

COVER SHEET

COMPLICATED or RECURRENT UTI PATHWAY

3/2011

Patients to include on pathway: (Patients must have all of these):

- Patients 28 days or older with fever, clinical signs and a urinalysis consistent with a urinary tract infection.
- Patients with stable vital signs and no clinical signs of sepsis
- Patients with a past history of UTI or patients with known GU anomalies (e.g. posterior urethral valves, UPJ obstruction, kidney stones, neurogenic bladder).

Patients to exclude from pathway: (Patients with any of these):

- Patients under 28 days of age, unless completed R/O Sepsis work up.
- Immunocompromised patients or patients with **significant** co-morbid conditions

Patients should be considered for removal from the pathway if:

(nursing staff should contact physician if any of the following apply)

- No significant improvement in clinical condition within 24 - 48 hours (persistent fever alone is not unexpected)
- Significant clinical deterioration
- Diagnosis of UTI becomes uncertain

Criteria for admission:

- All patients with UTIs who are less than 3 months old
- For patients 3 months of age or older, if any of the following apply:
 - Unable to take PO medications
 - Unable to maintain hydration by oral intake
 - General ill appearance

Criteria for discharge (Patients must have all of these):

- Significant improvement in fever and pain
- Taking PO fluids and medications without difficulty
- Safe and stable home situation

Background information:

- Urinary Tract Infections are the most common bacterial cause of unexplained fever in infants and young children.
- Most UTIs are caused by E. Coli and other enteric gram negative organisms.
- A large proportion of such organisms are resistant to ampicillin and sulfamethoxazole/trimethoprim (Bactrim, Septra) but sensitive to 1st generation cephalosporins. It is unusual for 1st time UTIs to be caused by organisms requiring a third generation cephalosporin. In children with GU anomalies or recurrent UTIs, broader spectrum antibiotics are warranted given a higher incidence of resistant organisms.
- In very young infants (under 2 months), group B streptococcus may also cause UTI.
- Most febrile UTIs are presumed to be pyelonephritis .
- Hypertension is the most common serious complication of pyelonephritis. All patients with suspected pyelonephritis should be screened for hypertension.
- Once patients are stable and are able to take oral medications, even pyelonephrities can be treated as an outpatient with oral antibiotics. There is no difference in efficacy between oral and IV antibiotics for treatment of UTIs in patients with normal urinary tracts.
- UTIs are 5-10 times more common in uncircumcised male infants than in circumcised male infants or female infants.
- UTIs are more common in infants and children with urologic anomalies or vesicoureteral reflux. For this reason, imaging studies (renal ultrasound and in many cases VCUG) are indicated in patients for UTI.

Goals

- Ensure appropriate choice of antibiotics for empiric treatment of UTI
- Reduce unnecessary use of monitors
- Screen all patients with UTI for hypertension
- Provide education for patients and families

Bauer R, Kogan B. 2008. "New Developments in the Diagnosis and Management of Pediatric UTIs" *Urologic Clinic North America* 35(1): 47-58; vi

Committee on Quality Improvement 1999. "The Diagnosis, Treatment, and Evaluation of the Initial Urinary Tract Infection in Febrile Infants and Young Children" *American Academy of Pediatrics* 103(4 Pt 1): 843-52

McDonald A, Scranton M, Gillespie R, Mahajan V, Edwards G. 2000. "Voiding Cystourethrograms and Urinary Tract Infections: How Long to Wait?" *Department of Pediatrics* 105(4)

Weight: _____

Allergies: _____

ORDERS

Time/Date: General:

- Diagnosis: Recurrent or Complicated urinary tract infection
- Estimated length of stay = 2 days
- Condition: Stable
- Activity: As tolerated for age
- Vitals (including blood pressure) and Pain Assessment: every 4 hrs times 3, then routine. Notify physician of hypertension (if <15mm above normal, notification is non-urgent and MD should be notified during daytime hours).
- Initiate "Learning Assessment" and implement UTI education.
- On admit, assess discharge needs and make appropriate referrals (see pediatric admission database)
- If patient self-catheterizes, I/O catheterization per home regimen
- Latex precautions if patient has spina bifida

Definition of Hypertension:	BP greater than values below on 3 measurements	
Age	Systolic BP	Diastolic BP
28 days to 6 months	100	55
6 mos - 1 yr	105	60
1 -3 years	110	65
3 - 10 years	115	75
10 - 18 years	120	80

Education:

- 1) **BEGIN EDUCATION ON ADMISSION**
- 2) Review educational materials regarding UTI with the family
 - Review reasons to call physician or return to ER
 - If patient self-catheterizes at home, review clean self-catheterizing techniques with patient and parent.

Diet and Fluids:

- Diet: Age-appropriate, encourage fluids.
- IV fluids at 1 times maintenance (see chart below).
- Continue IV fluids until patient is taking PO fluids well and has good urine output (>1mL/kg/hr averaged over shift). Wean IV fluids as tolerated to saline lock if PIV and heparin lock if patient has central line.
- If patient appears dehydrated, discuss with physician need for additional fluid orders
- Do not add potassium to IV fluids and **notify physician** if **serum potassium > 5.5** or **serum creatinine is:**

serum creatinine	age	sex
> 0.6	< 12	boys & girls
> 1.3	≥ 12	girls
> 1.3	≥ 12	boys

If initiated in ER for ER use only	
initial	date/time

* Definition of Maintenance IV Fluids:

0-10	Kg	4 mL/kg/hr
11-20	Kg	40 mL/hr + (2mL/kg/hr for each kg > 10)
>20	Kg	60 mL/hr + (1mL/kg/hr for each kg > 20)

for children ≤15 Kg, use D5 - ¼ NS; add 20 mEq KCl/L
 for children >15 Kg, use D5 - ½ NS; add 20 mEq KCl/L

Physician's Signature/ID number : _____ Date: ____/____/____ Time: _____

Complicated UTI

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Patient Label

0032



pathway 3/2011

Physician's Order Sheet

Interdisciplinary Patient/Family Learning Evaluation

Initial Patient/Family Learner Assessment

A learning evaluation is done with each initial teaching intervention for each learner. Teaching interventions should be documented in an ongoing manner with ongoing assessment and evaluation of readiness to learn, barriers to learning, and learning outcomes. Use your department or topic specific Interdisciplinary Patient/Family Education Documentation forms for ongoing patient/parent/family education documentation. Use this form for the initial assessment of a learner and keep this form with the ongoing patient/family education documentation forms.

Initial Learner Evaluation (assess one or multiple learners)			
1. _____ Date _____ (Pt./Primary care giver)	2. _____ Date _____ learner	3. _____ Date _____ learner	4. _____ Date _____ learner
Prior Knowledge of Plan of Care or care needs: <input type="checkbox"/> Comprehensive <input type="checkbox"/> Good <input type="checkbox"/> Limited <input type="checkbox"/> None <input type="checkbox"/> Other _____	Prior Knowledge of Plan of Care or care needs: <input type="checkbox"/> Comprehensive <input type="checkbox"/> Good <input type="checkbox"/> Limited <input type="checkbox"/> None <input type="checkbox"/> Other _____	Prior Knowledge of Plan of Care or care needs: <input type="checkbox"/> Comprehensive <input type="checkbox"/> Good <input type="checkbox"/> Limited <input type="checkbox"/> None <input type="checkbox"/> Other _____	Prior Knowledge of Plan of Care or care needs: <input type="checkbox"/> Comprehensive <input type="checkbox"/> Good <input type="checkbox"/> Limited <input type="checkbox"/> None <input type="checkbox"/> Other _____
Primary Language: check <input type="checkbox"/> English <input type="checkbox"/> Spanish <input type="checkbox"/> Hmong Other _____ <input type="checkbox"/> Writes <input type="checkbox"/> Reads	Primary Language: check <input type="checkbox"/> English <input type="checkbox"/> Spanish <input type="checkbox"/> Hmong Other _____ <input type="checkbox"/> Writes <input type="checkbox"/> Reads	Primary Language: check <input type="checkbox"/> English <input type="checkbox"/> Spanish <input type="checkbox"/> Hmong Other _____ <input type="checkbox"/> Writes <input type="checkbox"/> Reads	Primary Language: check <input type="checkbox"/> English <input type="checkbox"/> Spanish <input type="checkbox"/> Hmong Other _____ <input type="checkbox"/> Writes <input type="checkbox"/> Reads
Readiness to learn: check <input type="checkbox"/> Asking pertinent questions <input type="checkbox"/> Actively Listening <input type="checkbox"/> Unreceptive <input type="checkbox"/> No interest demonstrated <input type="checkbox"/> Distracted	Readiness to learn: check <input type="checkbox"/> Asking pertinent questions <input type="checkbox"/> Actively Listening <input type="checkbox"/> Unreceptive <input type="checkbox"/> No interest demonstrated <input type="checkbox"/> Distracted	Readiness to learn: check <input type="checkbox"/> Asking pertinent questions <input type="checkbox"/> Actively Listening <input type="checkbox"/> Unreceptive <input type="checkbox"/> No interest demonstrated <input type="checkbox"/> Distracted	Readiness to learn: check <input type="checkbox"/> Asking pertinent questions <input type="checkbox"/> Actively Listening <input type="checkbox"/> Unreceptive <input type="checkbox"/> No interest demonstrated <input type="checkbox"/> Distracted
Barriers to learning: check <input type="checkbox"/> No barriers <input type="checkbox"/> Low literacy or Edu level <input type="checkbox"/> Cultural <input type="checkbox"/> Language <input type="checkbox"/> Visual, hearing, speaking <input type="checkbox"/> Religious, spiritual <input type="checkbox"/> Cognitive <input type="checkbox"/> Emotional <input type="checkbox"/> Motivation <input type="checkbox"/> Pain or fatigue <input type="checkbox"/> Other _____ Accommodation: <input type="checkbox"/> Interpreter <input type="checkbox"/> Audio <input type="checkbox"/> Visuals <input type="checkbox"/> Handouts <input type="checkbox"/> Explanations <input type="checkbox"/> Demonstrations <input type="checkbox"/> Other	Barriers to learning: check <input type="checkbox"/> No barriers <input type="checkbox"/> Low literacy or Edu level <input type="checkbox"/> Cultural <input type="checkbox"/> Language <input type="checkbox"/> Visual, hearing, speaking <input type="checkbox"/> Religious, spiritual <input type="checkbox"/> Cognitive <input type="checkbox"/> Emotional <input type="checkbox"/> Motivation <input type="checkbox"/> Pain or fatigue <input type="checkbox"/> Other _____ Accommodation: <input type="checkbox"/> Interpreter <input type="checkbox"/> Audio <input type="checkbox"/> Visuals <input type="checkbox"/> Handouts <input type="checkbox"/> Explanations <input type="checkbox"/> Demonstrations <input type="checkbox"/> Other	Barriers to learning: check <input type="checkbox"/> No barriers <input type="checkbox"/> Low literacy or Edu level <input type="checkbox"/> Cultural <input type="checkbox"/> Language <input type="checkbox"/> Visual, hearing, speaking <input type="checkbox"/> Religious, spiritual <input type="checkbox"/> Cognitive <input type="checkbox"/> Emotional <input type="checkbox"/> Motivation <input type="checkbox"/> Pain or fatigue <input type="checkbox"/> Other _____ Accommodation: <input type="checkbox"/> Interpreter <input type="checkbox"/> Audio <input type="checkbox"/> Visuals <input type="checkbox"/> Handouts <input type="checkbox"/> Explanations <input type="checkbox"/> Demonstrations <input type="checkbox"/> Other	Barriers to learning: check <input type="checkbox"/> No barriers <input type="checkbox"/> Low literacy or Edu level <input type="checkbox"/> Cultural <input type="checkbox"/> Language <input type="checkbox"/> Visual, hearing, speaking <input type="checkbox"/> Religious, spiritual <input type="checkbox"/> Cognitive <input type="checkbox"/> Emotional <input type="checkbox"/> Motivation <input type="checkbox"/> Pain or fatigue <input type="checkbox"/> Other _____ Accommodation: <input type="checkbox"/> Interpreter <input type="checkbox"/> Audio <input type="checkbox"/> Visuals <input type="checkbox"/> Handouts <input type="checkbox"/> Explanations <input type="checkbox"/> Demonstrations <input type="checkbox"/> Other
Learning Preferences: <input type="checkbox"/> Demonstration <input type="checkbox"/> Written handouts <input type="checkbox"/> Verbal or audio <input type="checkbox"/> Video or TV <input type="checkbox"/> Hands on <input type="checkbox"/> Other _____	Learning Preferences: <input type="checkbox"/> Demonstration <input type="checkbox"/> Written handouts <input type="checkbox"/> Verbal or audio <input type="checkbox"/> Video or TV <input type="checkbox"/> Hands on <input type="checkbox"/> Other _____	Learning Preferences: <input type="checkbox"/> Demonstration <input type="checkbox"/> Written handouts <input type="checkbox"/> Verbal or audio <input type="checkbox"/> Video or TV <input type="checkbox"/> Hands on <input type="checkbox"/> Other _____	Learning Preferences: <input type="checkbox"/> Demonstration <input type="checkbox"/> Written handouts <input type="checkbox"/> Verbal or audio <input type="checkbox"/> Video or TV <input type="checkbox"/> Hands on <input type="checkbox"/> Other _____
Signature _____ Date _____	Signature _____ Date _____	Signature _____ Date _____	Signature _____ Date _____
Signature _____ Date _____	Signature _____ Date _____	Signature _____ Date _____	Signature _____ Date _____

Patient Label



pathway



Patient/Family Learner Assessment



What is a Urinary Tract Infection?

When germs (bacteria) get into the urinary tract, they can cause a urinary tract infection (UTI). A UTI can either be cystitis (infection of the bladder) or pyelonephritis (infection of the kidney). Pyelonephritis can cause more severe symptoms

UTI's are **more** common in:

- girls over two years of age
- children with neurogenic bladders, renal stones and abnormal anatomy of the urinary system

What is the Urinary Tract?

The urinary tract includes two kidneys, two ureters, the bladder and the urethra. (see diagram)

Kidneys - Make urine (pee). They clean the blood and remove waste products. These waste products leave the body in the urine.

Ureters - Are long tubes attached to the kidneys. The urine moves down these tubes into the bladder.

Bladder - Collects and holds the urine until it leaves the body.

Urethra - The opening where urine leaves the body.

How did my child get a UTI?

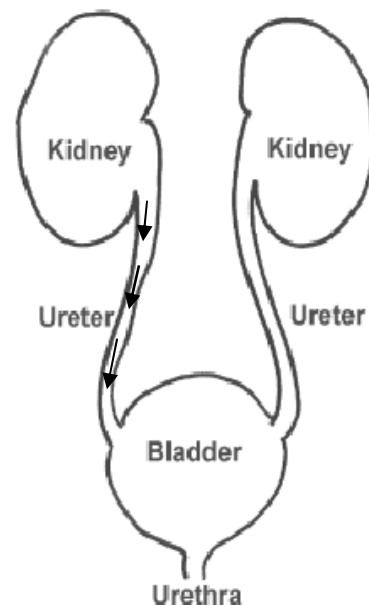
Germs (bacteria) enter the urinary tract from the urethral opening. Good hygiene may help decrease the chance of infection.

How will I know if my child has a UTI?

Some children will have many signs, some may only have one. With young children, it won't always be easy to tell. Look for one or more of the signs listed below:

- Fever
- Pain or burning when urinating (or peeing)
- Needing to urinate more often than usual
- Having the urge to urinate even after finishing urinating
- Bad smelling urine
- Pain to back, side, lower belly, inner thigh or genital (vagina or penis) area
- Vomiting (throwing up)
- Inability to control urination (bedwetting, accidents)

Normal Urinary Tract





Urinary Tract Infection

Education Information for Patients and Families

Amazing People. Incredible Care.

- Not wanting to eat
- Diarrhea (watery stools)
- Poor growth
- Dehydration (not drinking or peeing enough for your child)

How will the doctor know if a child has a UTI?

- A urine sample will be taken and sent for laboratory testing (urinalysis and urine culture). The test looks for white blood cells and bacteria in the urine.
- An ultrasound, x-ray, or other tests may also be ordered to look for changes in the normal anatomy of the urinary tract.

What can I do to help prevent a UTI? What can I do at home?

- **Have your child urinate often.** This gets rid of germs on the urethra.
- **Treat constipation** (hard stools or infrequent bowel movements) if this is a problem for your child, as it may cause pressure or blockage and the bladder may not be emptying properly
- **Practice good hygiene.** Girls should wipe from front to back after going to the bathroom. With infants you should change diapers often. For boys, it is important to clean around and under the foreskin, but don't retract the foreskin if it is difficult.
- **Buy cotton underwear** for your child. Cotton allows better air circulation which slows the growth of bacteria
- **Avoid tight clothing**
- **Do not use bubble baths and oils.** They can irritate the urethra of boys and girls.
- Give your child plenty of water to drink
- Delay potty training if necessary, as children tend to hold their urine longer when out of diapers

What is the treatment?

The infection is treated with antibiotics. Your child will feel better within a couple of days, but all of the germs won't be killed unless **all** of the medicine is taken.

When should I call my doctor?

Contact your doctor if your child has any of the signs of a UTI.

Discharge Sheet

For Hospital Use Only

Discharge sheet FAXed to PCP _____
initial/date

Dictation: 1-800-411-1001 (#963)

D/S Job #: _____ Follow-up appointment SCHEDULED with PCP _____
initial/date

Patient's Name: _____ **Discharge Date:** _____

Dx: 1) UTI (Recurrent or Complicated) 2) _____ 3) _____

Hospital Course

Patient was evaluated for fever and found to have a urinary tract infection. Patient was treated with IV fluids and IV antibiotics. The patient's symptoms improved.

Treated with: Ampicillin and Gentamicin or _____

Imaging: renal ultrasound VCUG DMSA Results: _____

Urine culture results: organism: _____
sensitivities: _____

Consults: _____

Complications during hospitalization: _____

Discharge Condition: _____ **Discharge Weight:** _____

Instruction to Patient

Activity: As tolerated

Diet: Regular for age. Encourage liquids.

Medications: See Medication Reconciliation Form

Follow-up: 1) Additional studies needed: _____ Date _____ Time _____

Additional instructions: Contact primary doctor if your child's fever persists or returns.

Reference: Patient Education Sheet

Signed: _____ M.D. _____

Signature of Parent or Guardian

Attending Physician

Attending Resident

Primary Care Physician

City

Complicated UTI



Patient Label

Discharge Instructions