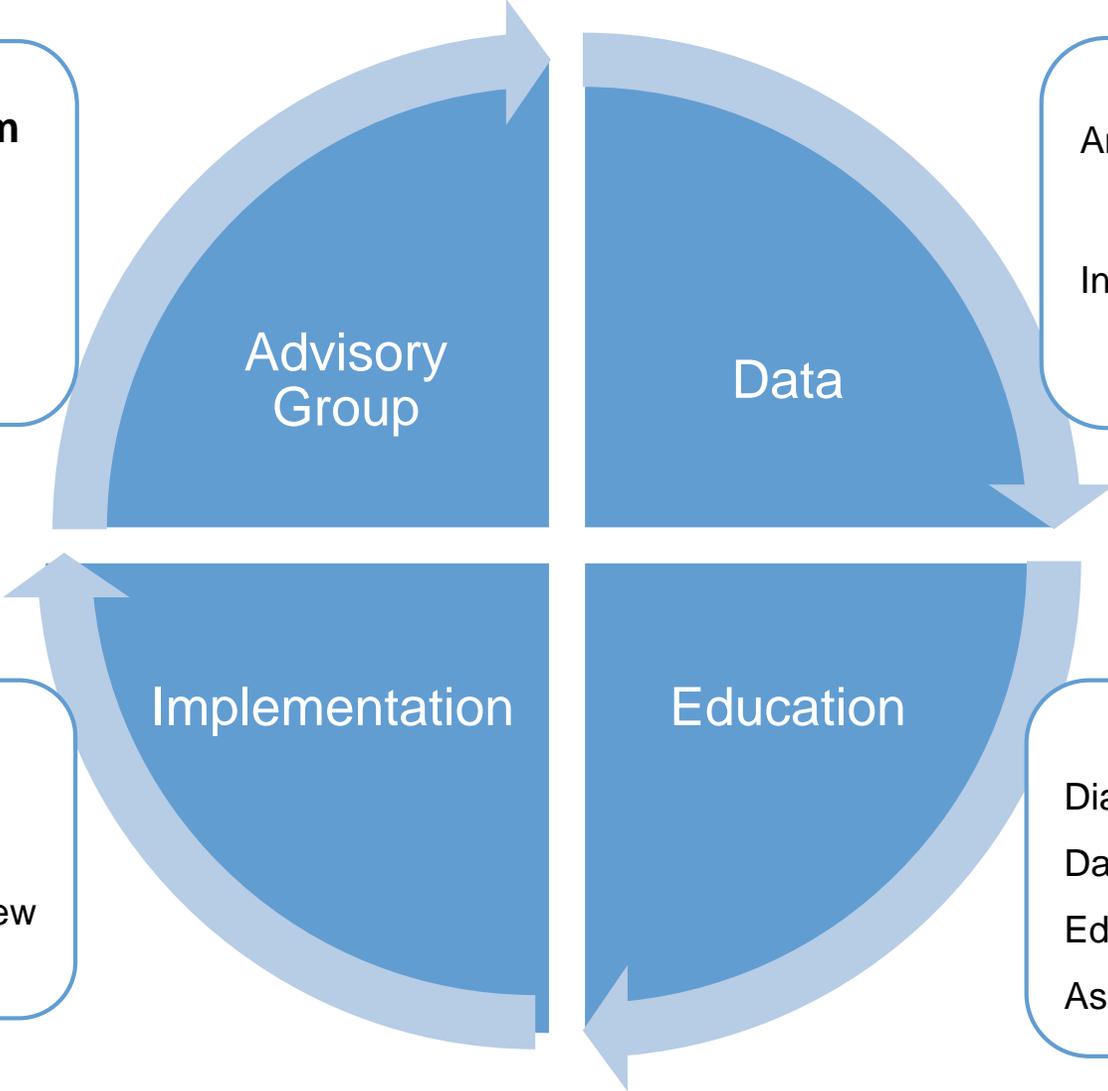
- Hospital infectious diseases physician
- Hospital antimicrobial stewardship pharmacist
- Project coordinator
- Project infection preventionist

LTCF Team

- Medical Director
- Nursing Director
- Infection Preventionist
- Nursing Educator
- In house dispensing Pharmacist
- NP/PA
- Director of Quality
- Nursing Home Administrator

Antimicrobial Stewardship Collaboration

Medical Director Advisory Team
Directors of other NH in the community
Hospital Team members
Treatment guidelines for UTI and Pneumonia



Microbiology lab
Antibiogram and list of urine cultures

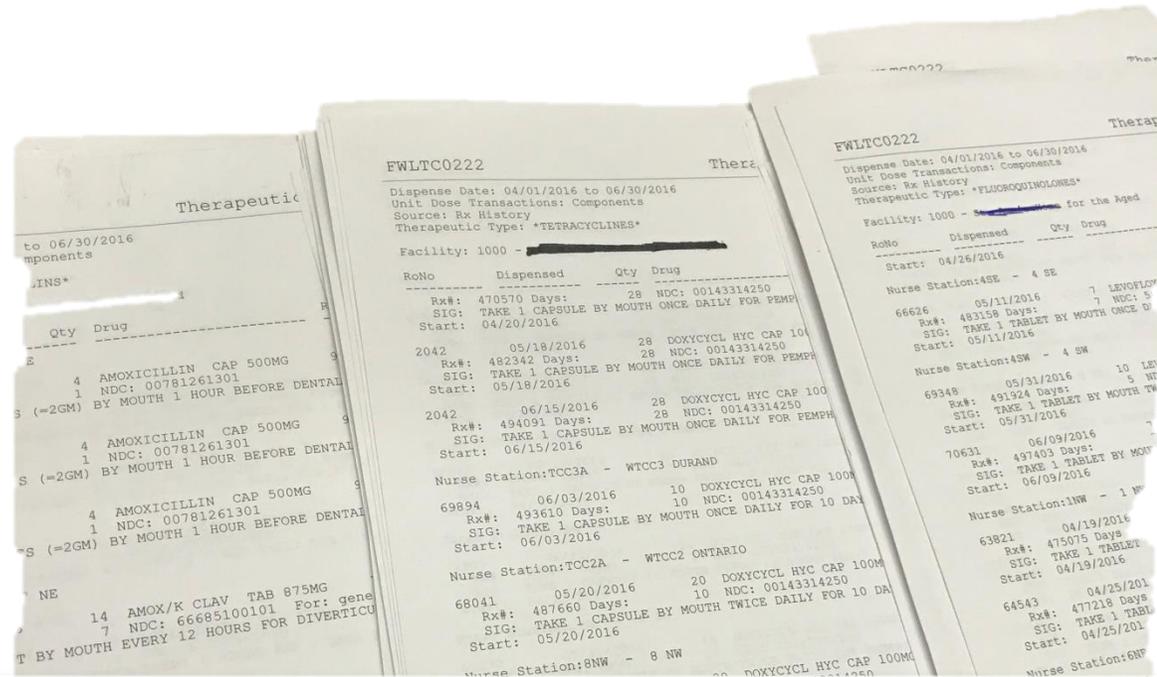
Dispensing pharmacy
In-house and a large dispensing pharmacy

EIP CDI data

LTCF Team
Implementation of guidelines
Antibiotic Reviews and feedback
Urine culture testing and treatment review
CDI NHSN reporting

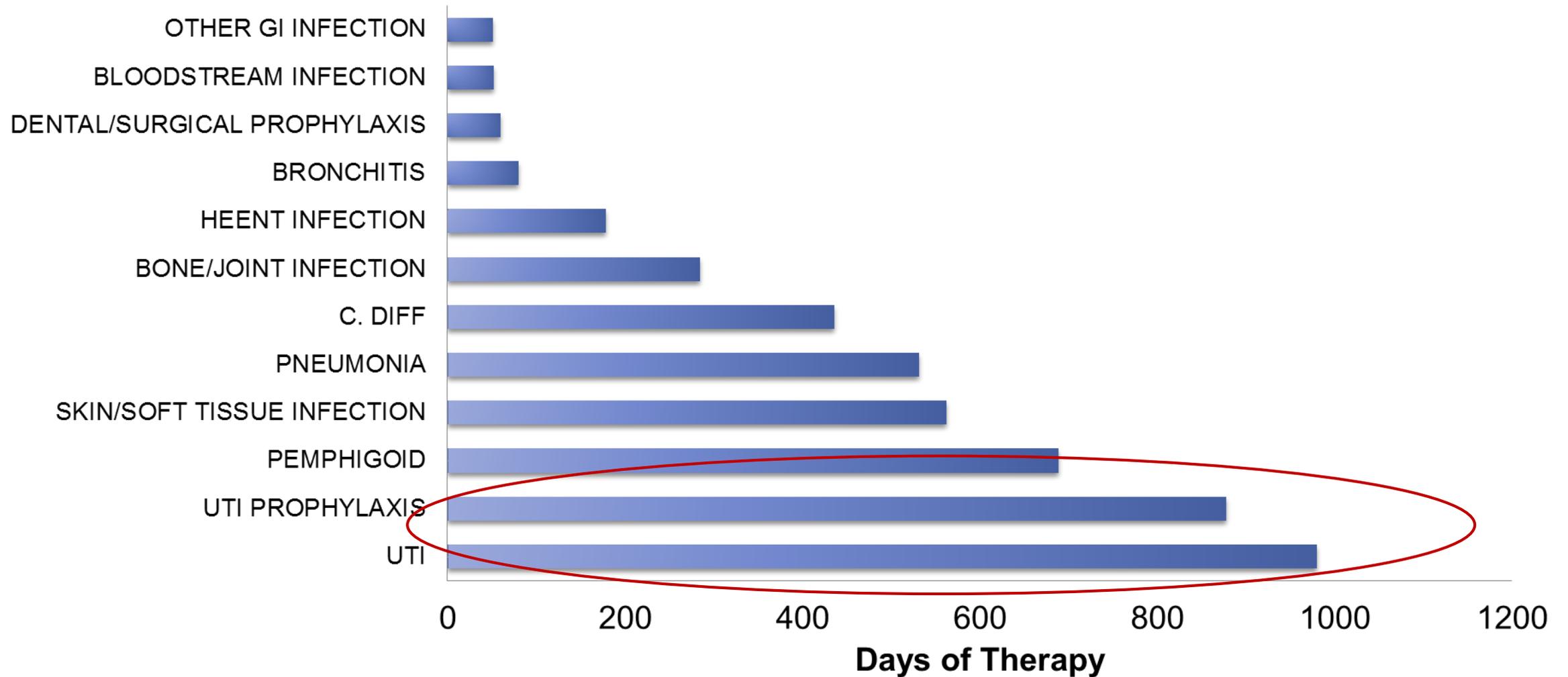
Hospital Team
Diagnosis and Treatment guidelines
Data summaries
Education, pocket cards, posters
Assistance with NHSN reporting

II. Measuring Antimicrobial Use

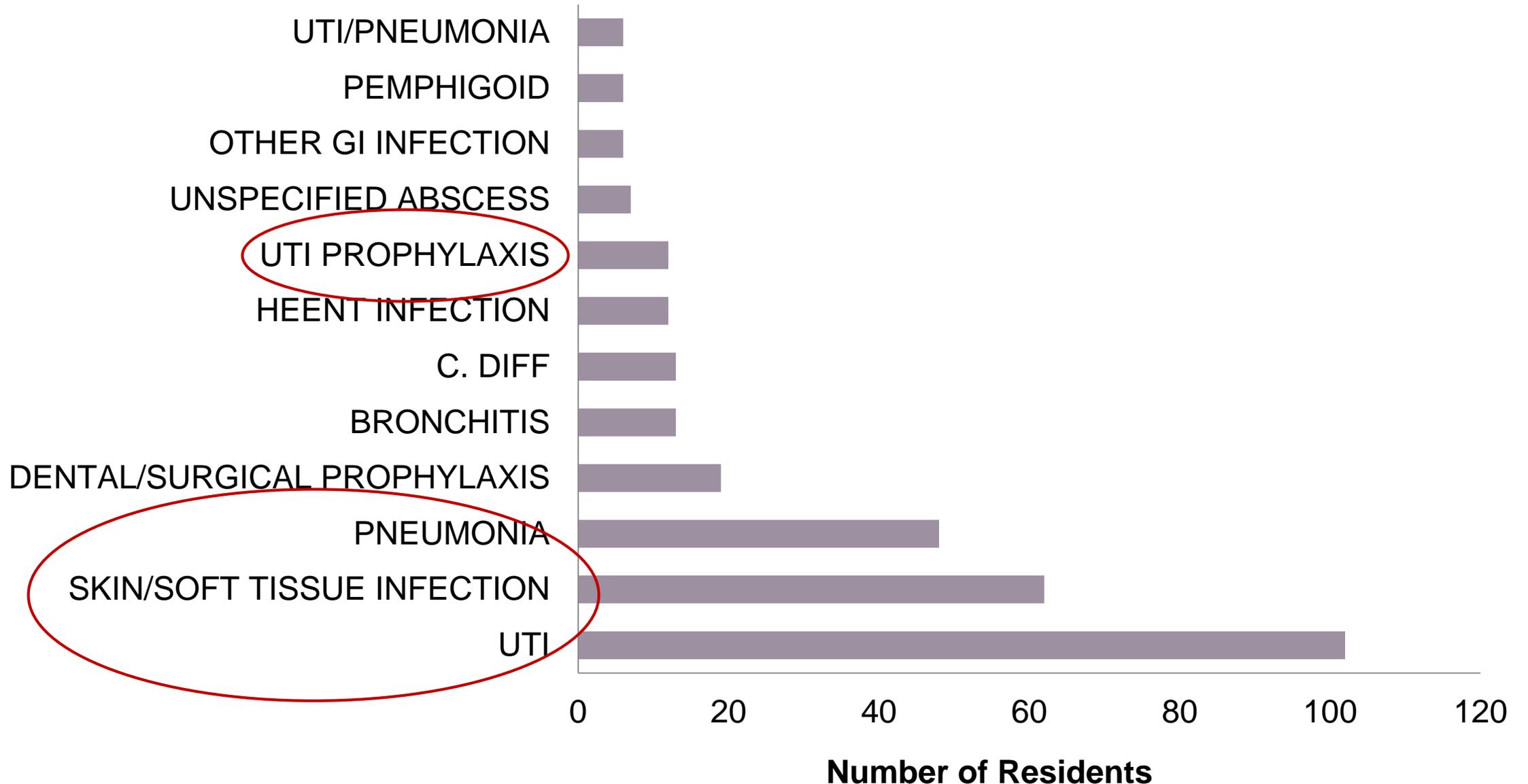


DRUG NAME	SIG	DATE WRITTEN	QTY AUTH	QTY DISP
DOXYCYCLINE 100 MG CAPSULE	TAKE ONE CAPSULE PO TWICE DAILY X 7 DAYS	27-Jan-16	14	14
CIPROFLOXACIN 500MG TABS(*)	ONE TABLET PO TWICE DAILY. (OSTEOMYELITIS)	4-Jan-16	70	55
VANCOMYCIN 1 GM ADD-VAN VIA	INFUSE 1GM I.V. EVERY 12 HOURS OVER 60-90 MINUTES	12-Jan-16	60	8
VANCOMYCIN 1 GM ADD-VAN VIA	INFUSE 1GM I.V. EVERY 12 HOURS OVER 60-90 MINUTES	25-Jan-16	28	8
SULFAMETHOXAZOLE/TMP DS TAB	TAKE 1 TABLET BY MOUTH TWICE DAILY X 14 DAYS.	11-Jan-16	28	2
CEFPODOXIME 200 MG TABLET	TAKE ONE TABLET PO EVERY 12 HOURS FOR 10 DAYS	12-Jan-16	20	5

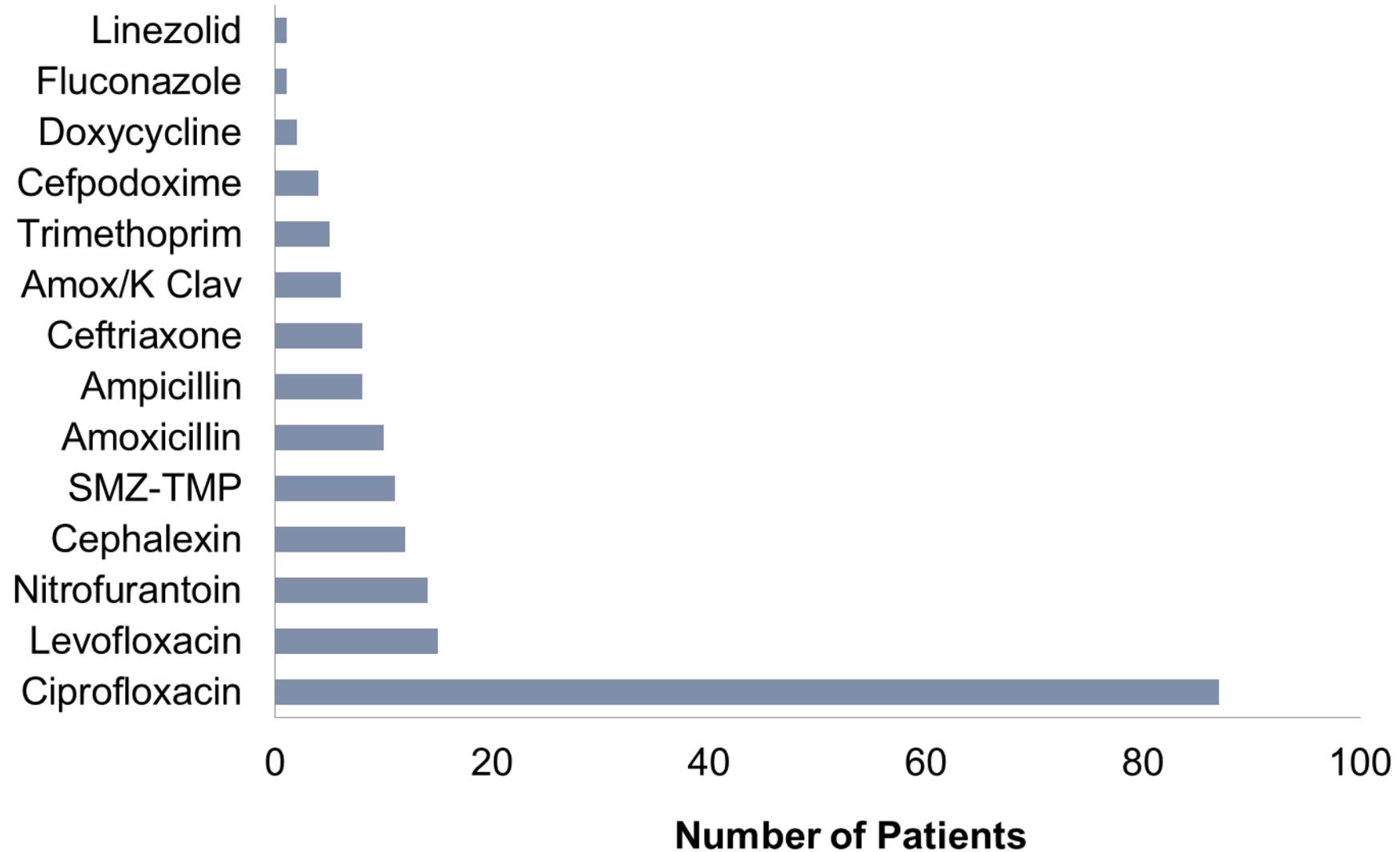
LTCF1-Top 12 Indications



LTCF1-12 Top Indications by Number of Residents



Most Common Agents Used for UTI



UTI Antibiogram

Nursing home A- 2013														
Urine Isolates: % Susceptible														
Organism	# of isolates	Ampicillin	Ampicillin-Sulbactam	Aztreonam	Cefazolin	Cefepime	Ciprofloxacin	Gentamicin	Imipenem	Levofloxacin	Piperacillin-Tazobactam	Tobramycin	Trimethprim-Sulfamethoxazole	Nitrofurantoin
GRAM-NEGATIVE ORGANISMS														
Escherichia coli	50	50	54	94	76	96	62	82	100	50	90	80	76	94
Klebsiella pneumoniae	11	0	82	82	82	82	82	82	100	100	100	82	100	45
Proteus mirabilis	18	88	*	100	89	100	67	94	*	78	94	94	83	0
*Limitations prevent the testing and reporting of ampicillin-sulbactam and imipenem for P. mirabilis.														
&Differences in the % susceptibility for an organism represented by <30 isolates may not be statistically significant from year to year.														

III. Action

Improve Antibiotic use for Urinary Tract Infections

**Assessment of Appropriateness of Antibiotics
Urinary Tract Infection (UTI)**

Urinary Tract Infection (UTI) Assessment

1. Patient Name: _____ Date of Urine Culture: ____/____/____

DOB: ____/____/____ Gender: Male Female Admission Date: _____ Nursing Home: _____ Unit: _____

2. Did the patient have a urinary catheter in place at the time of or in the 48 hours before urine specimen obtained?
 Yes No Unknown

3. Does the patient have any of the following comorbidities (check all that apply)?
 None History of renal transplant Kidney stones Neutropenia Recurrent UTI Urologic abnormality
Specify: _____

4. Were any of the following signs/symptoms documented (check all that apply)?

<input type="checkbox"/> Dysuria	<input type="checkbox"/> New onset delirium	<input type="checkbox"/> WBC >11,000 cells	<input type="checkbox"/> None
<input type="checkbox"/> Urgency	<input type="checkbox"/> Fever (>38 C) or rigors	<input type="checkbox"/> Increased incontinence	<input type="checkbox"/> Other (please specify): _____
<input type="checkbox"/> Frequency	<input type="checkbox"/> Nausea/vomiting	<input type="checkbox"/> New onset retention	_____
<input type="checkbox"/> Suprapubic pain	<input type="checkbox"/> Flank pain	<input type="checkbox"/> Costovertebral tenderness	_____
<input type="checkbox"/> Cloudy/foul smelling urine	<input type="checkbox"/> Gross hematuria		

5. Was a urinalysis sent? Yes No Unknown If YES, Date: _____

Urinalysis results:

Bacteriuria evident (≥ 5-10 WBCs/high power field)? Yes No Unknown If YES, WBC count: _____ WBC count Unknown

Substrates noted? Yes No Unknown If YES, specify #/high power field: _____

Results available? Unknown Leukocyte esterase Value: _____ Nitrites Value: _____

Results:

_____	Colony Count: _____	ESBL: <input type="checkbox"/> Yes <input type="checkbox"/> No
_____	Colony Count: _____	ESBL: <input type="checkbox"/> Yes <input type="checkbox"/> No
_____	Colony Count: _____	ESBL: <input type="checkbox"/> Yes <input type="checkbox"/> No

Culture collection method:
 Indwelling catheter Straight catheterization Unknown/method not specified

9. Were empiric antibiotics ordered prior to UA/culture result?
 Yes No Unknown If YES, Ordering Provider: _____

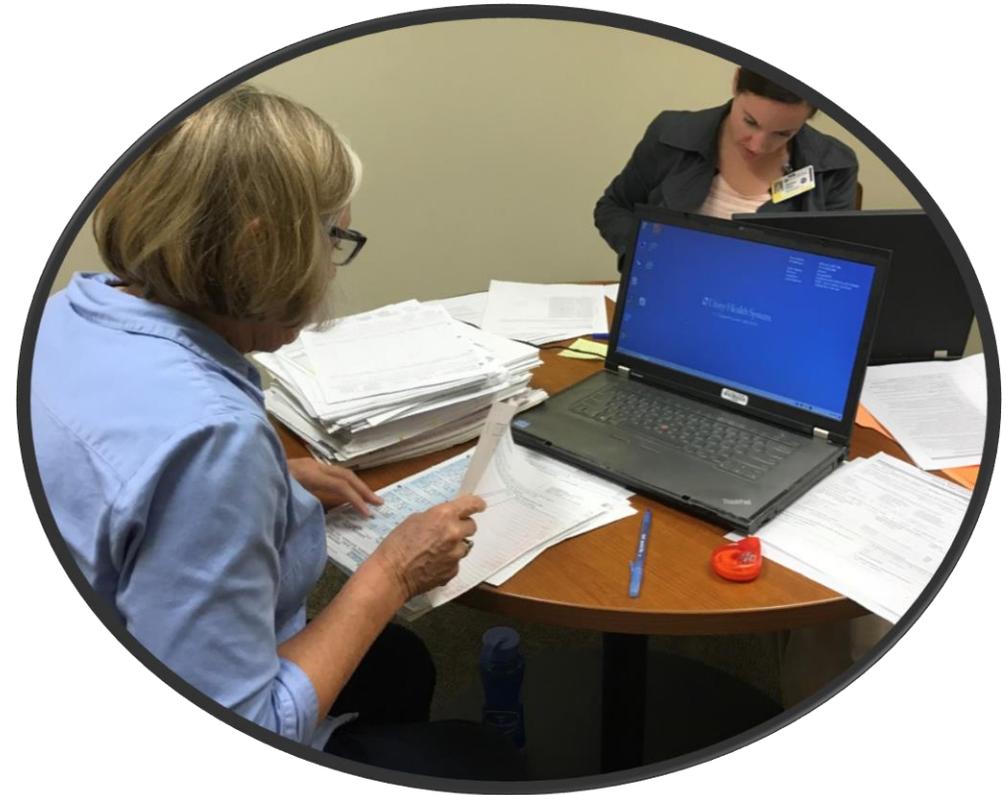
Date: _____ Day of week: _____
Time: _____
Name of antibiotic: _____

10. Were antibiotics ordered over the phone?
 Yes No Unknown

Resolution 10amg pen
20 tid pen cough
12/13/14 CH

U/A CFS - clean
catch (Foul smelling
urine)

3-11



Applying Criteria to Define UTI

Development of Minimum Criteria for Initiation of Antibiotics-Loeb, 2001



CHICAGO JOURNALS



Guidance on when to start antibiotics for common infections

Development of Minimum Criteria for the Initiation of Antibiotics in Residents of Long-Term-Care Facilities: Results of a Consensus Conference •

Author(s): Mark Loeb , MD, MSc; David W. Bentley , MD; Suzanne Bradley , MD; Kent Crossley , MD; Richard Garibaldi , MD; Nelson Gantz , MD; Allison McGeer , MD; Robert R. Muder , MD; Joseph Mylotte , MD; Lindsay E. Nicolle , MD; Brenda Nurse , MD; Shirley Paton , RN; Andrew E. Simor , MD; Philip Smith , MD; Larry Strausbaugh , MD

Source: *Infection Control and Hospital Epidemiology*, Vol. 22, No. 2 (February 2001), pp. 120-124

Published by: [The University of Chicago Press](#) on behalf of [The Society for Healthcare Epidemiology of America](#)

Stable URL: <http://www.jstor.org/stable/10.1086/501875>

Accessed: 07/07/2014 15:39

Revised Surveillance Definitions of Infections for Nursing Homes



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

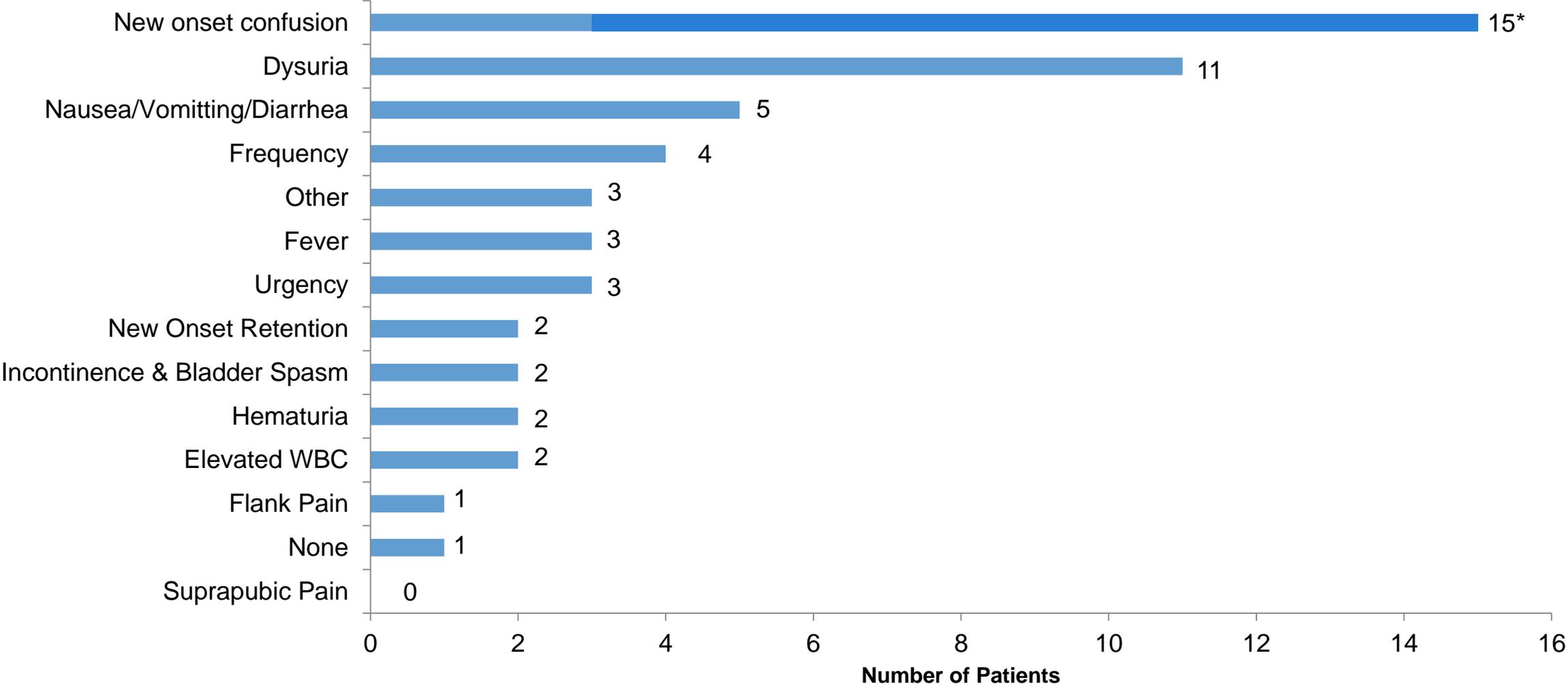
Author(s): Nimalie D. Stone, MD; Muhammad S. Ashraf, MD; Jennifer Calder, PhD; Christopher J. Crnich, MD; Kent Crossley, MD; Paul J. Drinka, MD; Carolyn V. Gould, MD;

- Surveillance definitions are not the same as the clinical criteria to start treatment
- Surveillance definitions are a tool to assess the percentage of antibiotics used that fit the criteria
- understand the gaps in knowledge, processes and guide improvement

America

Stable URL: <http://www.jstor.org/stable/10.1086/667743>

Appropriateness of UTI Testing and Treatment: Symptom Breakdown (n=42), Facility A



*12 patients, confusion delirium was the only symptom that triggered a urine culture

Revised McGeer Criteria for UTI

1. Need a positive urine culture

and

2. Localizing signs and symptoms to the genitourinary tract

For Patients without an indwelling catheter

Signs and symptoms

At least 1 of the following sign or symptom subcriteria

1. Acute dysuria or acute pain, swelling, or tenderness of the testes, epididymis, or prostate
2. Fever or leukocytosis and at least **1** of the following localizing urinary tract subcriteria

If no fever: **2** of the localizing urinary tract subcriteria

1. Acute costovertebral angle pain or tenderness
2. Suprapubic pain
3. Gross hematuria
4. New or marked increase in incontinence
5. New or marked increase in urgency
6. New or marked increase in frequency

Urine Culture

1. At least 10^5 cfu/mL of no more than 2 species of microorganisms in a voided urine sample
2. At least 10^2 cfu/mL of any number of organisms in a specimen collected by in-and-out catheter

For Patients with an Indwelling Catheter

Signs and Symptoms

At least 1 of the following sign or symptom subcriteria:

1. Fever, rigors, or new-onset hypotension, with **no alternate site of infection**
2. Either acute change in mental status or acute functional decline*, **with no alternate diagnosis and leukocytosis**
3. New-onset suprapubic pain or costovertebral angle pain or tenderness
4. Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate

Culture

- Urinary catheter specimen culture with at least 10⁵ cfu/mL of any organism(s)

*The definition of acute functional decline is also based on changes in ADLs according to the scoring system in MDS

Confusion Assessment Method (CAM) Criteria

Acute onset	Evidence of acute change in resident's mental status from baseline
Fluctuating	Behavior fluctuating (eg, coming and going or changing in severity during the assessment)
Inattention	Resident has difficulty focusing attention (eg, unable to keep track of discussion or easily distracted)
Disorganized thinking	Resident's thinking is incoherent (eg, rambling conversation, unclear flow of ideas, unpredictable switches in subject)
Altered level of consciousness	Resident's level of consciousness is described as different from baseline (eg, hyperalert, sleepy, drowsy, difficult to arouse, nonresponsive)



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Five Things Physicians and Patients Should Question

3

Don't obtain a urine culture unless there are clear signs and symptoms that localize to the urinary tract.

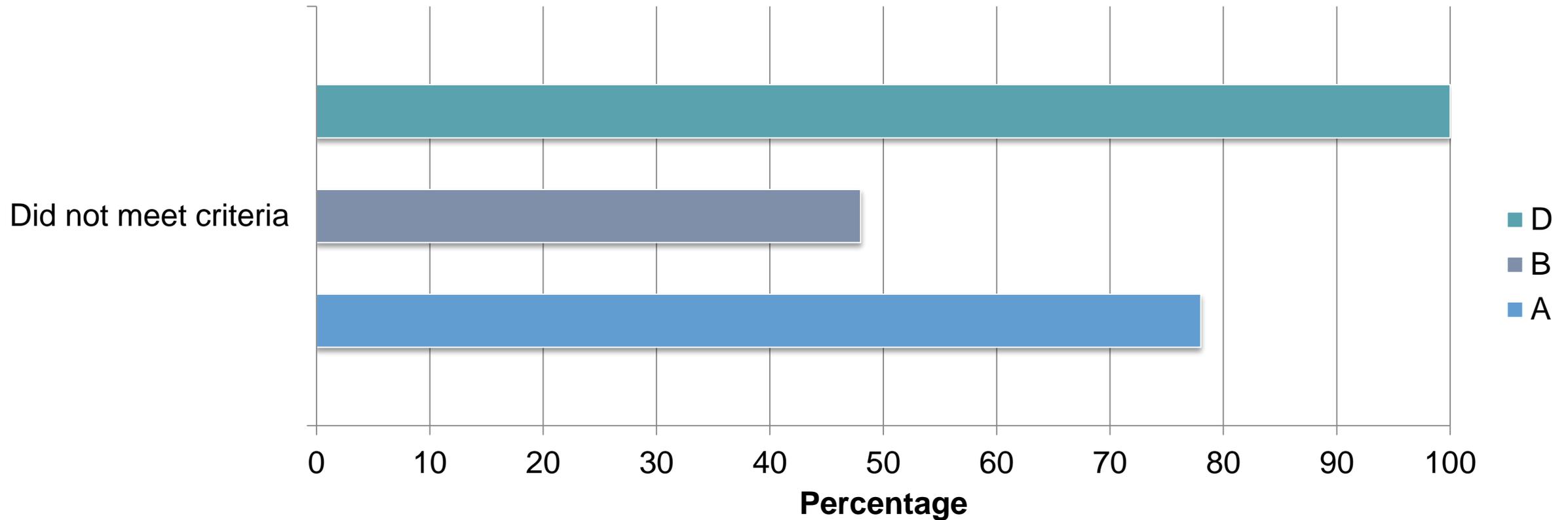
Chronic asymptomatic bacteriuria is frequent in the LTC setting, with prevalence as high as 50%. A positive urine culture in the absence of localized urinary tract infection (UTI) symptoms (i.e., dysuria, frequency, urgency) is of limited value in identifying whether a patient's symptoms are caused by a UTI. Colonization (a positive bacterial culture without signs or symptoms of a localized UTI) is a common problem in LTC facilities that contributes to the over-use of antibiotic therapy in this setting, leading to an increased risk of diarrhea, resistant organisms and infection due to *Clostridium difficile*. An additional concern is that the finding of asymptomatic bacteriuria may lead to an erroneous assumption that a UTI is the cause of an acute change of status, hence failing to detect or delaying the more timely detection of the patient's more serious underlying problem. A patient with advanced dementia may be unable to report urinary symptoms. In this situation, it is reasonable to obtain a urine culture if there are signs of systemic infection such as fever (increase in temperature of equal to or greater than 2°F [1.1°C] from baseline) leukocytosis, or a left shift or chills in the absence of additional symptoms (e.g., new cough) to suggest an alternative source of infection.

A patient with advanced dementia may be unable to report urinary symptoms, in this situation, it is reasonable to obtain a urine culture if there are signs of systemic infection such as

- **Fever**, (increase in temperature $\geq 2^{\circ}$ F (1.1° C) from baseline)
- **Elevated WBC**
- **Chills**

in the absence of additional symptoms (e.g. new cough) to suggest an alternative source of infection

Revised McGeer Surveillance Criteria*



*Stone ND et. al. Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria. *Infection control and hospital epidemiology*:2012;33(10):965-977

Findings of Medical Record Review

Most of the residents are tested and treated for asymptomatic bacteriuria

Treatment

- 47% were treated empirically
 - 30% organisms non susceptible
- 53% were treated after culture results
 - Evaluation and follow up at 48-72 hours minimal
 - A positive culture drives the decision to treat

Duration of treatment

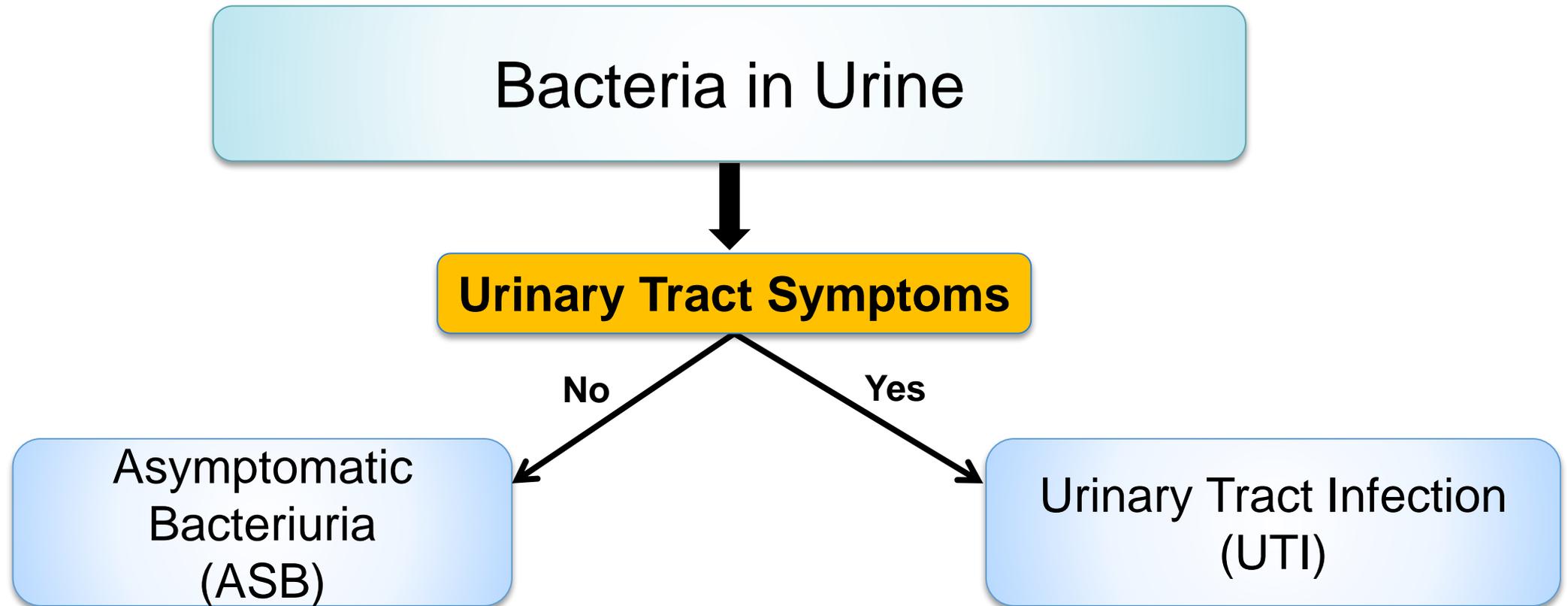
- Mean 5 days (range 3-14 days)

Asymptomatic Bacteriuria

If you obtain a urine specimen from **all female** residents in your nursing home, how many would be positive?

- a. 10%
 - b. 80%
 - c. Up to 50%
-
- Elderly LTCF Women 25-50%
 - Elderly LTCF Men 15-40%
 - Short term catheterization 9-23%
 - Long term catheterization 100%

A Positive Urine Test, What Does it Mean?



Asymptomatic Bacteriuria Is Common

	Asymptomatic bacteriuria
Women less than 60 years	3-5%
Elderly in Community	
Women	11-16%
men	15-40%
Elderly in Nursing Homes	
women	25-50%
men	15-40%
Patient with indwelling catheter	100%

IV. Education- Medical Providers

Small group sessions

- Presentation of facility antibiotic use, CDI and UTI review data
- Review appropriate testing and treatment of UTI
- Review antibiogram
- Review locally created treatment guidelines
- Provided pocket treatment cards
- Recommended
 - Improvement of the documentation of signs and symptoms
 - Clinical evaluation for every antibiotic prescription and at 48 hours, i.e. antibiotic “time out”

Nursing Home UTI Pocket Card

Diagnosis requires **both** symptoms and presence of bacteria in urine

- Altered mental status is extremely nonspecific in elderly patients and should not be used to diagnose UTI in patients without chronic indwelling catheters in absence of other symptoms

Recommended empiric antibiotics:

Patient population	1 st line	Alternatives
Severely ill (high fever, hypotension)	ceftriaxone	gentamicin
Lower UTI	nitrofurantoin or TMP-SMX	cephalexin
Possible prostatitis in men	TMP-SMX	ciprofloxacin
Pyelonephritis	TMP-SMX	ciprofloxacin, beta-lactams

Important information about recommended antibiotics for UTIs:

- Nitrofurantoin: Avoid in patients with creatinine clearance < 30 mL/min. Potential toxicities include pulmonary toxicity, peripheral neuropathy, hepatotoxicity, and hematologic disorders, but these are **extremely rare** during short courses. Does not cover *Proteus*.
- Trimethoprim-sulfamethoxazole (TMP-SMX): Risk of hyperkalemia. Monitor creatinine and potassium and ensure appropriate renal dose adjustments.
- Fluoroquinolones: Not recommended for treatment of UTIs due to high resistance rates and significant adverse effects in elderly patients (*C. diff*, QTc prolongation, altered mental status, etc.)

Dosing:

Drug	Dose	Renal adjustment
Ceftriaxone	1g IM/IV q24h	None
Cephalexin	500mg PO BID (uncomplicated) 500mg PO QID (complicated)	CrCl 10-50 mL/min: max dose 500mg TID CrCl < 10 mL/min: 500mg once daily
Ciprofloxacin	250mg PO BID (uncomplicated cystitis) 500mg PO BID (pyelonephritis) 400mg IV BID (severe, requiring IV)	CrCl < 30 mL/min: Administer once daily
Fluconazole	200mg PO q24h	CrCl < 50 mL/min: 100mg once daily
Gentamicin	≤ 60kg: 60mg IM/IV q24h 61-80kg: 80mg IM/IV q24h ≥ 81kg: 100-120mg IM/IV q24h (1 mg/kg)	CrCl < 30 mL/min: use caution, may need prolonged dosing intervals
Levofloxacin	250mg PO q24h	None
Nitrofurantoin	100mg PO BID	CrCl < 30 mL/min: avoid
TMP-SMX	800-160mg (1 DS tab or 2 SS tabs) PO BID	CrCl 15-30 mL/min: 1 DS tab daily or 1 SS tab BID CrCl < 15 mL/min: avoid

Nursing Home urinary antibiogram: % isolates susceptible

	amp-sulb	ceftriaxone	ciprofloxacin	levofloxacin	TMP-SMX	nitrofurantoin
<i>Escherichia coli</i>	55	96	70	65	88	95
<i>Klebsiella pneumoniae</i>	92	93	100	100	100	26
<i>Proteus mirabilis</i>	88	100	53	38	58	
<i>Pseudomonas aerug.</i>			100	100		
<i>Enterococcus sp.</i>	79					88

Education- Nursing Staff

Small group sessions

- Review CDI and UTI review data
- Review appropriateness of urine testing and treatment
- Recommended the use of an on-line education program
- Recommended the use of the SBAR
- Emphasized the importance of documentation of signs and symptoms
- Created posters



Education- Family

- Created a brochure on appropriate treatment of UTI
- Created a newsletter for distribution to residents and families
- Recommended coaching of nursing staff on best method to deliver the brochure information to families

Common myths

Sometimes, other symptoms that older adults experience can be confused with a UTI. The following symptoms **do not** necessarily indicate a UTI especially if there are no other urinary symptoms or fever:

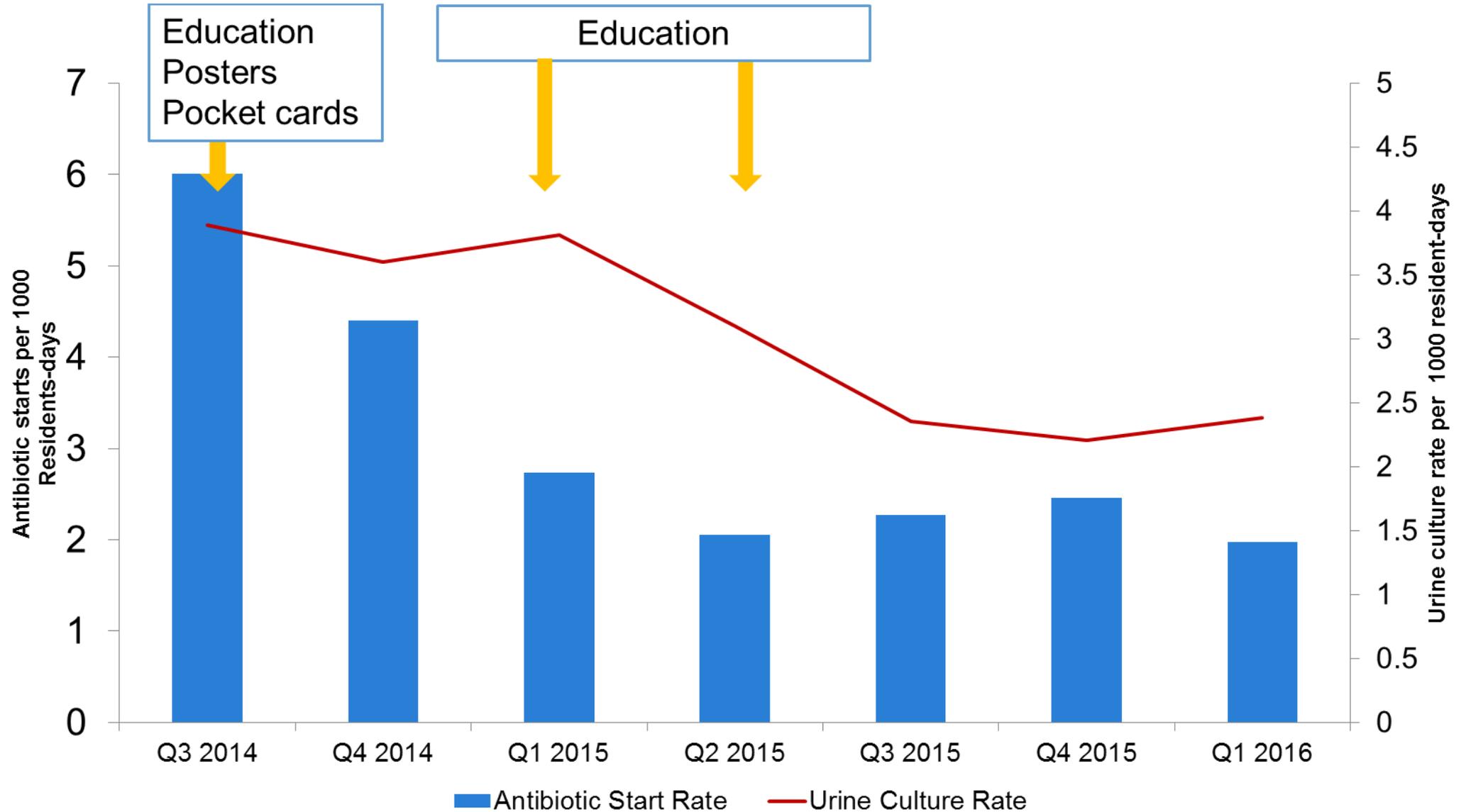
- Confusion
- Falling
- Cloudy/foul-smelling urine
- Muscle weakness



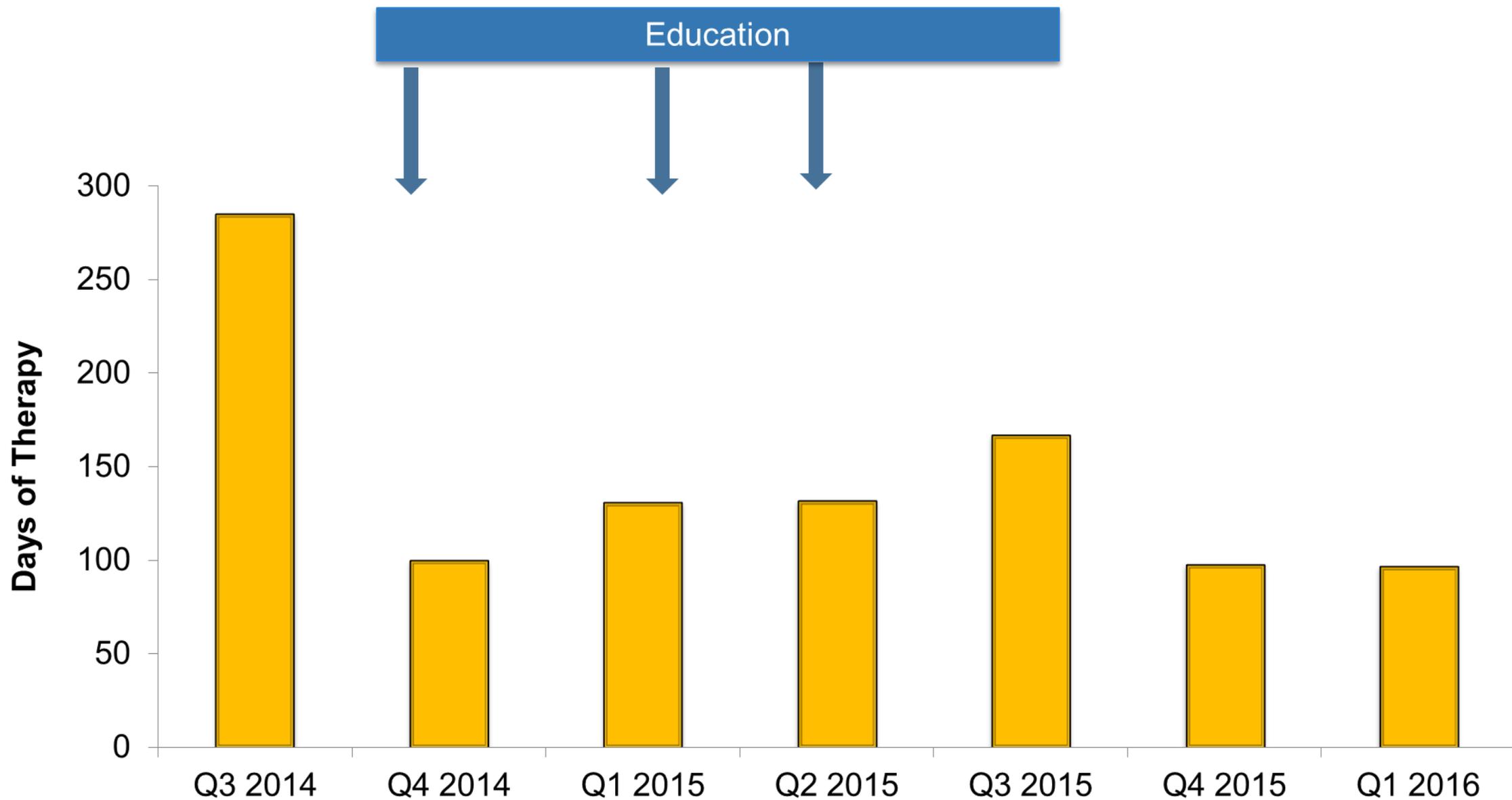
Doctors and other practitioners are not always sure what may be causing the symptoms in a patient, and sometimes the best option for the patient is observation and monitoring.

V. Feedback of Data

LTCF1. Rate of Antibiotic Starts for UTI and Urine Culture Rate



LTCF1. Change in Ciprofloxacin DOT for UTI



Example How Data Was Used for Action

- Goal to capture all urine cultures and UTI treatment
 - Worked with micro lab to get list of tested residents
 - Worked with pharmacy to get new antibiotic starts for UTI
- Uncovered the limitation of the 24 hour report
- Performed monthly assessments of tested and treated residents for signs and symptoms of UTI
- Feedback to nurses and in house medical providers on the appropriateness of testing and treatment

“We used to work in silos, now we talk to each other”



Action: Improve Documentation of Antibiotic Indication

ANTIBIOTIC ORDERING AND TRACKING FORM

I make sure all the antibiotic orders have an indication



Resident information (can use sticker):			Date: _____	
Patient Name:	Unit:	Height:		
Date of Birth:	Weight:			
Allergies:				
Medication:				
Drug:				
Dose:				
Frequency & Route:				
Duration:	Dispense as Written			
Indication:				
Prescriber signature/Date/Time: _____	Nurses' s Signature/Date _____ _____ _____			

Optional Symptom/HPI Documentation:

Fever	Y	N	Cough	Y	N	Urinary Catheter	Y	N
Dysuria	Y	N	Sputum	Y	N	Central Line	Y	N
Abdominal pain	Y	N	Diarrhea	Y	N	Ventilator	Y	N

Other symptoms/Risk Factors: _____

Exam Documentation

Vitals:

Exam:

Diagnostic Testing Results

No cultures

Tx based on prior lab data

Impression Plan

Signature:

Date/Time:

Dispensing Pharmacist Antibiotic Review and Feedback

Assessment of Appropriateness of Antibiotics for Urinary Tract Infection (UTI)

Resident Name: _____ Date: _____

Unit: _____ MD/NP/PA: _____

Diagnosis of Urinary Tract Infection (UTI) in long term care resident requires clinical signs and symptoms of UTI and a positive culture.

1. Was urinalysis/urine culture ordered based on appropriate symptoms? (See below) ___Yes ___No ___Unknown
2. Fever (oral > 100°F or any site > 2°F above baseline or repeated oral > 99°F / rectal >99.5°F) ___Yes ___No ___Unknown
3. Clinically unstable: fever > 102° F, heart rate > 100, RR > 30, BP < 90 systolic, finger stick glucose < 60 or > 400 ___Yes ___No ___Unknown

Suggestions:

Thank You, _____
Signature of Pharmacist

Please contact me in the Pharmacy (ext 6108) if additional information is required on the matter.

RESPONSE: The above comments or suggestions were reviewed by me and my response is:
___Agree and have taken follow-up action. ___Don't Agree ___Will Review and Respond. ___See following comments: _____

Signature of Physician/NP/PA

PLEASE RETURN TO THE PHARMACY WHEN COMPLETED

▪ If NO, was the antibiotic changed?
___Yes ___No ___Unknown ___N/A

Name of antibiotic _____

▪ Was empiric antibiotic stopped if no organism was isolated by culture?

OR

▪ Was the antibiotic used a quinolone?
___Yes ___No

If yes, were there other options on the sensitivities rpt?
___Yes ___No

▪ Was resident evaluated for continued symptoms prior to

Acknowledgments

- Elizabeth Dodds Ashley, PharmD
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- LTCF Pharmacists
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