Proposed Best Practice for Initiation of Antibiotics for Suspected UTI

Best Practice overview. Urine testing and antimicrobial therapy should only be ordered in those with UTI symptoms, but not those with only nonspecific signs or noninfectious symptoms such as fatigue or delirium. Both unnecessary urine testing and antimicrobial therapy contribute to direct patient harm and antimicrobial resistance. Observation and monitoring of residents in whom the diagnosis of UTI is unclear is a best practice. The Best Practice can be approached in 4 steps.

Step 1. Assessment.

When observed change in condition suggestive of UTI, perform assessment for UTI (i.e. SBAR Clinical Assessment and Communications Tool for Suspect UTI) and initiate **appropriate hydration**

Step 2. Avoid unnecessary diagnostics.
Unless Best Practice Criteria (i.e., modified Loeb Criteria) met on SBAR, don't obtain UA/UC;

a) No UA/UC if
   - Only 1 UTI criteria (urgency, rigors, frequency, suprapubic pain, CVA tender, gross hematuria, new incontinence) and no fever or warning signs (nausea/vomiting, low blood pressure)
   - Fever and 2 or more respiratory or skin/soft tissue symptoms (cough, sputum, cellulitis) regardless of UTI criteria

b) **No Catheter**: order UA/UC and start empiric antibiotics if any of below:
   - Dysuria regardless of fever (in residents with no catheter)
   - F**ever*** + ≥1 UTI symptoms (See SBAR)
   - Fever in advanced dementia (unable to report UTI symptoms) (or leukocytosis, left shift, rigors) **and no** respiratory/skin/soft tissue symptoms (i.e, from Choosing Wisely)
   - No fever + ≥2 UTI symptoms OR 1 symptom and warning signs (nausea, vomiting, hypotenstion)

c) **Indwelling catheter** – UA/UC and empiric antibiotics if ≥1 of:
   - Fever, CVA tender/flank pain, rigors, delirium, pelvic discomfort, acute hematuria, malaise/lethargy AND without other cause (medication, trauma, etc.)
   - Consider removing catheter for void, replace if >2 weeks old and obtain fresh UA/UC

**Fever: > 100 F or increase 2.4 F above baseline*

Step 3. Empiric treatment if indicated from b and c above.

- Facility Stewardship Program. "Best Practice" has identified first line antibiotics to maximize patient safety (avoiding harm) and likelihood for successful treatment of possible infection awaiting laboratory results. Table 1 lists empiric therapy choice and Table 2 rational, Table 5 expanded recommendations.

Step 4. Time out/revise course based on UA/UC. After 2-3 days with return of urinalysis and urine culture re-evaluate

- Stop treatment if UA negative (<10 WBC/hpf)
- UA + (>10 WBC/hpf) **AND** + UC (>10^5 cfu/ml)* for recognized pathogen (not *Candia* spp):
  - Change treatment to organism once isolated (Table 3)
  - Document and refine duration based on agent (Table 4)
  - When susceptibilities available, confirm organism is susceptible to agent

**Use lower colony count of 10^2 CFU/ml in a specimen collected from catheter*

Table 1. Empiric therapy of choice

Recommendations based on Antibiogram and National Guidelines		
UTI and Cystitis (Lower UTI), uncomplicated or complicated (stones, catheter in place)		
1st line	Nitrofurantoin 100 BID	• Avoid only if CrCL < 30 ml/min; clincalc.com/kinetics/crcl.aspx • Avoid if suspect pyelonephritis or prostatitis • Make Day 3 switch if Proteus
	Cephalexin 500 mg PO BID (QID if severe)	• Acceptable unless severe B-lactam allergy • Low dose if CrCL low: 10-50 ml/min max does TID, <10 max dose QD • Make Day 3 switch if enterococcus, Pseudomonas
2nd line	Doxycycline 100 mg PO BID	• Moderate coverage, safe • Make Day 3 switch if Proteus, Pseudomonas, or Enterococcus
	Bactrim 1 SS po BID or Bactrim 1 DS po BID	• SS if CrCL low (10-30 ml/min); DS if CrCL nl; avoid if CrCL <10 ml/min • Moderate coverage; (>50% *E. coli* is resistant at Budd Terrace) • Interactions on warfarin, follow K level • Day 3 switch if non-susceptible
3rd line	Fosfomycin 3g po sachet single dose	• Good coverage, especially if suspect Enterococcus, Pseudomonas • Alert microbiology lab to test for susceptibility; may have poor insurance coverage
Pyelonephritis (Upper UTI) or Severe Illness (high fever, nausea/vomiting, hypotension)		
1st line	Ceftriaxone IV/IM 1 g IV/IM dose and consider transfer or 1 g QD	• Safe if mild PCN allergy (i.e., rash), cross rxn low • Patient needing other intravenous antibiotics (severe b-lactam allergy) such as aminoglycosides consider transfer and careful dosing.
2nd line	Bactrim (after ceftriaxone)	See above
	Ciprofloxacin 250 or 500 PO BID (400 IV BID) or Levofloxacin 750 PO QD and consider transfer	• Low dose if CrCl <30 ml/min • If unable to transfer and unable to tolerate Bactrim • Or severe symptoms; review culture to confirm susceptible • QTc prolonging potential in combination with anti-psychotics and anti-emetics here.

Table 2. Estimated percentage of all Pathogens causing UTI that are Susceptible to select antibiotics and safety in terms of C. difficile risk, and tolerability

	Empiric Oral Therapy for **uncomplicated UTI** in Budd Terrace Resident					
Characteristic of Antibiotic	Nitrofurantoin	Cephalexin	Bactrim	Doxycycline	Amp-sulbactum	Levofloxacin
Relative Safety regarding *C. difficile*	Safe	Mod Safe	Safe	Safe	Mod Safe	Not Safe
Tolerability	Good in most patients; Only avoid if CrCl <30 ml/min		Avoid warfarin Renal dosing			Avoid use for uncomplicated UTI; o.k. if @risk for Pseudomonas Danger of QT prolongation

Table 3. Streamlined (change) Therapy for UTI based on urinalysis and urine culture results after 2 days, if susceptibilities are delayed. Assuming Urinalysis has positive leukocyte esterase or WBC AND positive Urine Culture >10

Organism Isolated	Switch ensure adequate coverage if not already on listed agent.
No Pathogen Identified	Stop Antibiotics
E. coli	Nitrofurantoin, cephalexin, doxycycline
Citrobacter freundii	Nitrofurantoin, TMP-SMX, doxycycline
K. pneumoniae, C. koseri	Cephalexin, TMP-SMX, doxycycline
***Proteus* spp.**	Cephalexin, TMP-SMX, ampicillin-sulbactam
***Enterococcus* spp.**	Nitrofurantoin, amoxicillin, ampicillin-sulbactam
***Pseudomonas* spp.**	May need intravenous until susceptibilities returned: cefipime, ceftazidime. Only 61% susceptible to levofloxacin
***Candida* spp.**	Replace urinary catheter, usually responds to no antifungal therapy

Table 4. Duration of Treatment

Agents	Uncomplicated UTI	Complicated UTI (i.e. male, renal stones, obstruction, catheter related)	Pyelonephritis or severe symptoms
Bactrim, Ciprofloxacin/Levofloxacin	**3 days**	Remove/replace catheter 7 days if rapid improvement 14 days ONLY if delayed response	Quinolones 7 days other agents 10-14 days
Nitrofurantoin, Cephelexin, Doxycycline	**5 days**		
Fosfomycin trometamol	1 dose	NA	NA

Table 5. Summary of Dosing and Renal Adjustment for Various Antibiotics for Treating UTI among Skillned Nursing Residents

Dosing		
Drug	Dose	Renal adjustment
Amoxicillin	500mg PO TID	CrCl 10-50 mL/min: 500mg BID CrCl < 10 mL/min: 500mg once daily
Ceftriaxone	1g IM/IV q24h	None
Cefpodoxime	100mg PO BID (cystitis) 200mg PO BID (pyelonephritis)	CrCl < 30 mL/min: Administer once daily
Cephalexin	500mg PO BID (cystitis) 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 (severely ill)	CrCl < 30 mL/min: Administer once daily
Doxycycline	100mg PO BID	None
Fluconazole	200mg PO once daily	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 (cystitis) 750mg PO p 24hrs (pyelonephritis)	None CrCl< 20-49 mL/min 750 mg q 48 hrs CrCl 10-20 mL 750 mg then 500 mq q 48 hrs
Nitrofurantoin (Macrobid)	100mg PO BID	CrCl < 30 mL/min: avoid[4-5]
TMP-SMX	1 SS tab bid (preferred in older adults) 1 DS tab (800-160mg) PO BID (for normal CrCL)	CrCl 15-30 mL/min: 1 DS tab once daily --OR-- 1 SS tab BID CrCl < 15 mL/min: avoid
Fosfomycin	3-g sachet in a single dose 3 g sachet every 48-72 hours for complicated UTI	None