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**

Specialist assessment and management is required for children who are considered at high risk of serious illness (underlying structural urinary tract abnormalities, neurogenic bladder or kidney transplant recipients). These children are beyond the scope of these guidelines and are excluded from the recommendations below.

**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:**
- Seriously ill
- 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
- Raised creatinine
- Failure to respond to suitable antibiotics within 48hours
- Infection with non-Ecoli organisms

**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.

CHANGE SUMMARY

- NICE guideline cg54 was updated in 2016
- Changes to this document have been made in line with the current NICE guideline and current evidence
- Management of Urinary Tract Infection Flow Chart has had updates as well as all the tables in the document, and guidance around suprapubic aspiration which is used less frequently in clinical practice over other preferred methods for urine collection.
- Models for ambulatory care include ARC (Acute Review Clinic at CHW), MDU (Medical Day Unit at SCH) and HITH (Hospital in The Home across both sites)

READ ACKNOWLEDGEMENT

- General Medicine clinicians
- Nephrology clinicians
- Emergency department clinicians
- Discretionary? – [local manager to determine which staff, if any, are to read and acknowledge they understand the contents of the document or only need to be aware of the document.]
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Management of Urinary Tract Infection Flow Chart

FEVER

ED Practice Guideline:
Fever without Focus under 5 years Assessment and Management in the ED

Identification of the Unwell Child: NSW Health Policy: Recognition of the Sick Child

Urine Collection Procedures (see Appendix A)

Preverbal/non-toilet trained infant or child
Catheter urine preferred or clean catch urine (rarely suprapubic aspirate (SPA) if indicated)

Toilet trained infant or child
Clean catch and preferably mid-stream urine (MSU)

Urinalysis and/or Microscopy and Culture (MCS)

Typical Urinary Tract Infection

Yes

Child relatively well and tolerating oral intake

Management:
Oral antibiotics (see Appendix B)
Discharge Home
ED discharge letter with script
Factsheet: Urinary Tract Infection in Children and UTI Factsheet for GPs (see SCHN website)

No

Unwell/toxic/shocked not tolerating oral intake, vomiting or age <3 months of age

Atypical/complicated, recurrent UTI or known multiresistant organism

Discuss with senior doctor regarding admission to ward, MDU, ARC or HITH and need for IV antibiotics (See Appendix B) and any further management

No

NB! Any child who fulfils one of the following must be discussed with a senior clinician:
- Age <3 months
- Unwell/toxic
- Not tolerating oral intake
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 (1) 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 throughout the Sydney Children’s Hospital Network (SCHN).

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

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

Identification of a Urinary Tract infection

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

UTI Symptoms

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Symptoms and signs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Most common→ Least common</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Infants younger than 3 months</td>
<td>Fever</td>
</tr>
<tr>
<td></td>
<td>Vomiting</td>
</tr>
<tr>
<td></td>
<td>Lethargy</td>
</tr>
<tr>
<td></td>
<td>Irritability</td>
</tr>
<tr>
<td></td>
<td>Poor feeding</td>
</tr>
<tr>
<td></td>
<td>Failure to thrive</td>
</tr>
<tr>
<td></td>
<td>Abdominal pain</td>
</tr>
<tr>
<td></td>
<td>Jaundice</td>
</tr>
<tr>
<td></td>
<td>Haematuria</td>
</tr>
<tr>
<td></td>
<td>Offensive urine</td>
</tr>
<tr>
<td>Infants and children 3 months or older</td>
<td>予verbal</td>
</tr>
<tr>
<td></td>
<td>Fever</td>
</tr>
<tr>
<td></td>
<td>Abdominal pain</td>
</tr>
<tr>
<td></td>
<td>Loin tenderness</td>
</tr>
<tr>
<td></td>
<td>Vomiting</td>
</tr>
<tr>
<td></td>
<td>Poor feeding</td>
</tr>
<tr>
<td></td>
<td>Lethargy</td>
</tr>
<tr>
<td></td>
<td>Irritability</td>
</tr>
<tr>
<td></td>
<td>Haematuria</td>
</tr>
<tr>
<td></td>
<td>Offensive urine</td>
</tr>
<tr>
<td></td>
<td>Failure to thrive</td>
</tr>
<tr>
<td>Verbal</td>
<td>Frequency</td>
</tr>
<tr>
<td></td>
<td>Dysuria</td>
</tr>
<tr>
<td></td>
<td>Dysfunctional voiding</td>
</tr>
<tr>
<td></td>
<td>Changes to continence</td>
</tr>
<tr>
<td></td>
<td>Abdominal pain</td>
</tr>
<tr>
<td></td>
<td>Loin tenderness</td>
</tr>
<tr>
<td></td>
<td>Fever</td>
</tr>
<tr>
<td></td>
<td>Malaise</td>
</tr>
<tr>
<td></td>
<td>Vomiting</td>
</tr>
<tr>
<td></td>
<td>Haematuria</td>
</tr>
<tr>
<td></td>
<td>Offensive urine</td>
</tr>
</tbody>
</table>
Assessment of seriousness of illness


Children who are verbal

- A child who is verbal and relatively well, may provide a verbal account of their symptoms\(^\text{(2)}\). (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 must be 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.

Atypical Urinary Tract Infection includes:

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:
   Febrile 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. Any seriously ill child

3. History of poor urine flow

4. Abdominal or bladder mass palpable

5. Raised creatinine

6. Septicaemia

7. Toxic/vomiting

8. Failure to respond to suitable antibiotics within 48 hours

9. Infection with non-ecoli organisms

Note: Patients presenting with atypical/complicated UTIs should be discussed with a senior doctor in ED regarding possible admission to the ward, Medical Day Unit (MDU), Acute Review Clinic (ARC) or Hospital in the Home (HITH) and IV antibiotics. Ongoing management of these patients is beyond the scope of this document.
**Recurrent UTIs**

Recurrent UTI (1) 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 be 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 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. A suprapubic aspirate should occur after there is confirmation via ultrasound of urine present in the bladder.

- 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 (5).

**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 nitrites. (6,7,8).

  See the table below for recommended management.

- In a low-risk child, older than 3 months, dipstick screening will miss 4-12% of UTIs (6).

- The presence of bacteriuria (by microscopy with gram stain) on an appropriately collected urine specimen can be used as the basis for a presumptive diagnosis of UTI. (7)
Urinalysis result | Implications | Management | Further Testing |
--- | --- | --- | --- |
Leucocyte esterase positive Nitrite positive | Consistent with UTI | Commence antibiotics | Send urine for MCS |
Leucocyte esterase positive Nitrite negative | Treat as UTI if clinically indicated | Consider antibiotics | Send urine for MCS and consider infection outside the urinary tract |
Leucocyte esterase negative Nitrite positive | Treat as UTI if clinically indicated | Consider antibiotics | Send for MCS |
Leucocyte esterase negative Nitrite negative | Do not treat as UTI | Antibiotics for UTI should not be started | Unlikely to be a UTI, consider other causes of illness unless child is <3 yrs. An MCS is usually still sent. |

**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 \(^{(7,8)}\). See the below table.

<table>
<thead>
<tr>
<th>Microscopy Result</th>
<th>Pyuria positive</th>
<th>Pyuria Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteriuria positive</td>
<td>The infant or child should be regarded as having a UTI</td>
<td>The infant or child should be regarded as not having a UTI</td>
</tr>
<tr>
<td>Bacteriuria negative</td>
<td>Antibiotic treatment should be started if clinically UTI</td>
<td>The infant or child should be regarded as not having a UTI</td>
</tr>
</tbody>
</table>

**Note:** Pathology at some sites do not comment on the presence of organisms in urine specimens. The availability of microscopy results should not determine the need to commence antibiotics. 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. Antibiotics should not be withheld until the microscopy or culture is available.
- It is recommended the following minimum counts of colony forming units (CFU) grown on urine culture can be considered as diagnostic of UTI:
  - SPA: Any growth
  - Catheter urine: >10\(^8\) CFU/L (10\(^6\)-10\(^8\) CFU/L: possible UTI)
  - MSU/Clean catch: >10\(^8\) CFU/L (10\(^7\)-10\(^8\) CFU/L: possible UTI)
  - Bag/pad/cotton ball: not recommended for definitive culture
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\(^9\). 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 be discharged on the full course.

- For admitted patients still requiring IV antibiotics after 24 hours consider the Medical Day Unit (MDU), ARC (Acute Review Clinic) or Hospital in the Home (HITH) 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 or GP follow-up within 48 hours.

- Oral antibiotic treatment duration consists of 4 days treatment, if afebrile and 7 days treatment, if febrile patients\(^{10}\). (See Appendix B: [Antibiotic Treatment for typical UTI](#))

- The child’s carers should be provided with
  - An ED or ward Discharge letter
  - 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 accordingly if required.
The medical review will then need to include arrangement of any 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 guidelines\(^1\), 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 UTI)

Renal ultrasound can be considered in children who\(^7\):

- Have concurrent bacteraemia
- Are less than 3 months of age
- Have a urine culture with atypical organisms
- Lack a clinical response to 48 hours of antibiotic if sensitive organism
- Have renal impairment or significant electrolyte derangement
- Have an abdominal mass
- Have a poor urinary stream

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 should outline the patient’s presentation and management and any follow-up that may be required.
References

1. National Institute for Health and Clinical Excellence (NICE) CG54 Urinary tract infection in children. Full
guideline Available at www.nice.org.uk/CG54
2. Shaikh, N, Morone, N, Lopez et al. Does This Child Have a Urinary Tract Infection? JAMA 2007;298: 2895-
2904.
3. CHW ED Practice Guideline 2016: Fever without Focus under 5 years: Assessment and Management in ED.
5. Singh-Grewal D, Macdessi J, Craig JC. Circumcision for the prevention of urinary tract infection in boys: a
urinalysis in the diagnosis of urinary tract infection in young children.[see comment]. Journal of Pediatrics,
2005;147:451–458
7. KHA-CARI Guideline: Diagnosis and Treatment of Urinary Tract Infection in Children
8. Whiting P, Westwood M, Watt I, Cooper J, Kleinjen J. Rapid tests and urine sampling techniques for the
diagnosis of urinary tract infection (UTI) in children under five years: a systematic review. [Review]. BMC
9. Huicho L, Campos-Sanchez M, Alamo C. Metaanalysis of urine screening tests for determining the risk of
Reviews 2003;CD003772
11. Michael M, Hodson EM, Craig JC, Martin S, Moyer VA. Short versus standard duration oral antibiotic therapy
for acute urinary tract infection in children.[Review] [31refs]. Cochrane Database of Systematic Reviews
2003;CD003966

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Appendix A: Urine Collection Procedures

A clean catch urine sample is the recommended method for urine collection. If a clean catch is unobtainable:

- Aseptic catheterisation can be used
- Occasionally a suprapubic aspirate can be used, particularly if clean catch urine and catheter urine are not practical. Before an SPA is attempted, ultrasound guidance should be used to demonstrate the presence of urine in the bladder.

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).


Please note: 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

Suprapubic aspirate whilst being the most definitive method of urine culture, is more invasive than other methods. The use of a clean catch, mid-stream or in-out catheter urine sample are preferred as alternate methods for urine collection.(7)

Please refer to the SCHN policy: Suprapubic Aspiration of Urine for indications and details on the procedure.


Best practice states that before an SPA is attempted, ultrasound guidance should be used to demonstrate the presence of urine in the bladder.
Appendix B: Antibiotic Treatment for typical UTI

Treatment should be commenced for presumed UTI in children who have clinical symptoms suggestive of UTI and who have positive leucocyte esterase or nitrite on urinary dipstick or bacteriuria on microscopy.

**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 the patient is afebrile and 7 days treatment, if the patient is febrile.

**IV Antibiotics**

*Both ampicillin and gentamicin are used together to treat most typical UTIs* *

*Ampicillin:*

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

*Gentamicin:*

- As per [SCHN Gentamicin dosing guideline](http://webapps.schn.health.nsw.gov.au/meds4kids/browse/G) (see under Gentamicin)
- With daily dosing document clearly when the first dose is given in ED and when the next dose is due on the ward.

*note children with a history of recurrent UTIs or those with an atypical infection may have had a previous multiresistant organism, in which case the above antibiotics may not be appropriate, and the correct antibiotics are chosen on an individual basis*
Appendix C: Renal Imaging Recommendations for UTI

**Infants <6 months**

<table>
<thead>
<tr>
<th>Test</th>
<th>Responds well to treatment within 48h</th>
<th>Atypical UTI a</th>
<th>Recurrent UTI a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasound during acute infection</td>
<td>No</td>
<td>Yes c</td>
<td>Yes</td>
</tr>
<tr>
<td>Ultrasound within six weeks</td>
<td>Yes b</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>DMSA 4-6 months following the acute infection</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>MCUG</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

a see above page 7 for features of atypical UTI or recurrent UTI
b If abnormal consider an MCUG
c In an infant or child with non-Ecoli UTI, responding well to antibiotics with no other features of an atypical infection, the ultrasound can be requested on a non-urgent basis, within 6 weeks.

**Infants and children > 6 months but younger than 3 years**

<table>
<thead>
<tr>
<th>Test</th>
<th>Responds well to treatment within 48h</th>
<th>Atypical UTI a</th>
<th>Recurrent UTI a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasound during acute infection</td>
<td>No</td>
<td>Yes c</td>
<td>No</td>
</tr>
<tr>
<td>Ultrasound within six weeks</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>DMSA 4-6 months following the acute infection</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>MCUG</td>
<td>No</td>
<td>No b</td>
<td>No b</td>
</tr>
</tbody>
</table>

a see above page 7 for features of atypical UTI or recurrent UTI
b While MCUG should not be performed routinely, it should be considered if the following are present:
- Dilatation on ultrasound
- Poor urine flow
- Non E-Coli infection
- Family history of VUR
c In an infant or child with non-Ecoli UTI, responding well to antibiotics with no other features of an atypical infection, the ultrasound can be requested on a non-urgent basis, within 6 weeks.
### Children 3 years or older

<table>
<thead>
<tr>
<th>Test</th>
<th>Responds well to treatment within 48h</th>
<th>Atypical UTI $^a$</th>
<th>Recurrent UTI $^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasound during acute infection</td>
<td>No</td>
<td>Yes $^{bc}$</td>
<td>No</td>
</tr>
<tr>
<td>Ultrasound within six weeks</td>
<td>No</td>
<td>No</td>
<td>Yes $^b$</td>
</tr>
<tr>
<td>DMSA 4-6 months following the acute infection</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>MCUG</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

$^a$ see above page 7 for features of atypical UTI or recurrent UTI

$^b$ Ultrasound in toilet-trained children should be performed with a full bladder with an estimate of bladder volume and after micturition

$^c$ In an infant or child with non-Ecoli UTI, responding well to antibiotics with no other features of an atypical infection, the ultrasound can be requested on a non-urgent basis, within 6 weeks.