**Clinical Pathway:**

**Urinary Tract Infection (UTI)**

### Inclusion Criteria:
- 2 mo-18 yrs old, 1st or 2nd UTI

### Exclusion Criteria:
- < 2 mo old, past documented >2 UTI or pyelonephritis, pre-existing GU/Nephro abnormalities

### Initial Work-Up:
- If 2mo-24mo or non-toilet trained:
  - Obtain urinalysis (U/A) and culture via suprapubic aspiration (SPA) or catheterization (cath)
- If any voided specimen is positive (LE/nitrite/bacteria/pus): obtain a cath specimen for U/A, culture
- If toilet-trained/non sexually active adolescent: Obtain mid stream clean catch U/A and culture
- If sexually active adolescent: Obtain dirty urine for GC/Chlamydia, mid stream clean catch U/A, culture, urine hCG

### If concern for sepsis, initiate Septic Shock Pathway

### Meets Admission Criteria?
- Requires IV antibiotics
- Immunocompromised
- Vomiting, unable to tolerate oral medication
- Lack of adequate f/u

### OUTPATIENT TREATMENT
- **Antibiotics:**
  - Review past culture results for potential resistance patterns.
  - If history of UTI with resistance, treat off pathway.
  - Cephalexin: 50-100 mg/kg/day TID PO
  - If PCN allergy:
    - Bactrim: 8 mg (TMP)/kg/day PO divided BID (max: 160 mg TMP single dose) OR
    - Nitrofurantoin (only for use in simple cystitis): 5-7 mg/kg/day divided q6hr PO (max 400 mg/day)
  - Duration of treatment: 7-14 days
  - If sexually active female: Nitrofurantoin 100 mg BID x 5-7 days or Bactrim DS BID for 3 days for Staph saprophyticus. If concern for pyelonephritis: consider Ciprofloxacin or Levofloxacin

### Imaging:
- Renal bladder ultrasound if indicated:
  - All boys
  - All patients 2-24 months 1st or 2nd UTI
  - Girls >24 months: provider discretion based on behavioral history such as toileting issues, constipation and bladder dysfunction
  - Consider VCUG if previous or current RBUS is abnormal (Hydronephrosis, scarring, structural abnormalities)

### Follow Up:
- Urine culture for speciation and sensitivities
- Schedule follow-up w/PCP
- If imaging abnormal, consider f/u with Nephrology or Urology

### Discharge Criteria:
- Clinical improvement (down-trending fevers, down-trending CRP if following)
- Adequate PO without need for IVs
- Tolerating PO antibiotics
- Parent capable of caring for child at home, parental education complete
- Imaging studies completed or scheduled as outpatient
- PCP and/or subspecialty follow-up scheduled

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**Risk Factors for developing UTI:**

### Males
- Uncircumcised < 1 year old
- All < 6 months old
- Temp > 39°C
- Fever > 24hrs
- Non-black race
- Absence of another source of infection

### Females
- White race
- All < 12 months old
- Temp > 39°C
- Fever > 2 days
- Absence of another source of infection

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**Considereations for sexually active adolescents:**
- If lower abdominal/pelvic pain: consider bimanual exam to evaluate for PID.
- If abnormal vaginal discharge: test for yeast, BV, trichomonas.

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**Definite UTI**

- (++U/A + culture)
- Positive urine culture = SPA > 100 cfu/ml or
- Cath: > 10,000 cfu/ml OR
- Clean catch: > 10,000-100,000 cfu/ml of a single organism

### Antibiotics:
- Adjust antibiotics according to sensitivities to organism
  - Treat for total 7-14 days
  - Transition to PO as tolerated
- Consider ID consult for: UTI likely but culture >1 organism, drug resistant organisms, UTI with bacteremia

### Order Renal Bladder Ultrasound (RBUS) for:
- All boys
- Girls 2-24 months
- Girls >24 months: provider discretion based on behavioral history such as toileting issues, constipation and bladder dysfunction
- Previously abnormal RBUS
- Severely ill, poor urine flow, elevated creatinine, urine culture positive for candida or staphylococcus aureus

If RBUS is anatomically normal, strongly consider VCUG and Nephrology AND/OR Urology consult.

If 2nd UTI with normal RBUS, can discuss further imaging with specialist.

Consider: Treating any bowel/bladder dysfunction (i.e. constipation)

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**2 Consider Acute Kidney Injury (AKI) based on the following criteria:**
- 2 months-2yrs: Cr=0.4 mg/dL
- 3yrs-15yrs: Cr=0.7 mg/dL
- >16 yrs: Cr=1.0mg/dL
- Cr that increases by 50% from baseline or by 0.2 mg/dL