Alaska Antimicrobial Stewardship Collaborative (A2SC) announces the Alaska specific ***Urinary Tract Infection Treatment Guidelines.*** These clinical guidelines are intended to aid in the selection of antimicrobial therapy for patients residing in Alaska who present with a urinary tract infection. Treatment guidelines available for the following Alaska care setting:

- Inpatient Adult UTI Clinical Pathway
- Outpatient Adult UTI Clinical Pathway
- Long term care Adult UTI Clinical Pathway
- Pediatric UTI Clinical Pathway

These guidelines will help Alaska physicians and pharmacists ensure patients receive the right antibiotic at the right time and only when necessary. As a companion to the guidelines the 2017 Alaska State Antibiogram is also available to help guide the best antibiotic choice.

UTI Guidelines are available for download on the A2SC website:
https://www.ashnha.com/antimicrobial-stewardship/a2sc-resources/uti/

The Alaska Antibiogram is available for download:
https://www.ashnha.com/wp-content/uploads/2018/11/AK-2017-Antibiograms.pdf

The guidelines are being released as part of 2018 Antibiotic Awareness Week November 12-18. Antibiotics save lives, but any time antibiotics are used, they can cause side effects and lead to antibiotic resistance. In U.S. doctors' offices and emergency departments, at least 47 million antibiotic prescriptions each year are unnecessary, which makes improving antibiotic prescribing and use a national priority.

About Alaska Antimicrobial Stewardship Collaborative

The Alaska Antimicrobial Stewardship Collaborative (A2SC) is an active partnership of hospitals and other health care stakeholders dedicated to developing innovative strategies to ensure appropriate antibiotic use. A2SC's goal is a simple one: all patients in Alaska will receive the right antibiotic at the right time and only when necessary.

The emergence of antibiotic-resistant bacteria caused by the misuse and overuse of antibiotics is pushing the healthcare industry to re-evaluate how medicine is practiced. Together we will accelerate positive changes to achieve this critical goal.

Alaska Antimicrobial Stewardship Collaborative (A2SC)
Adult INPATIENT Urinary Tract Infection Treatment Guideline (Last Updated 10-2018)

Category	Asymptomatic Bacteriuria	Acute Cystitis	Acute Pyelonephritis	Complicated UTI / Catheter-Associated UTI (CAUTI)
Symptoms and/or Risk Factors	Isolation of a specific quantity of bacteria in an appropriately collected urine specimen (**≥10^5 cfu/mL** or from catheter; **≥10^2 cfu/mL**) from an individual **WITHOUT** signs or symptoms of infection.	**General symptoms**: Acute onset dysuria, frequency or urgency	**Upper UTI** is frequently associated with general symptoms PLUS **back/flank pain, fever & chills.**	**Complicated UTI:** Infection in males or in the presence of an anatomic/functional abnormality (e.g. enlarged prostate, calculi, obstruction, catheter or stent, neurogenic bladder, neutropenia).
		Consider deviation from the below recommendations (or consult to ID provider) if any of the following risk factors for multidrug resistant organisms are present: antibiotic exposure within 90 days, presence of urinary invasive device(s), history of UTI with multi-drug resistant organism.		
Culture & Susceptibility (C&S) Investigation	Routine C&S is **NOT indicated** in asymptomatic patients *unless* screening in pregnancy or prior to urologic procedure with compromise of the urothelial mucosa.	If patient requires inpatient admission for acute cystitis, acute pyelonephritis, or complicated/catheter associated cystitis**, urine C&S are critical** in order to optimize therapy. Urine cultures should be collected from a midstream void prior to antibiotics or a freshly placed urinary catheter.		
Recommended Treatment and Duration	Treatment is **NOT** recommended for patients who fail to meet the below criteria (e.g. pregnancy or those undergoing urologic procedures). Pregnant women: (select one option) • **Nitrofurantoin** 100mg PO BID x 5d *** Note: contraindicated at 38-42 weeks gestation* • **Cephalexin** 500mg PO BID x 5d Urologic procedure: Direct treatment based on pre-procedure screening C&S.	First Line: (select one option) • **Nitrofurantoin** 100mg PO BID x 5d • **Cephalexin** 500mg PO BID x 7d **Fluoroquinolone FDA Safety Alert**: *Disabling & potentially permanent adverse effects outweigh benefit in cystitis. Only use when no other alternatives exist.* Second Line: • **Ciprofloxacin** 250mg PO BID x 3d ***Note: If at risk for STIs w/ symptoms of urethritis, consider screening for chlamydia.*	First Line: • **Ceftriaxone** 1g IV Q24H Second Line: • **Ciprofloxacin** 400mg IV Q12H • **Levofloxacin** 750mg IV Q24H *Above recommendations are for empiric antimicrobial therapy, tailor maintenance therapy to C&S report.* **Duration:** • Duration may vary based upon final antibiotic selection. • Shorter courses (**7 days**) are reasonable, if symptoms promptly resolve. • Longer courses (**10-14 days**) if delayed response, regardless if catheterized or not. • *If female and ≤ 65 years of age*, a **3-day** regimen *may be considered* for CAUTI with catheter removal.	

- Scope of this guideline is limited to immunocompetent adults >18 y/o without history of renal transplant.
- **Nitrofurantoin** is contraindicated for CrCl < 30mL/min and in pregnancy at term (38-42wks).
- Statewide *E. coli* susceptibility to **TMP/SMX** is <80% and should be avoided as empiric therapy, but may be considered if confirmed by C&S for complicated UTI or pyelonephritis (2 week duration).
- If patient reports penicillin allergy, inquire about onset and severity of symptoms, as well as prior beta-lactam exposure and update patient medical record. Severe or life-threatening allergic reactions may include: anaphylaxis, angioedema, urticaria, Stevens-Johnson Syndrome (SJS), etc.
- Patients with recurrent UTIs should have empiric therapy selected based upon prior C&S results.
- Chronic antibiotic prophylaxis for most patients with risk factors for recurrent, complicated UTI is NOT typically recommended. Risk of resistance outweighs the slight reduction in infection rate.

Note: This guideline is intended to aid in the selection of antimicrobial therapy in adult INPATIENTS residing in Alaska who are diagnosed with a urinary tract infection. It is not intended to replace the clinical judgment of the prescribing provider or to be used for those residing outside the State of Alaska.

Executive Summary: International Clinical Practice Guidelines for the Treatment of Acute Uncomplicated Cystitis and Pyelonephritis in Women: **CID 2011;52(5):561–564**. Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: **CID 2010; 50:625–663.** IDSA Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults. **CID 2005; 40:643–54.** 2015 Updated Beers Criteria.

Alaska Antimicrobial Stewardship Collaborative (A2SC)
Adult OUTPATIENT Urinary Tract Infection Treatment Guideline (Last Updated 10-2018)

Category	Asymptomatic Bacteriuria	Acute Cystitis	Acute Pyelonephritis	Complicated UTI / Catheter-Associated UTI (CAUTI)
Symptoms and/or Risk Factors	Isolation of a specific quantity of bacteria in an appropriately collected urine specimen (**≥10^5 cfu/mL** or from catheter; **≥10^2 cfu/mL**) from an individual **WITHOUT** signs or symptoms of infection.	**General symptoms**: Acute onset dysuria, frequency or urgency *Risk factors for resistance:* • Antibiotic exposure within 90d • Hospitalization within 90d • Presence of invasive device(s)	**Upper UTI** is frequently associated with general symptoms PLUS **back/flank pain, fever & chills.**	**Complicated UTI:** Infection in males or in the presence of an anatomic/functional abnormality (e.g. enlarged prostate, calculi, obstruction, catheter or stent, neurogenic bladder, neutropenia).
Culture & Susceptibility (C&S) Investigation	Routine C&S is **NOT** indicated in asymptomatic patients *unless* screening in pregnancy or prior to urologic procedure with compromise of the urothelial mucosa.	Routine C&S is NOT indicated *unless* risk factor(s) for resistance exist; consider if prescribing 2nd line therapy	**Urine C&S are critical** in order to optimize therapy. Urine cultures should be collected from a midstream void prior to antibiotics or a freshly placed urinary catheter.	
Recommended Treatment and Duration	Treatment is **NOT** recommended for patients who do not meet the below criteria (e.g. pregnancy or those undergoing urologic procedures). Pregnant women: (select one option) • **Nitrofurantoin** 100mg PO BID x 5d *** Note: contraindicated at 38-42 weeks gestation* • **Cephalexin** 500mg PO BID x 5d Urologic procedure: Direct treatment based on pre-procedure screening C&S.	First Line: (select one option) • **Nitrofurantoin** 100mg PO BID x 5d • **Cephalexin** 500mg PO BID x 7d **Fluoroquinolone FDA Safety Alert**: *Disabling & potentially permanent adverse effects outweigh benefit in cystitis. Only use when no other alternatives exist.* Second Line: • **Ciprofloxacin** 250mg PO BID x 3d ***Note: If STI risk w/ symptoms of urethritis, consider treatment for chlamydia.*	First Line: • **Ceftriaxone** 1g IM/IV x 1 dose If severe or life-threatening beta-lactam allergy consider **Gentamicin** 5mg/kg IM/IV x 1 dose Followed by: First line: • **Cephalexin** 1g PO TID x 10-14d Second line: • **Ciprofloxacin** 500mg PO BID x 7d *Tailor maintenance therapy to C&S report.*	Base empiric treatment on prior culture data. If stable vitals & afebrile, provide definitive therapy when new C&S result. **Duration:** • Shorter courses (**7 days**) are reasonable, if symptoms promptly resolve. • Longer courses (**10-14 days**) if delayed response, regardless if catheterized or not. • *If female and ≤ 65 years of age*, a **3-day** regimen *may be considered* for CAUTI with catheter removal.

- Scope of this guideline is limited to adults>18 y/o without signs of severe physiologic disturbance. This guideline should not be used for patients who are immunocompromised or kidney transplant recipients.
- **Nitrofurantoin** is 1st line for most patients without symptoms of pyelonephritis. Contraindicated for CrCl < 30mL/min and in pregnancy at term (38-42wks).
- Statewide *E. coli* susceptibility to **TMP/SMX** is <80% and should be avoided as empiric therapy, but may be considered if confirmed by C&S for complicated UTI or pyelonephritis (2 week duration).
- For ESBL (Extended Spectrum Beta-lactamase) producing organisms, treat according to reported susceptibility with **nitrofurantoin, TMP/SMX or ciprofloxacin**. If resistant to all tested antibiotics or multiple allergies, *consult Infectious Diseases* for potential alternatives. ESBL pyelonephritis may require inpatient admission and/or IV antibiotics.
- If patient reports penicillin allergy inquire about onset and severity of symptoms, as well as prior beta-lactam exposure and update patient medical record. *Severe or life-threatening allergic reactions may include: anaphylaxis, angioedema, urticaria, Stevens-Johnson Syndrome (SJS), etc.*
- Antibiotic prophylaxis for most patients with risk factors for recurrent, complicated UTI is NOT typically recommended. Risk of resistance outweighs the slight reduction in infection rate.

Note: This guideline is intended to aid in the selection of antimicrobial therapy in adult OUTPATIENTS residing in Alaska who present with a urinary tract infection. It is not intended to replace the clinical judgment of the prescribing provider or to be used for those residing outside the State of Alaska.

Executive Summary: International Clinical Practice Guidelines for the Treatment of Acute Uncomplicated Cystitis and Pyelonephritis in Women: **CID 2011;52(5):561–564**. Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: **CID 2010; 50:625–663.** IDSA Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults. **CID 2005; 40:643–54.** 2015 Updated Beers Criteria.

Alaska Antimicrobial Stewardship Collaborative
Adult LONG TERM CARE Urinary Tract Infection Treatment Guidelines (Last Updated 10-2018)

INDICATION FOR URINALYSIS IN NON-CATHETERIZED RESIDENTS – FOLLOW THE LOEB/MCGEER CRITERIA: Acute dysuria alone **OR** Fever > 100 F **AND** 1 of the following → New or worsening: urgency, frequency, suprapubic pain, gross hematuria, costovertebral tenderness, urinary incontinence *(Note: urinalysis is **NOT** indicated in non-catheterized patients for work up of worsening mental status changes without other symptoms of UTI)*

INDICATION FOR URINALYSIS IN CATHETERIZED RESIDENTS: New onset suprapubic pain or costovertebral tenderness, swelling/tenderness of the testes, epididymis or prostate, or purulent discharge from around the catheter; **OR** Fever > 100 F, rigors, acute change in mental status, new-onset hypotension, with **NO** alternate diagnosis or site of infection

Category	Asymptomatic Bacteriuria	Acute Cystitis	Acute Pyelonephritis	Complicated UTI/ Catheter-Associated UTI (CAUTI)
Symptoms and/or Risk Factors	Presence of bacteria in urine (**≥10^5 cfu/mL** or from catheter; **≥10^2 cfu/mL**) from an individual **WITHOUT** signs or symptoms of infection.	**General symptoms**: Acute onset dysuria, frequency or urgency	**Upper UTI** is frequently associated with general symptoms PLUS **back/flank pain, fever & chills.**	**Complicated UTI:** Infection in males or in the presence of an anatomic/functional abnormality (e.g. enlarged prostate, calculi, obstruction, catheter or stent, neurogenic bladder, neutropenia).
Culture & Susceptibility (C&S) Investigation	Routine C&S is NOT indicated in asymptomatic patients *unless* screening in pregnancy or prior to urologic procedure with compromise of urothelial mucosa.	**Urine C&S are critical** in order to optimize therapy. Urine cultures should be collected from a midstream void prior to antibiotics or a freshly placed urinary catheter.		
Recommended Treatment and Duration	Treatment is **NOT** recommended for patients who do not meet the below criteria (e.g. pregnancy or those undergoing urologic procedures) Pregnant women: (select one option) • **Nitrofurantoin** 100mg PO BID x 5d *** Note: contraindicated at 38-42 weeks gestation* • **Cephalexin** 500mg PO BID x 5d Urologic procedure: Direct treatment based on pre-procedure screening C&S. ***Note: when NOT giving antibiotics, close monitoring is recommended*	First Line: (select one option) • **Nitrofurantoin** 100mg PO BID x 5d • **Cephalexin** 500mg PO BID x 7 days **Fluoroquinolone FDA Safety Alert**: *Disabling & potentially permanent adverse effects outweigh benefit in cystitis. Only use when no other alternatives exist.* Second Line: • **Ciprofloxacin** 250mg PO BID x 3 days ***Note: If STD risk w/ symptoms of urethritis, consider treatment for chlamydia.*	First Line: • **Ceftriaxone** 1g IM/IV x 1 dose If severe or life-threatening beta-lactam allergy consider **Gentamicin** 5mg/kg IM/IV x 1 dose Followed by: First line: • **Cephalexin** 1g PO TID x 14 days Second line: • **Ciprofloxacin** 500mg PO BID x 7d *Tailor maintenance therapy to C&S report.*	Base empiric treatment on prior culture data. **If stable vitals & afebrile**, provide definitive therapy when new C&S result. **Duration:** • Shorter courses (**7 days**) are reasonable, if symptoms promptly resolve. • Longer courses (**10-14 days**) if delayed response, regardless if catheterized or not. • *If female and ≤ 65 years of age*, a **3-day** regimen *may be considered* for CAUTI with catheter removal.

- Scope of this guideline is limited to adults>18 y/o without signs of severe physiologic disturbance. This guideline should not be used for patients who are immunocompromised or kidney transplant recipients.
- **Nitrofurantoin** is 1st line for most patients without symptoms of pyelonephritis. Contraindicated for CrCl < 30mL/min and in pregnancy at term (38-42wks).
- Statewide *E. coli* susceptibility to TMP/SMX is <80% **and should be avoided as empiric therapy** but may be considered if confirmed by C&S for complicated UTI or pyelonephritis (2 week duration).
- Risk factors for resistance: Antibiotic exposure within 90 days, hospitalization within 90 days, presence of invasive device(s)
- For ESBL (Extended Spectrum Beta-lactamase) producing organism, treat according to reported susceptibility with **nitrofurantoin, TMP/SMX or ciprofloxacin**. If resistant to all tested antibiotics or multiple allergies, *consult Infectious Diseases* for potential alternatives. ESBL pyelonephritis may require inpatient admission and/or IV antibiotics.
- If patient reports penicillin allergy inquire about onset and severity of symptoms as well as prior beta-lactam exposure and update patient medical record. *Severe or life-threatening allergic reactions may include: anaphylaxis, angioedema, urticaria, Stevens-Johnson Syndrome (SJS), etc.*
- Antibiotic prophylaxis for most patients with risk factors for recurrent, complicated UTI is NOT typically recommended. Risk of resistance outweighs the slight reduction in infection rate.

Note: This guideline is intended to aid in the selection of antimicrobial therapy in adult LONG TERM CARE residents in Alaska who present with a urinary tract infection. It is not intended to replace the clinical judgment of the prescribing provider or to be used for those residing outside the State of Alaska.

Executive Summary: International Clinical Practice Guidelines for the Treatment of Acute Uncomplicated Cystitis and Pyelonephritis in Women: **CID 2011;52(5):561–564**. Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: **CID 2010; 50:625–663.** IDSA Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults. **CID 2005; 40:643–54.** 2015 Updated Beers Criteria. Development of minimum criteria for the initiation of antibiotics in residents of long-term-care facilities: results of a consensus conference: **Infect Control Hosp Epidemiol 2012; 33(10):965-77.**

Pediatric FEBRILE Urinary Tract Infection Treatment Guideline (2-24 months)

Symptoms	Diagnostic Criteria for Acute Pyelonephritis[1]	Risk Factors[1]
• Fever • Poor feeding • Vomiting • Irritability • Strong-smelling urine	Urinalysis results that suggest infection • Positive nitrite OR • Leukocyte esterase OR • Pyuria AND • >50,000 CFUs per mL of a uropathogen cultured from a urine specimen obtained through catheterization or SPA	Girls: Age <12 months; Temp ≥39 C; Fever ≥2 days Boys: Temp ≥39 C; Fever ≥24 hours; Uncircumcised Absence of another source of infection

Test	Treat	Imaging[1]
Obtain urine culture PRIOR to starting antibiotics	Adjust therapy based on sensitivity testing	• Renal/bladder ultrasound for 1st febrile UTI • VCUG for 2nd febrile UTI or if abnormalities seen on renal/bladder ultrasound

Antibiotic Selection[1]

	Ambulatory Empiric Treatment	Inpatient Empiric Treatment	Duration of Therapy
Preferred Treatment[1]	**Cephalexin** 50mg/kg/day PO divided TID or QID (max 4gm/day)	**Ceftriaxone** 50mg/kg IV Q24H (max 2gm/day)	7-10 days
Beta-lactam allergic[1]	**Sulfamethoxazole/trimethoprim** 4-5mg/kg PO BID (trimethoprim component for dosing; max 160mg trimethoprim/dose)	**Gentamicin** 5mg/kg/day IV	

1.Roberts KB. Urinary tract infection: clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and children 2 to 24 months. Pediatrics. 2011;128(3):595-610.

Pediatric Urinary Tract Infection Treatment Guideline (>24 months)

Symptoms[2]		Risk Factors[2]	Test/Treat
Preverbal • Fever • Abdominal/flank pain • Vomiting • Poor feeding • Lethargy • Malodorous urine	Verbal • Frequency • Dysuria • Hesitancy • Urgency • Abdominal/flank pain	Prior history of UTI • Review prior organism/susceptibilities for guidance on empiric therapy selection if recurrent UTI Fever ≥ 2 days or prolonged ≥ 5 days	Obtain urine culture PRIOR to starting antibiotics Adjust therapy based on sensitivity testing

Antibiotic Selection[2]

	Ambulatory Empiric Treatment	Inpatient Empiric Treatment	Duration of Therapy
Preferred Treatment[2]	**Cephalexin** 50mg/kg/day PO divided TID or QID (max 4gm/day)	**Ceftriaxone** 50mg/kg IV Q24H (max 2gm/day)	7-10 days
Beta-lactam allergic[2]	**Sulfamethoxazole/trimethoprim** 4-5mg/kg PO BID (trimethoprim component for dosing; max 160mg trimethoprim/dose)	**Gentamicin** 5mg/kg/day IV	

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2.Shaw K, et al. Pathway for the Evaluation and Treatment of Children with Febrile UTI. Children's Hospital of Philadelphia. https://www.chop.edu/clinical-pathway/urinary-tract-infection-uti-febrile-clinical-pathway. Accessed Oct 2018.

Alaska Antimicrobial Stewardship Collaborative