

Urinary Tract Infections (UTIs) in Children - Full Clinical Guideline – Joint Derby & Burton

Reference no.: CH CLIN G 85/April 23/v006

1. Introduction

To provide medical staff with information and guidance to achieve more consistent clinical practice, based on accurate diagnosis and effective management.

2. Aim and Purpose

The guideline covers initial diagnosis and treatment of suspected UTI and further investigation of confirmed UTI in all ages of children.

It does not cover ongoing management of recurrent UTI.

3. Main body of Guidelines

Implementing the Guideline

Diagnosis

Does this infant/child have a suspected UTI?

UTI is a common bacterial infection causing illness in infants and children. It may be difficult to recognise UTI in children because the presenting symptoms and signs are non-specific, particularly in infants and children younger than 3 years.

Diagnosis is made on:

- **Clinical features**
- **Urine microscopy / urinalysis**
- **Urine culture** (in most cases)

Table 1 is a guide to the symptoms and signs that infants and children present with.

Table 1 Presenting symptoms and signs in infants and children with UTI

Age	Infants younger than 3 months	Infants and children, 3 months or older	
		Preverbal	Verbal
<p>Symptoms and signs</p> <p>Most common</p> <p style="text-align: center;">↓</p> <p>Least common</p>	Fever Vomiting Lethargy Irritability Poor feeding Failure to thrive Abdominal pain Jaundice Haematuria Offensive urine	Fever Abdominal pain Loin tenderness Vomiting Poor feeding Lethargy Irritability Haematuria Offensive urine Failure to thrive	Frequency Dysuria Dysfunctional voiding Changes to continence Abdominal pain Loin tenderness Fever Malaise Vomiting Haematuria Offensive urine Cloudy urine

Which infants/children need a urine sample tested?

A urine sample should be tested in those with:

- Symptoms and signs suggestive of UTI (see table 1)
- Unexplained fever of 38°C or higher

Consider testing urine after 24 hours at the latest in Infants and children with an alternative site of infection who remain unwell.

Do **not** routinely test a urine sample *for infection* if

- there is an alternative site of infection present or
- there is acute diarrhoea

How should a urine sample be collected?

1. A clean catch urine sample
2. If a clean catch urine sample is unobtainable document how the urine has been collected:
The following should not be used to collect urine:
 - Cotton wool balls
 - Gauze and sanitary towels
3. When it is not possible or practical to collect urine by non-invasive methods, catheter samples or suprapubic aspiration (SPA) should be used. Before an SPA is attempted, it is helpful to ultrasound the bladder to confirm the presence of urine. A portable USS (sonosite) is available on the Derby site in CED, theatres and Dolphin ward.

In an infant or child with a high risk of serious illness, treatment should not be delayed if a urine sample is unobtainable.

How should a urine sample be tested?

Urine-testing strategy for infants younger than 3 years

Urgent microscopy and culture is the preferred method for diagnosing UTI in this age group. When urgent microscopy is not available, dipstick testing may act as a substitute.

Note: urine flow cytometry is now standard for older children. If this states “not sent for culture” the algorithm for bacteriuria/pyuria has predicted a negative culture result. This should therefore be documented as no UTI.

Table 2 Interpreting urgent microscopy results **before** culture is available

Microscopy results	Pyuria positive	Pyuria negative
Bacteriuria positive (on microscopy)	The infant or child should be regarded as having UTI	The infant or child should be regarded as having UTI
Bacteriuria negative (on microscopy)	Antibiotic treatment should be started if clinically UTI	The infant or child should be regarded as not having UTI

All urine samples should be sent for culture in children under 3 years.

Urine-testing strategies for children 3 years or older

Dipstick testing for leukocyte esterase and nitrite is diagnostically as useful as microscopy, and can safely be used.

Table 4 Interpreting urinalysis on dipstick testing

Test	Result	Leucocyte	
		+ve	-ve
Nitrites	+ve	The child should be regarded as having UTI and antibiotic treatment should be started	Antibiotic treatment should be started if the urine test was carried out on a fresh sample of urine. A urine sample should be sent for culture. Subsequent management will depend upon the result of urine culture
	-ve	A urine sample should be sent for microscopy and culture. Antibiotic treatment for UTI should not be started unless there is good clinical evidence of UTI (for example, obvious urinary symptoms)	The child should not be regarded as having UTI. Antibiotic treatment for UTI should not be started, and a urine sample should not be sent for culture

Do **not** send a urine for culture if both leucocyte and nitrites are negative on dipstick.

Managing a confirmed UTI

Was the infection in the upper (acute pyelonephritis) or lower (cystitis) urinary tract?

Acute pyelonephritis/upper UTI = bacteriuria and fever of 38°C or higher.
= bacteriuria with loin pain/tenderness

All other infants and children who have bacteriuria but no systemic symptoms or signs should be considered to have cystitis/lower urinary tract infection.

C-reactive protein alone should not be used to differentiate acute pyelonephritis/upper urinary tract infection from cystitis/lower urinary tract

Is there a risk of an underlying renal tract pathology?

The following risk factors for UTI and serious underlying pathology should be **documented**:

high blood pressure – ensure all infants and children have BP performed

poor urine flow

history suggesting previous UTI or confirmed previous UTI

recurrent fever of uncertain origin

antenatally-diagnosed renal abnormality

family history of vesicoureteric reflux (VUR) or renal disease

constipation

dysfunctional voiding

enlarged bladder

abdominal mass

evidence of spinal lesion – check leg reflexes and look at spine

poor growth – plot weight, height and head circumference on growth chart

Which antibiotics should a suspected UTI be treated with?

0-3 months

Treat with IV antibiotics initially.

IV cefotaxime and amoxicillin until sensitivities known (or IV ceftriaxone alone in the over 1 month age group)

IV antibiotics should be continued at least until the fever has settled and preferably 5 days.

Changing to oral antibiotics should be discussed with a consultant as GI absorption in the neonatal period is less predictable.

Infants younger than 3 months diagnosed with a UTI during a prolonged jaundice screen *may* be treated with oral trimethoprim (or according to sensitivity results) at home if they are otherwise asymptomatic. (Please note: nitrofurantoin should not be used in patients < 3 months old).

3 months or older

Acute pyelonephritis/upper urinary tract infection:

treat with oral cefalexin for 7–10 days (until sensitivities are known).

if oral antibiotics cannot be used, treat with intravenous (IV) cefuroxime for 2–4 days, followed by oral antibiotics for a total duration of 10 days.

Cystitis/lower urinary tract infection: treat with oral nitrofurantoin tablets (or cephalexin liquid) for 3 days.

The parents or carers should be advised to bring the infant or child back if the infant or child is still unwell after 24–48 hours. If an alternative diagnosis is not made, a urine sample should be sent for culture to identify the presence of bacteria and determine antibiotic sensitivity if urine culture has not already been carried out.

All suggestions are for empirical treatment only. Treatment should be guided by culture and sensitivity results, and narrower spectrum agents should be used once these results become available. Microbiology support is available to discuss cases.

If parenteral treatment is required and IV treatment is not possible, intramuscular treatment should be considered.

If an infant or child is receiving prophylactic medication and develops an infection, treatment should be with a different antibiotic, not a higher dose of the same antibiotic. Asymptomatic bacteriuria in infants and children should not be treated with antibiotics.

Can the risk of recurrence be reduced?

Ensure the following are addressed:

- Adequate urine voiding – advise children to sit on the toilet for long enough.
- Constipation – fluid intake, fibre intake, medication
- Encourage an adequate fluid intake
- Access to clean toilets so as not to delay voiding

Should antibiotic prophylaxis be prescribed?

Antibiotic prophylaxis should **not** be routinely prescribed in infants and children following first-time UTI.

Be vigilant and promptly treat any further UTIs, even in the presence of VUR.

Antibiotic prophylaxis may be considered in infants and children with **recurrent** UTIs.

Should imaging tests be performed?

Table 4: Definitions of atypical and recurrent UTI

Atypical UTI includes:

- poor urine flow
- abdominal or bladder mass
- persistently raised creatinine (if bloods have been performed)
- septicaemia
- failure to respond to treatment with suitable antibiotics within 48 hours
- infection with non E. coli or coliform organisms

Recurrent UTI:

- two or more episodes of UTI with acute pyelonephritis/upper urinary tract infection, or
- one episode of UTI with acute pyelonephritis/upper urinary tract infection plus one or more episode of UTI with cystitis/lower urinary tract infection or
- three or more episodes of UTI with cystitis/lower urinary tract infection.

Infants under 6 months

Ultrasound of the renal tract

- Indicated in all infants
- Can be on a non urgent basis if the child responds well to antibiotics

May need to be performed during the acute phase if the infection is atypical or recurrent (as defined in Table 4).

Direct Contrast Cystourethrography (M.C.U.G) (see “Antibiotics and imaging” below)

Indications

- Abnormal ultrasound
- Severe or atypical infection as defined above
- Exclusion of urethral pathology in male infants
- Recurrent infections

D.M.S.A.

Discuss with a paediatrician with an interest in nephrology or urologist

Infants and children 6 months – 3 years

Ultrasound of the renal tract

NOT routinely indicated in cases of a single uncomplicated infection which has responded well to antibiotics

Indications

- Atypical infection – ultrasound may need to be performed during the acute phase
- Recurrent infections

M.C.U.G (see “Antibiotics and imaging” below)

Consider in those under 1 year old if

- Ultrasound is abnormal
- Poor urine flow
- Non E coli infection
- Family history of vesico-ureteric reflux

Discuss with a paediatrician with an interest in nephrology or urologist

M.C.U.G is traumatic in children over 12 months of age and is often not feasible. If the clinical picture permits, it is preferable to wait until the child is old enough to co operate with an indirect cystogram (Mag 3 renogram study) at around the age of 4 or 5 years. Discuss with the radiologist.

D.M.S.A

Discuss with a paediatrician with an interest in nephrology or urologist

Children 3 years and older

Children over 3 years who present with a single uncomplicated UTI do not routinely need any imaging

Ultrasound of the renal tract

Indications

- Atypical infection – ultrasound may need to be performed in the acute phase
- Recurrent infections

DMSA

Discuss with a paediatrician with an interest in nephrology or urologist

Mag 3 renogram (with indirect cystogram)

- May be helpful in children with recurrent infections to exclude major reflux.

Antibiotics and imaging

There is a significant risk of introducing infection at cystography. All children should therefore have antibiotic cover according to the following protocol.

1. In all infants/children NOT on antibiotic prophylaxis:
Trimethoprim 4mg/kg dose the night before and 2 hours before M.C.U.G.
2. In all infants/children ON antibiotic prophylaxis:
Cephalexin 12.5mg/Kg the night before and the morning of the M.C.U.G.

When requesting M.C.U.G. please indicate on the request form which antibiotic will be given.

NOTE: If significant reflux is demonstrated the patient should complete a 3 day course of antibiotics to prevent urosepsis post investigation. The decision to start prophylaxis remains with the consultant in charge of the case.

Does this patient need follow-up?

Infants and children should **not routinely** be followed up further if:

- they do not undergo imaging investigations.
- the investigation results are normal and parents/carers have been informed of these results.

Infants and children who have **recurrent UTI** or **abnormal imaging** results should be followed up by a paediatric specialist.

Follow up should include:

- **height**
- **weight**
- **blood pressure**
- routine testing for **proteinuria**

Infants and children with a *minor*, unilateral renal parenchymal defect do **not** need long-term follow-up unless they have recurrent UTI or family history / lifestyle risk factors for hypertension.

Infants and children who have **bilateral renal abnormalities**, impaired kidney function, raised blood pressure and/or proteinuria should receive monitoring and appropriate management by a **paediatrician with an interest in nephrologist** to slow the progression of chronic kidney disease.

Infants and children who are asymptomatic following an episode of UTI should not routinely have their urine re-tested for infection.

Asymptomatic bacteriuria is not an indication for follow-up.

Information and advice for children, young people and parents or carers

Information on the following should be provided:

- the need for treatment, the importance of completing any course of treatment and advice about prevention and possible long-term management.
- the possibility of a UTI recurring and the need for vigilance and to seek prompt treatment from a healthcare professional for any suspected reinfection.
- prompt recognition of symptoms
- urine collection, storage and testing
- appropriate treatment options
- prevention of recurrence with good drinking, toilet hygiene and constipation management
- the nature of and reason for any urinary tract investigation
- prognosis
- reasons and arrangements for long-term management if required.

4. References (including any links to NICE Guidance etc.)

NICE, 2018. Urinary tract infection in children: diagnosis, treatment and long-term management. www.nice.nhs.uk

NICE 2018 Antimicrobial prescribing: UTI www.nice.nhs.uk

NICE CG160 (2017) Fever in under 5s: assessment and initial management
<https://www.nice.org.uk/guidance/cg160>

NICE (2018) Pyelonephritis (acute): antimicrobial prescribing
<https://www.nice.org.uk/guidance/ng111>

5. Documentation Controls

Development of Guideline:	Dr R Bowker
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Review Date:	April 2026
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6. Appendices – SUMMARY

Urinary Tract Infections (UTIs) in Children – Summary Paediatric Guideline

Ref No CH CLIN G85/Dec 2015/v004

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