

# URINARY TRACT INFECTION (TYPICAL)

## IDENTIFICATION AND MANAGEMENT

### PRACTICE GUIDELINE<sup>®</sup>

#### DOCUMENT SUMMARY/KEY POINTS

- This document outlines:
  - Identification and Management of children with a **Typical UTI**
  - The management in relatively well children with a UTI
- Typical UTI management – [FLOWCHART](#)

**NOTE:** This guideline **does not** specifically address the child who presents with **Atypical/ Complicated Urinary Tract Infections (UTI) or Serious illness/Septicaemia/Shock**.

**Atypical/Complicated UTI patients may have one or more of the following:**

- Urinary catheter in situ
- Poor urine flow
- Pre-existing uropathy or grade IV-V vesicoureteric reflux with renal dysplasia
- Reduced renal function
- Abdominal or bladder mass
- Spinal cord lesion
- High blood pressure
- Immunosuppression
- Failure to respond to treatment within 48hours

Discussion with a senior Medical Clinician should occur regarding admission and planned management for the above patients.

- Patients with Recurrent UTIs should be discussed with a senior doctor regarding management and follow-up.

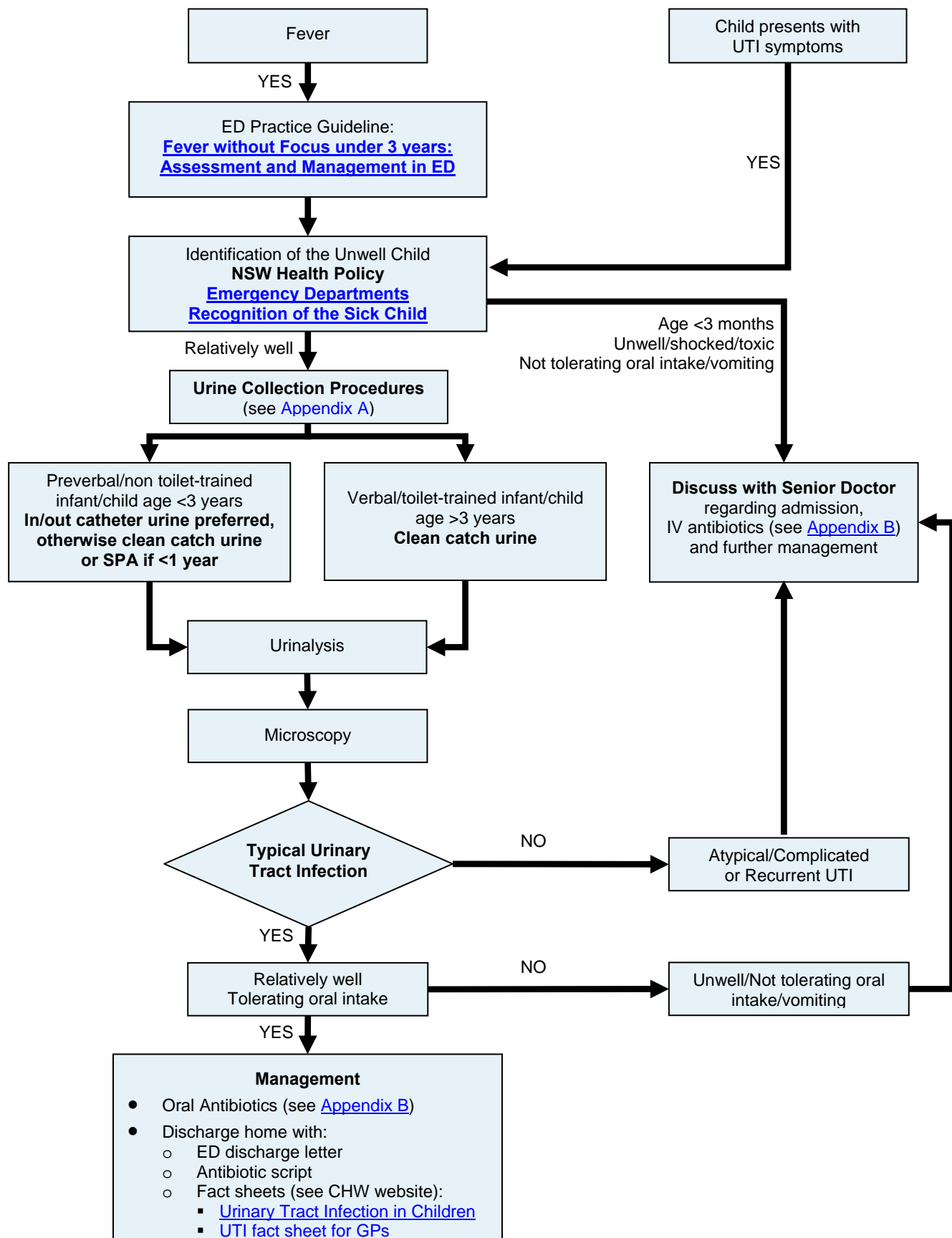
This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

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## Management of Urinary Tract Infection Flow Chart



## Preamble

Urinary Tract Infection (UTI) is a frequently occurring paediatric illness. This guideline is largely based on the National Institute for Health and Clinical Excellence (NICE) Guideline <sup>(1)</sup> from the United Kingdom and aims to assist with identification, assessment and management of Typical UTIs in infants and children. The [Management of UTI Flowchart](#) outlines the recommended approach to Typical UTIs at The Children's Hospital at Westmead (CHW).

This guideline was developed considering the resources and expertise available to CHW.

**Note:** The guideline can be used by accredited **CHW Nurse Practitioners**.

## Identification of a Urinary Tract infection

Many infants may present with fever alone and only later a UTI is confirmed with urine culture. Alternatively a child may present with symptoms consistent with a suspected UTI, which again will be confirmed on urine culture <sup>(2)</sup>.

### **UTI Symptoms**

Include:

- Fever
- Dysuria
- Frequency
- Urgency
- Incontinence
- Abdominal Pain
- Suprapubic Pain
- Back Pain
- Urethral discharge
- Vomiting

## Assessment of seriousness of illness

### ***Patient aged less than 3 years***

- A child aged less than 3 years presenting to the ED with a history of fever or a documented fever without clear focus should be assessed using the ED Practice Guideline: [Fever without Focus under 3 years: Assessment and Management in ED](#) <sup>(3)</sup>.
- Assessing the seriousness of the illness should be undertaken in accordance with the NSW Health Policy: [Emergency Departments Recognition of a Sick Child](#) <sup>(4)</sup>.

### ***Patient aged greater than 3 years***

- A child aged more than 3 years and relatively well, may provide a verbal account of their symptoms <sup>(2)</sup>. (See [UTI Symptoms](#))

Should the child experience any symptoms consistent with a UTI then collection of a urine specimen is required.

In order to confirm the diagnosis of a UTI a suitable urine specimen is obtained for culture (See Appendix A: [Urine Collection Procedures](#)).

Following assessment of the child, the suspected UTI may be considered to be *typical* when the child is relatively well. If a child fulfils at least one of the criteria for variation from a typical UTI (see below) the illness may be considered an atypical/complicated UTI.

## Criteria for variation from a Typical Urinary Tract Infection

Children should be considered to vary from the management of a *typical* UTI if they present with any of the following features: (See [Urinary Tract Infection Flow Chart](#))

### 1. Aged less than 3 months:

Infants aged less than 3 months who present with fever generally require a septic work up and intravenous antibiotics regardless of whether a UTI is suspected.

### 2. Shock:

Any child who is shocked or septicaemic requires immediate resuscitation and stabilisation. Should this child have a suspected UTI, treatment for this will require intravenous fluids and antibiotics as an inpatient. This patient's management should be discussed with a senior doctor in ED.

### 3. Toxic/Vomiting:

Any child who appears unwell or toxic or is vomiting should be discussed with a senior in ED regarding admission, intravenous fluid and antibiotic treatment.

### 4. Atypical/Complicated UTIs:

Atypical/Complicated UTIs include patients who have: poor urine flow, a urinary catheter in situ, a pre-existing uropathy/or renal disease, an abdominal or bladder mass, a spinal cord lesion, high blood pressure, immunosuppression or failure to respond to treatment within 48 hours.

**Note:** Patients presenting with atypical/complicated UTIs should be discussed with a senior doctor in ED regarding possible admission and IV antibiotics. Ongoing management of these patients is beyond the scope of this document.

## Recurrent UTIs

Recurrent UTI <sup>(1)</sup> is defined as children who have:

- i. Two or more UTIs with acute pyelonephritis/upper UTI
- ii. A UTI with acute pyelonephritis/upper UTI and 1 or more UTI with cystitis/lower UTI
- iii. Three or more UTIs with cystitis/lower UTI

**Note:** Patients with recurrent UTIs may still be considered to have typical UTIs with each presentation and treated accordingly, however they should be discussed with a senior doctor regarding ongoing management and suitable medical follow-up.

## Urine Specimen

### Patient criteria determining urine collection procedure

(See [Urine Collection Procedures](#), Appendix A)

- If the child is able to verbally communicate, toilet-trained or able to provide a urine specimen on demand, a clean-catch urine specimen should be collected.
- If the child is a male and circumcised, a clean-catch urine specimen would be a suitable specimen for examination <sup>(5)</sup>.
- If the child is preverbal (often aged less than 3 years), not toilet-trained or unable to provide a specimen on demand then collection of an in/out catheter specimen is preferred. Alternatively a clean-catch specimen, or supra-pubic specimen in infants younger than 12 months, may be necessary if a catheter specimen is unable to be obtained.

## Urinalysis, Microscopy and Culture

### Urinalysis

- Following collection of an appropriate urine specimen, the sample will need to be tested with an appropriate urine dipstick to test for the presence of leucocytes and nitrite. <sup>(6,7,8)</sup>. See the table below for recommended management.
- In a low-risk child, older than 3 months, dipstick screening will miss 4-12% of UTIs. <sup>(6)</sup>

Urinalysis result	Implications	Management
Leucocyte esterase positive Nitrite positive	Consistent with UTI	Commence antibiotics
Leucocyte esterase positive Nitrite negative	Treat as UTI if clinically indicated	Consider antibiotics
Leucocyte esterase negative Nitrite positive	Treat as UTI if clinically indicated	Consider antibiotics
Leucocyte esterase negative Nitrite negative	Do not treat as UTI	Explore other causes, but do not exclude UTI.

### Microscopy and Culture

- All urine specimens collected from children aged less than 3 years are to be sent for culture.
- The result of microscopy alone is not required to suspect a UTI. Microscopy showing leucocytes (i.e. pyuria) should be considered as a possible UTI <sup>(7,8)</sup>. See the below table.

Microscopy Result	Implications	Management
Leucocytes seen (Pyuria)	Possible UTI	Treat as UTI based on clinical indications
No leucocytes seen	Do not treat as UTI	Explore other causes, but do not exclude UTI.

**Note:** Pathology at the Children's Hospital at Westmead does not comment on the presence of organisms in urine specimens. The availability of microscopy results should not determine the need to commence antibiotics and this remains a clinical decision.

- Confirmation of a UTI will be available with the urine culture results. The culture results will identify the type of organism and the antibiotic sensitivities of that organism. These results however will not be available for the initial commencement of antibiotics, therefore antibiotics should not be withheld until the microscopy or culture is available.

## Treatment of a Typical UTI

Oral antibiotic treatment should be commenced following identification of a suspected typical UTI in a child who is relatively well and tolerating oral intake. <sup>(9)</sup> The child's suspected diagnosis and management should be discussed with the family.

### Oral antibiotic treatment recommendations

See Appendix B: [Antibiotic Treatment for UTI](#)

### Child not tolerating oral intake or vomiting

- The child with a suspected typical UTI who is unwell or unable to tolerate oral intake and hence oral antibiotics, should be commenced on intravenous fluids and IV antibiotic treatment. See Appendix B [Antibiotic Treatment for typical UTI](#) for management options.
- Vomiting patients will need to be admitted for ongoing care. Admitted patients may require IV fluids and will require IV antibiotic treatment. The patient's clinical progress will need to be reviewed within 24 hours and if tolerating oral intake changed to oral antibiotics. (See Appendix B: [Antibiotic Treatment for typical UTI](#)) Those patients tolerating oral antibiotics can then be discharged on the full course.
- For admitted patients still requiring IV antibiotics after 24 hours consider the [Community Acute and Post Acute Care Service \(CAPAC\)](#) for ongoing administration of IV antibiotics. These patients will require a General Paediatrician to supervise their care and arrange for appropriate review and renal imaging.

### Discharge and Follow-up

- The relatively well child with a suspected or confirmed UTI is suitable for discharge on oral antibiotics, with a plan for medical follow-up within 48 hours.
- Oral antibiotic treatment duration consists of 4 days treatment, if afebrile and 7 days treatment, if febrile patients <sup>(10)</sup>. (See Appendix B: [Antibiotic Treatment for typical UTI](#))
- The child's carers should be provided with
  - An ED Discharge letter
  - A Fact sheet – **Urinary tract infection in children**, explaining the diagnosis and management of a typical urinary tract infection:  
(<http://www.chw.edu.au/parents/factsheets/uritracj.htm>)

- A UTI fact sheet for GPs ([UTI Fact Sheet for GPs](http://intranet.kids/ou/emergency/resources/UTI_GP_fact_sheet.pdf)) is located on the CHW internet site outlining the availability of culture sensitivities and imaging management. It is also available on the Emergency Department intranet site at: [http://intranet.kids/ou/emergency/resources/UTI\\_GP\\_fact\\_sheet.pdf](http://intranet.kids/ou/emergency/resources/UTI_GP_fact_sheet.pdf)
- Medical follow-up should include reviewing the child's clinical state, ensuring oral antibiotic compliance, checking the blood culture result, confirming the urine culture and antibiotic sensitivities and altering the antibiotic should this be required.
- The medical review will then need to include arrangement of appropriate renal imaging as outlined in the following section (See Appendix C: [Renal Imaging for typical UTI and recurrent UTI](#)). If the child had required admission, paediatrician follow-up for review and planned appropriate investigation is recommended.

## Renal Imaging

According to the NICE (National Institute for Health and Clinical Excellence) guidelines<sup>(1)</sup>, children aged less than 6 months, with a first UTI, who respond well to treatment (i.e. within 48 hours) require a renal ultrasound within 6 weeks of presentation and no other investigations. Children aged greater than 6 months, with a first UTI, who respond well to treatment (i.e. within 48 hours) do not require renal ultrasound or more extensive imaging of the renal tract. (See Appendix C: [Renal Imaging for typical UTI and recurrent UTI](#))

## Prophylactic antibiotics

Prophylactic antibiotic treatment following typical urinary tract infections is not recommended.

## Recommendations

Children with a typical urinary tract infection should be considered suitable for discharge if tolerating oral intake and relatively well. The child's carers should be provided with parent information sheets outlining symptoms and signs which would prompt early medical review or hospitalisation and a fact sheet explaining the diagnosis and management of a typical urinary tract infection. The discharge letter outlines the patient's presentation and management.



## References

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## Appendix A: Urine Collection Procedures

Any urine specimen collected by invasive procedures must be sent for culture.

Collection of an in/out catheter specimen is preferred if the child is preverbal (often aged less than 3 years), not toilet-trained or unable to provide a specimen on demand.

### Aseptic Catheter Urine collection

The technique for collecting a catheter urine specimen is described in the CHW Procedure [Catheters \(Urinary\): Management](#) in the section Intermittent Catheterisation (page 9).

**Caveat:** The urine specimen to be obtained in this procedure needs to be collected in a sterile specimen container for analysis rather than into cotton balls in a kidney dish as described in the Catheters (Urinary): Management procedure.

### Clean-catch Urine collection

Wash genitalia with water and dry. The specimen is collected in a sterile container on request to void.

### Suprapubic Aspiration Urine collection

This procedure is undertaken by a medical officer. If the patient has not voided in the previous 30 minutes, and has a dry nappy this increases the chance of a successful aspiration. Providing the patient with oral fluid intake increases the chance of a successful blind aspiration. A bladder which is dull to percussion also suggests a higher chance of a successful aspiration. Bedside ultrasound can be used, if available, to assist collection of the sample.

#### ***Procedure:***

1. Hold the infant supine with legs extended
2. Have a specimen container ready to catch urine if the patient voids
3. Wipe the skin with an alcohol swab
4. Insert a 23g needle with an attached syringe perpendicular to the skin in the midline, along the lower abdominal crease. Aspirate as the needle advances.
5. If no success, withdraw the needle to immediately below the skin, and advance more caudal yet relatively perpendicular to skin.
6. When urine is obtained, withdraw and remove the needle.
7. Place the urine in a sterile container.
8. Following the procedure a bandaid may be placed over the puncture site.

## Appendix B: Antibiotic Treatment for typical UTI

### Oral Antibiotics

#### ***Cephalexin (Keflex etc)***

- Cephalexin 12.5 – 25 mg/Kg/dose (maximum 1g per dose) four times a day

#### ***Trimethoprim – sulfamethoxazole (Bactrim/Resprim)***

- Trimethoprim – sulfamethoxazole is a fixed-ratio combination which always contains 1mg trimethoprim for every 5mg sulfamethoxazole.
- The dose is conventionally specified based on the trimethoprim component, but to avoid errors we suggest specifying both components.
- The recommended dose is 20/4 mg/Kg/dose twice daily (maximum dose sulfamethoxazole 1600mg / trimethoprim 320 mg / day).
- The usual mixture comes as: Sulfamethoxazole 200mg / Trimethoprim 40mg in 5mL, so the recommended dose of this mixture is 0.5mL/Kg twice daily.

#### ***Amoxycillin- clavulanic acid (Augmentin Duo, Clamoxyl Duo, etc)***

- 20 mg/Kg/dose twice a day

Oral antibiotic treatment duration consists of 4 days treatment, if afebrile and 7 days treatment, if febrile patients.

### IV Antibiotics

#### ***Ampicillin:***

- 25 – 50mg/Kg/dose 4 – 6 times a day (max 2g/dose or 12g/day)

#### ***Gentamicin:***

- **Age ≤10 years:** 7.5mg/Kg single dose daily (max initial daily dose 320mg)
- **Age ≥10 years:** 6mg/kg single dose daily (max initial daily dose 320mg)
- Daily dosing: if treating for longer than 48 hours, take a level 6 – 14 hours after 1<sup>st</sup> or 2<sup>nd</sup> dose and use the nomogram (refer to drug therapy [Monitoring Aminoglycoside](#) intranet site for more detail) to adjust the dose either up or down.
- With daily dosing document clearly when the first dose is given in ED and when the next dose is due on the ward.

## Appendix C: Renal Imaging for typical UTI and recurrent UTI

### Infants <6 months

Test	Ultrasound during acute infection	Ultrasound within 6 weeks	DMSA 4–6 months following acute infection	MCUG
Typical UTI	No	Yes <sup>a</sup>	No	No
Recurrent UTI	Yes <sup>b</sup>	No	Yes <sup>b</sup>	Yes <sup>b</sup>

<sup>a</sup> if Abnormal consider MCUG

<sup>b</sup> In event of recurrent UTI consideration should be made as to whether a repeat ultrasound is truly warranted. Reviewing previous imaging investigations eg. DMSA and MCUG is recommended.

### Infants and children > 6 months

Test	Ultrasound during acute infection	Ultrasound within 6 weeks	DMSA 4–6 months following acute infection
Typical	No	No	No
Recurrent UTI	No	Yes	Consider