



# **When and How to Treat UTI**

## **Section 2: How to Treat**

On Behalf of the  
Wisconsin Healthcare-Associated (HAIs) in Long Term Care Coalition



# UTI Toolkit – Module 4b

Narration by:

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Content developed in partnership with the Wisconsin  
Healthcare-Associated Infections in Long-Term Care Coalition

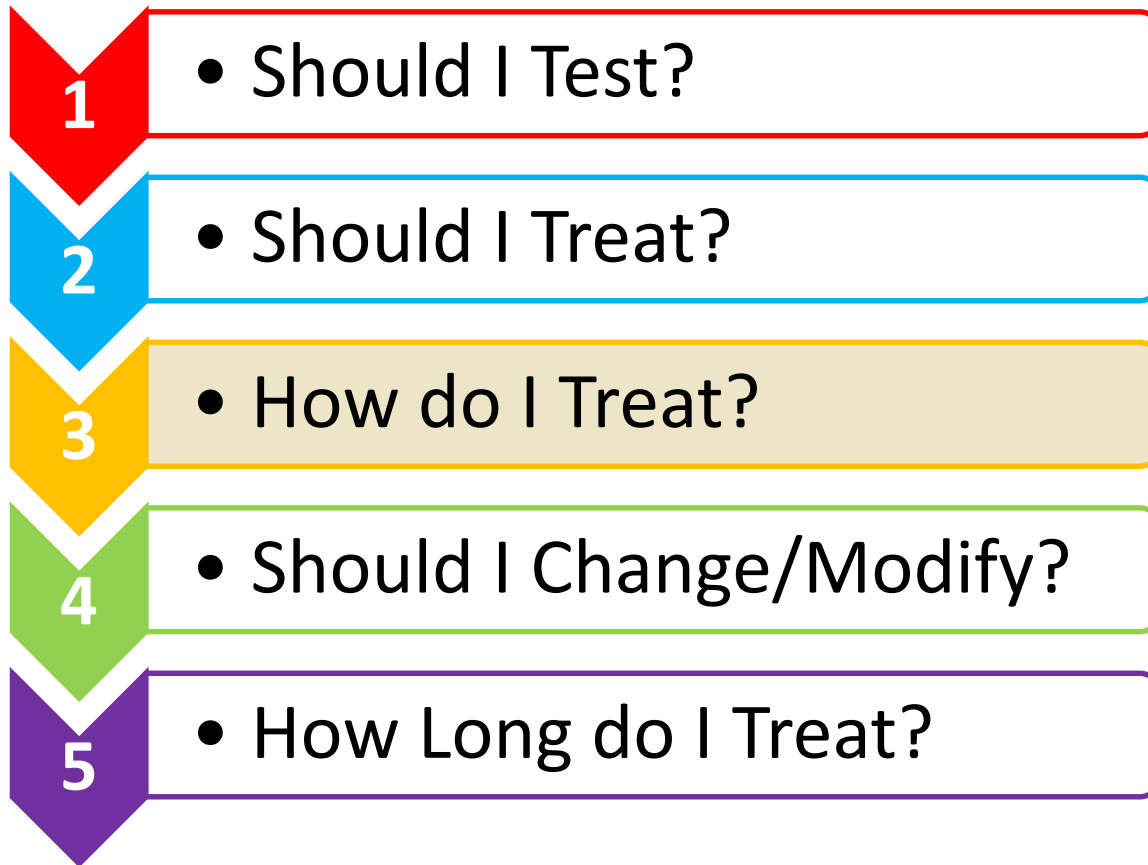


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SCHOOL OF MEDICINE AND PUBLIC HEALTH

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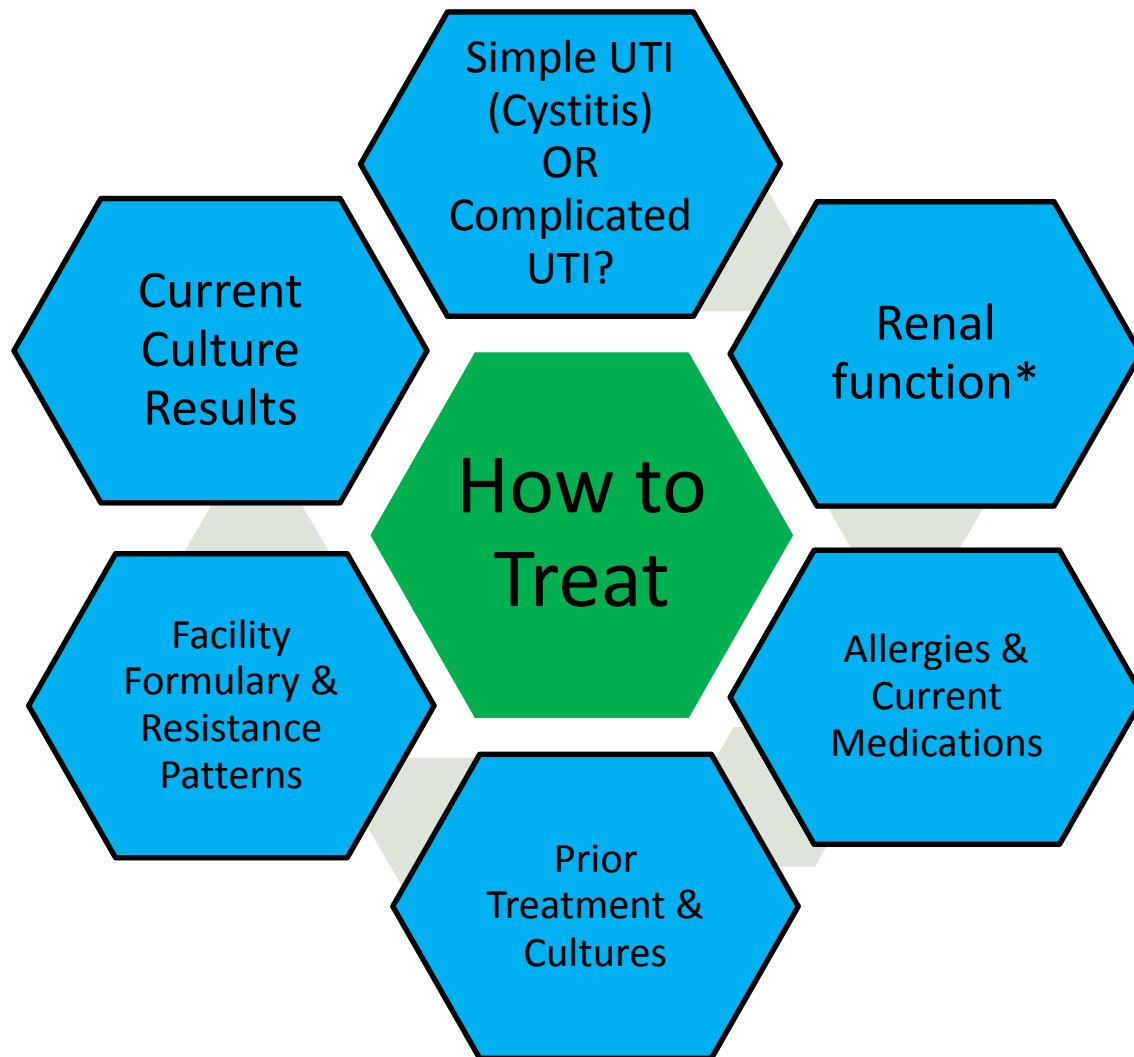


# There are Five Moments of Antibiotic Decision-Making





## How to Treat is a little more complex...



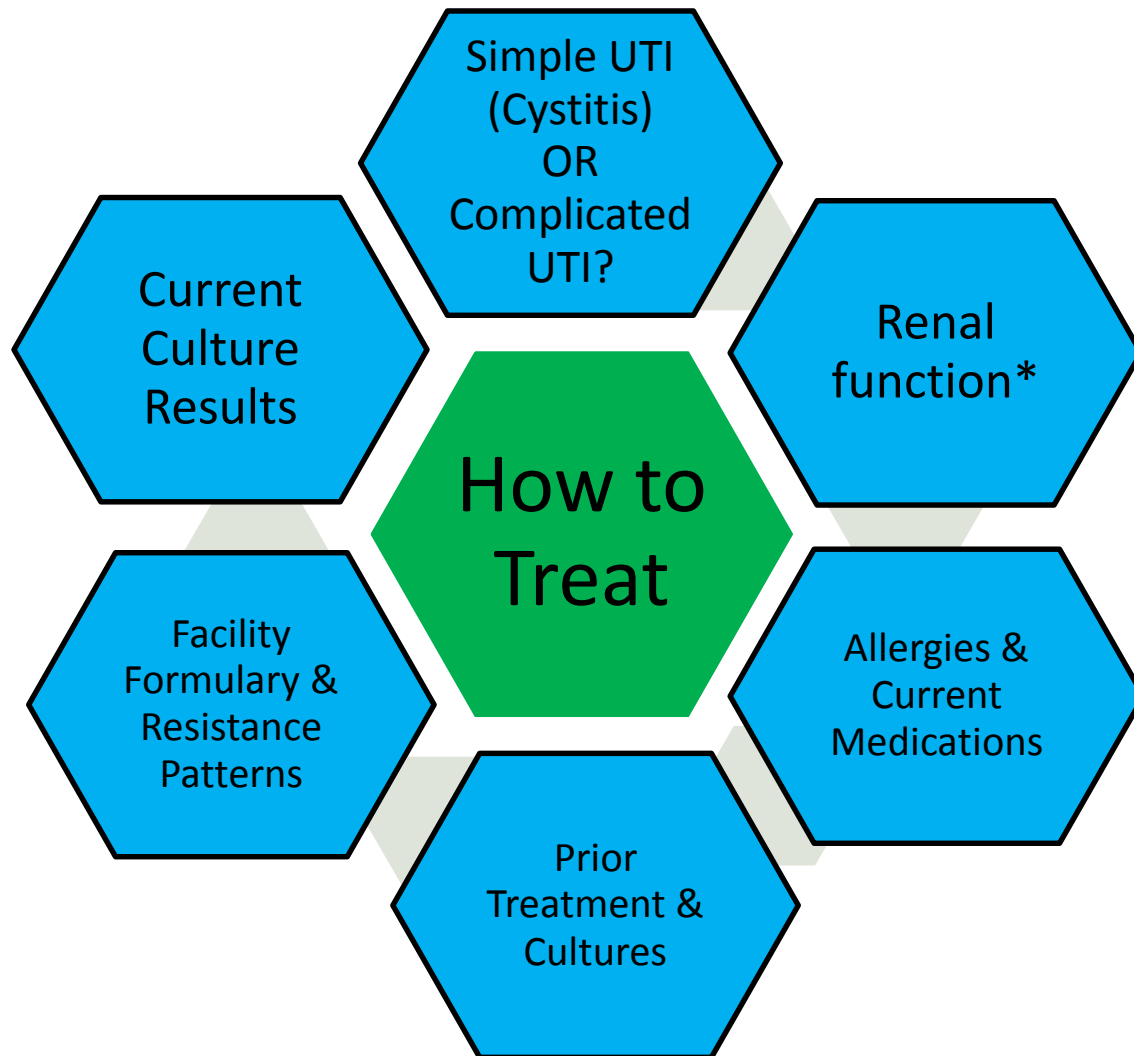
**While treatment should not be the same for every resident, ...**

**... there are certain principles that should be followed**

\*Age, weight, height, sex, race



# How To Treat



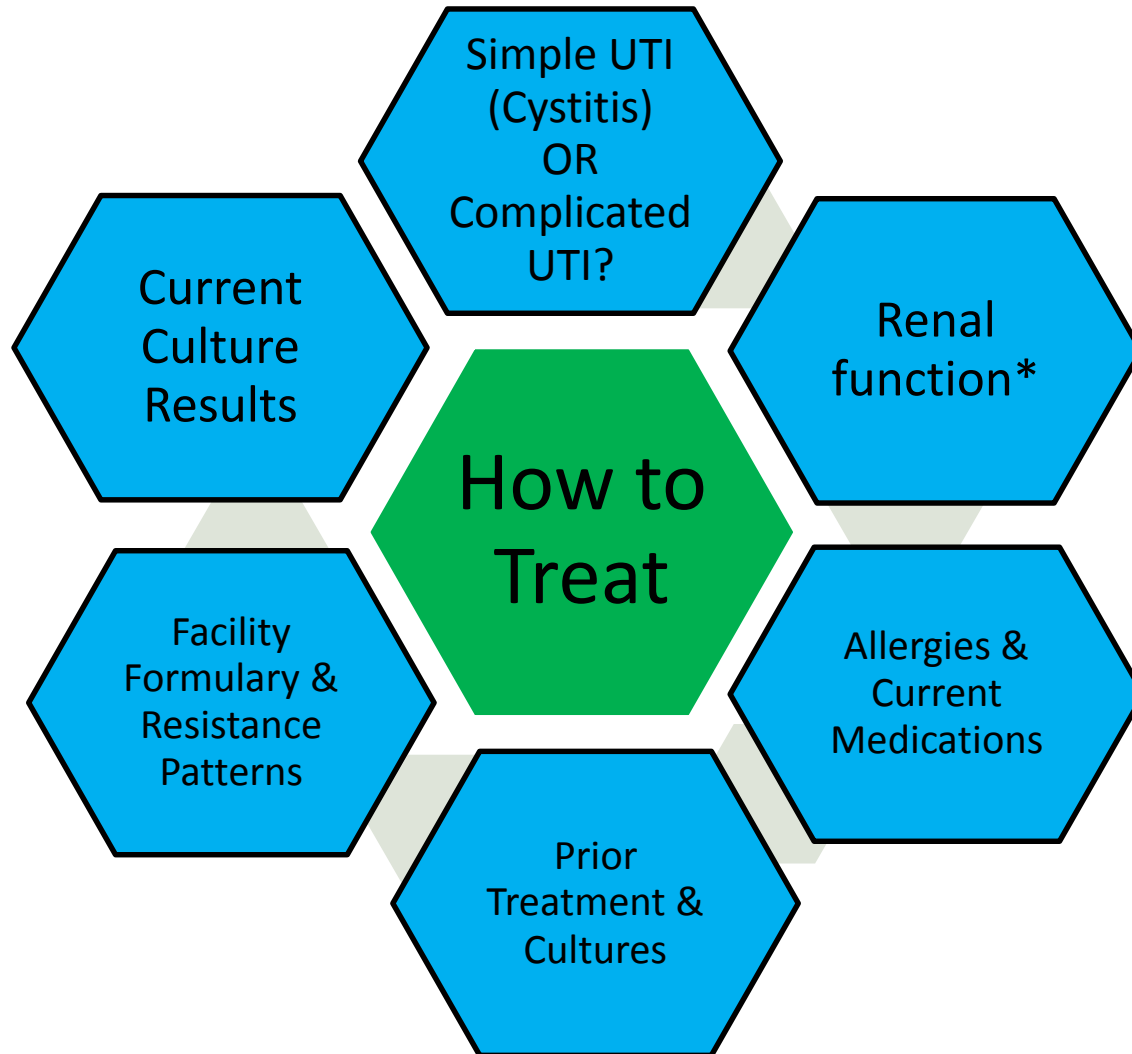
## Basic Principles

- Always get cultures before treating
- Nitrofurantoin and TMP/SMX are preferred over fluoroquinolones
- Use the shortest duration of therapy possible

\*Age, weight, height, sex, race



# How To Treat



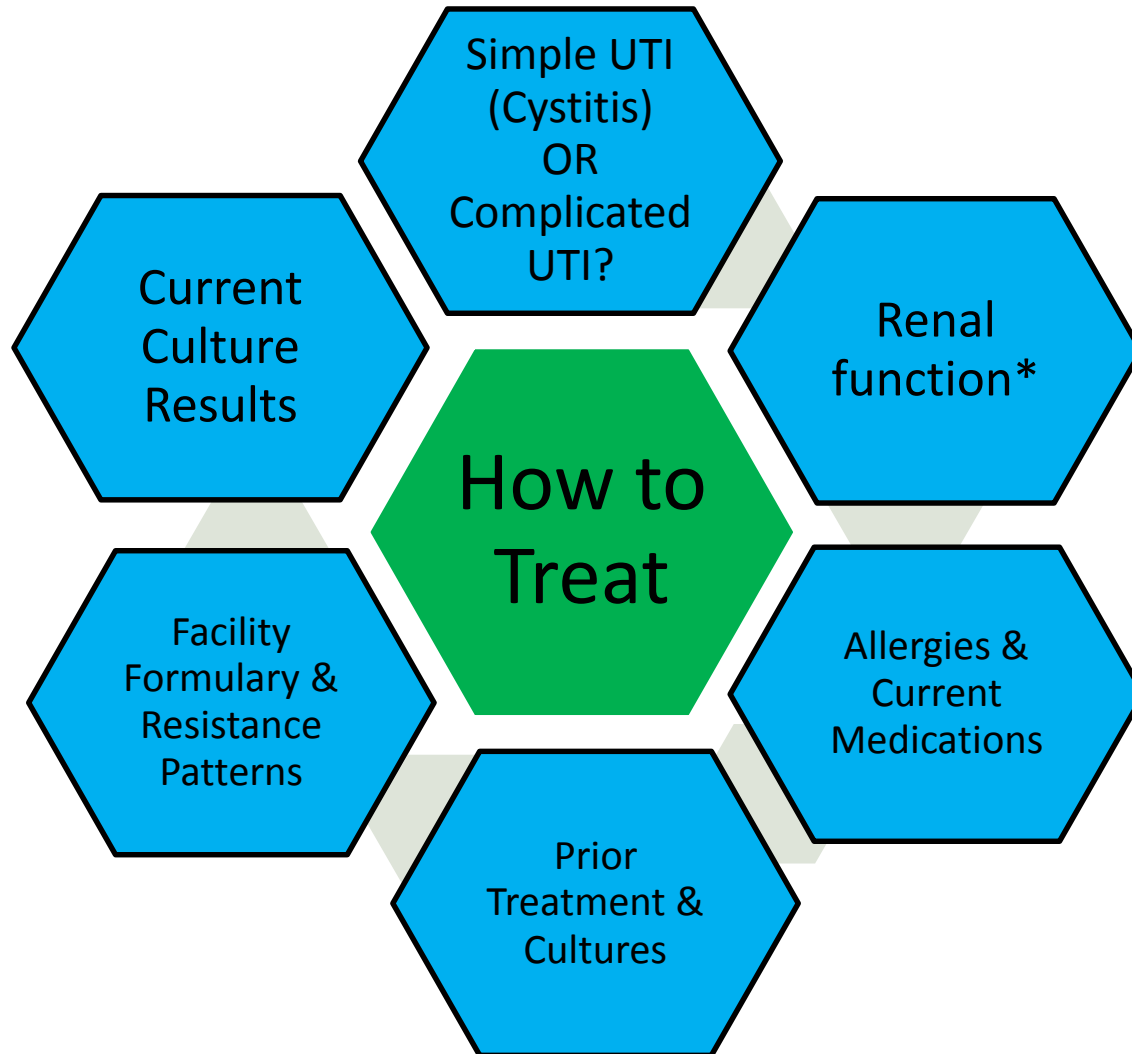
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# How To Treat



## Basic Principles

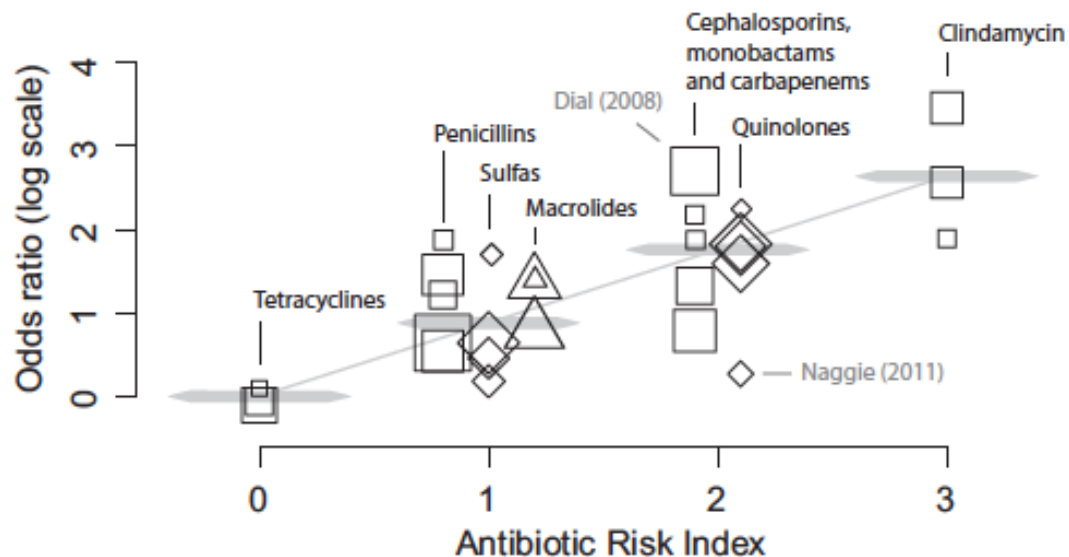
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\*Age, weight, height, sex, race



# Why Avoid Fluoroquinolones?

- High rates of resistance among bacteria that cause UTI
- Major driver of infection with *Clostridioides difficile* (Figure) <sup>2</sup>
- High rates of adverse effects (Table) <sup>3,4</sup>
- FDA → do not use for treatment of common infections <sup>5</sup>



Adverse Effects of Fluoroquinolones	
<b>Gastrointestinal</b>	Nausea and vomiting
<b>CNS</b>	Headaches, dizziness, sleep disturbances
<b>Musculoskeletal</b>	Tendon rupture, arthropathy
<b>Cardiovascular</b>	QT prolongation, aortic aneurysms
<b>Skin</b>	Rash (maculopapular)

3 Brown et al. *Antimicrob Agents Chemother* 2013

4 Tandan et al. *Int J Antimicrob Agents* 2018

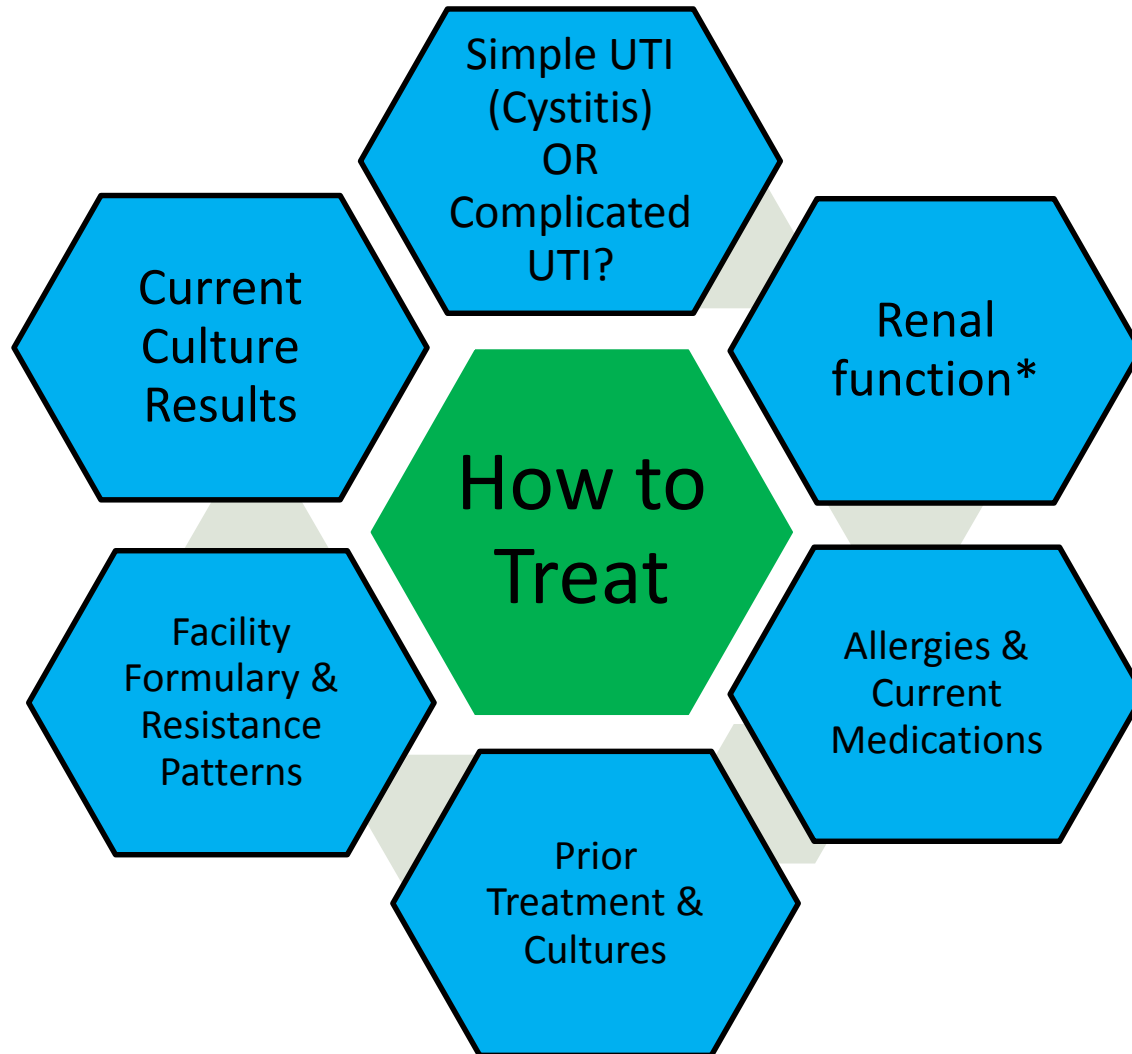
5 Daneman et al. *BMJ* 2015

6 FDA Drug Safety Communication 2016





# How To Treat



## Basic Principles

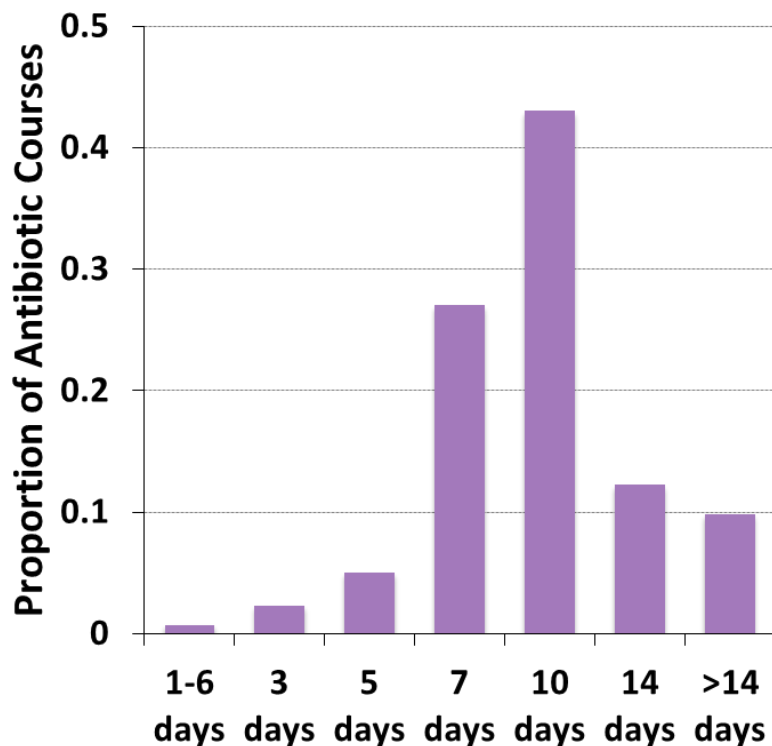
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# Frequency and Consequences of Long Durations of UTI Treatment

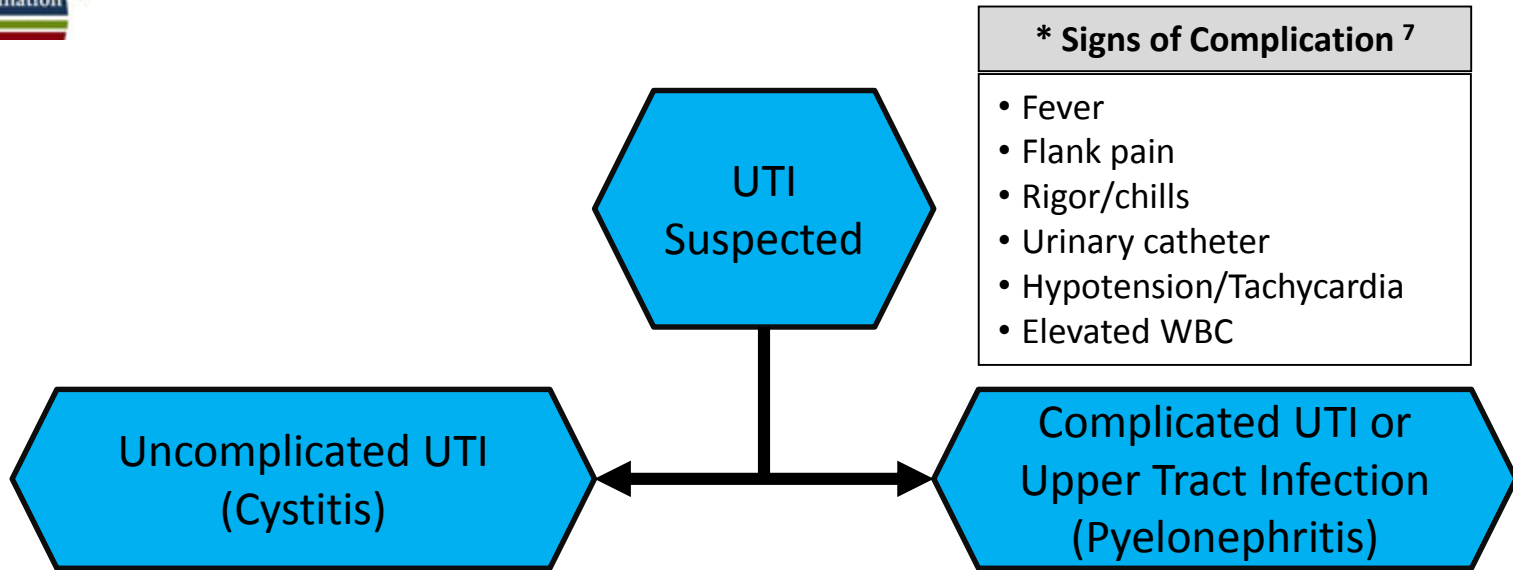
Distribution of Treatment Length



- Study of treated UTI episodes among 40,000 older male Veterans (65% of patients received >7d of therapy [Figure])
- Early recurrence (<30 days after completing treatment) was **the same** in patients treated for <7d or >7d (3.9% vs. 4.2%,  $P = 0.55$ )
- Late recurrence ( $\geq 30$  days after completing treatment) was **higher** in patients treated for >7d (OR 1.2; 95% CI 1.1 – 1.3)
- Infection with *C. difficile* was **higher\*** in patients treated for >7d (OR 1.4; 95% CI 1.0 – 2.1)



# What Am I Treating?



- Urethral symptoms (dysuria, frequency) are predominant
- Signs of complication\* are absent
- Can often wait for culture results before starting treatment
- **Females can often be treated for less than 7 days depending on the agent used**

- Signs of complication\* are present
- **Don't wait for culture results if resident has high fever, rigors or hypotension/tachycardia**
- Use agents that provide high blood and urine levels (IV agents, TMP/SMX, and fluoroquinolones)



# Empiric Treatment of Cystitis

## Females

Preference	Estimated Creatinine Clearance (eCrCl)		
	>30	15 – 30	<15
First	Nitrofurantoin 100mg BID (5 days)  OR  TMP/SMX 160/800 BID (3 days)	TMP/SMX 80/400 BID (3 days)	Ciprofloxacin 250mg BID (3 days)
Second	Fosfomycin 3gm (Once)  Re-dose on day #3 if extending treatment >3d	Fosfomycin 3gm (Once)  Re-dose on day #3 if extending treatment >3d	Fosfomycin 3gm (Once)  Re-dose on day #3 if extending treatment >3d
Third	Ciprofloxacin 250mg BID (3 days)	Ciprofloxacin 250mg BID (3 days)	---



# Empiric Treatment of Cystitis

## Males

Preference	Estimated Creatinine Clearance (eCrCl)		
	>30	15 – 30	<15
First	Nitrofurantoin 100mg BID (7 days)  OR  TMP/SMX 160/800 BID (7 days)	TMP/SMX 80/400 BID (7 days)	Ciprofloxacin 250mg BID (7 days)
Second	Fosfomycin 3gm (Dose on day #1, #3, #5)	Fosfomycin 3gm (Dose on day #1, #3, #5)	Fosfomycin 3gm (Dose on day #1, #3, #5)
Third	Ciprofloxacin 250mg BID (7 days)	Ciprofloxacin 250mg BID (7 days)	---



# What About Amoxicillin & Cephalexin?

- **Primary rates of resistance** to amoxicillin and cephalexin **are too high** to recommend their use during the empiric phase of treatment.
- It is reasonable to use these agents as alternatives to fluoroquinolones once culture results are back and show these agents are active
- Treatment courses using these drugs need to be at least 7 days due to lower urinary drug levels when compared to TMP/SMX and fluoroquinolones



# Empiric Treatment of Complicated UTI. It's “Complicated”

- Consider transfer if high fever, tachycardia or hypotension.
  - If concerned about sepsis: obtain a urine culture and administer a single 1gm dose of ceftriaxone (IV/IM) or ertapenem (IV/IM) prior to transfer.
- Choice of empiric therapy should be based on resident's previous culture results **AND** previous antibiotic treatment **AND** facility resistance patterns.
  - It may be necessary to administer IV/IM therapy until urine culture results are back before using an oral agent.
- Most residents can be treated for ~7 days of therapy but it may be appropriate to extend therapy if symptoms are severe at onset or if resident not back to baseline after 72 hours of effective therapy.
  - Effective therapy means urine cultures are positive for an organism that is susceptible to the antibiotic chosen empirically
  - Consider alternative causes if resident not improving by 48 hours if cultures show drug is active or if cultures are negative.



# Empiric Treatment of Complicated UTI

## Hemodynamically Stable & Low Concern for Resistance\*

Preference	Estimated Creatinine Clearance (eCrCl)		
	>30	15 – 30	<15
First	TMP/SMX 160/800 BID (7 days)	TMP/SMX 80/400 BID (7 days)	Ciprofloxacin 250mg BID (5 days)
Second	Cefpodoxime 200mg PO BID (7 days)  OR  Cefuroxime 500mg PO BID (7 days)	Cefpodoxime 200mg PO QD (7 days)  OR  Cefuroxime 500mg PO QD (7 days)	Cefpodoxime 200mg PO QD (7 days)  OR  Cefuroxime 500mg PO Q48° (Admin on days 1, 3, 5, & 7)
Third	Ciprofloxacin 500mg BID (5 days)	Ciprofloxacin 250mg BID (5 days)	---

Extend therapy if symptoms severe at onset or if resident is not back to baseline after 72 hours of therapy:  
Cipro (5d → 7d); TMP/SMX (7d → 10d); Cefpodoxime/Cefuroxime (7d → 10d)

\* No culture results with resistance to TMP/SMX and/or ciprofloxacin or treatment with these agents in the **prior 3 months**. Resistance rates to TMP/SMX and/or ciprofloxacin <20% in facility.





# Empiric Treatment of Complicated UTI

**Resident Ill (but not enough to hospitalize) and/or  
Concern for TMP/SMX and/or Ciprofloxacin Resistance\***

**Culture Results Unknown\*\***

<p><b>First-Line</b> Ceftriaxone 1gm q24</p> <p><b>Second-Line</b> Gentamicin 5 mg/kg q24</p> <hr/> <p>+/- Vancomycin 1gm q12</p>
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**Culture Results & Susceptibilities Known\*\***

Non-Pseudomonal Gram-Negative (e.g. <i>E. coli</i> )	
1	TMP/SMX
2	Cefuroxime/Cefpodoxime
4	Ciprofloxacin

Pseudomonas	
1	Ciprofloxacin
2	Levofloxacin

\* Culture results with resistance to TMP/SMX and/or ciprofloxacin or treatment with these agents in the prior 3 months. Resistance rates to TMP/SMX and/or ciprofloxacin  $\geq 20\%$  in facility.

\*\* Refer to Johns Hopkins Antibiotic Guide or Sanford Guide for exact dosing in residents with impaired renal function



# Empiric Treatment of Complicated UTI

**Resident Ill (but not enough to hospitalize) and/or  
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**Culture Results Unknown\*\***

**First-Line**  
Ceftriaxone 1gm q24

**Second-Line**  
Gentamicin 5 mg/kg q24

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+/-  
Vancomycin 1gm q12



**Culture Results & Susceptibilities Known\*\***

Enterococcus sp.	
1	Amoxicillin
2	Doxycycline

Staphylococcus sp.	
1	TMP/SMX (if methicillin-resistant)
2	Cephalexin (if methicillin-susceptible)

\* Culture results with resistance to TMP/SMX and/or ciprofloxacin or treatment with these agents in the prior 3 months. Resistance rates to TMP/SMX and/or ciprofloxacin  $\geq 20\%$  in facility.

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