Cover page

Urinary tract infection in under 16s: diagnosis and management

NICE guideline: short version

Draft for consultation, June 2017

This guideline covers diagnosing and managing first or recurrent upper or lower urinary tract infection in infants, children and young people. It aims to achieve more consistent clinical practice, based on accurate diagnosis and effective management.

Who is it for?

- Healthcare professionals
- Commissioners
- People under 16 with urinary tract infection, their families and carers

This guideline will update NICE guideline CG54 (published August 2007).

We have updated the recommendations on the urine testing strategies for infants and children under 3 years.

You are invited to comment on the new and updated recommendations in this guideline. These are marked as:

- **[2017]**

You are also invited to comment on recommendations that NICE proposes to delete from the 2007 guideline.

We have not updated recommendations shaded in grey, and cannot accept comments on them.

See Update information for a full explanation of what is being updated.

This version of the guideline contains the draft recommendations, context and recommendations for research. Information about how the guideline was developed is on the guideline's page on the NICE website. This includes details of the committee and any declarations of interest.

The supporting information and evidence for the 2017 recommendations is contained in the addendum. The supporting information and evidence for the 2007 recommendations is in the full version of the 2007 guideline.

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Contents

Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in your care.

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

1.1 Diagnosis

1.1.1 Symptoms and signs

1.1.1.1 Infants and children presenting with unexplained fever of 38°C or higher should have a urine sample tested within 24 hours. **[2007]**

1.1.1.2 Infants and children with an alternative site of infection should not have a urine sample tested. When infants and children with an alternative site of

infection remain unwell, urine testing should be considered after 24 hours at the latest. **[2007]**

1.1.1.3 Infants and children with symptoms and signs suggestive of urinary tract infection (UTI) should have a urine sample tested for infection. Table 1 is a guide to the symptoms and signs that infants and children present with. **[2007]**

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

Age group		Symptoms and signs Most common ----------> Least common		
Infants younger than 3 months		Fever Vomiting Lethargy Irritability	Poor feeding Failure to thrive	Abdominal pain Jaundice Haematuria Offensive urine
Infants and children, 3 months or older	Preverbal	Fever	Abdominal pain Loin tenderness Vomiting Poor feeding	Lethargy Irritability Haematuria Offensive urine Failure to thrive
	Verbal	Frequency Dysuria	Dysfunctional voiding Changes to continence Abdominal pain Loin tenderness	Fever Malaise Vomiting Haematuria Offensive urine Cloudy urine

1.1.2 Assessment of risk of serious illness

1.1.2.1 The illness level in infants and children should be assessed in accordance with recommendations in the NICE guideline on fever in in under 5s. **[2007]**

1.1.3 Urine collection

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

- Other non-invasive methods such as urine collection pads should be used. It is important to follow the manufacturer's instructions when using urine collection pads. Cotton wool balls, gauze and sanitary towels should not be used to collect urine in infants and children.
- When it is not possible or practical to collect urine by non-invasive methods, catheter samples or suprapubic aspiration (SPA) should be used.
- Before SPA is attempted, ultrasound guidance should be used to demonstrate the presence of urine in the bladder. **[2007]**

1.1.3.2 In an infant or child with a high risk of serious illness it is highly preferable that a urine sample is obtained; however, treatment should not be delayed if a urine sample is unobtainable. **[2007]**

1.1.4 Urine preservation

1.1.4.1 If urine is to be cultured but cannot be cultured within 4 hours of collection, the sample should be refrigerated or preserved with boric acid immediately. **[2007]**

1.1.4.2 The manufacturer's instructions should be followed when boric acid is used to ensure the correct specimen volume to avoid potential toxicity against bacteria in the specimen. **[2007]**

1.1.5 Urine testing

1.1.5.1 For all diagnostic tests there will be a small number of false negative results; therefore clinicians should use clinical criteria for their decisions in cases where urine testing does not support the findings. **[2007]**

1.1.5.2 Refer all infants under 3 months with a suspected UTI (see table 1) to paediatric specialist care, and

- send a urine sample for urgent microscopy and culture
- manage in line with the NICE guideline on fever in under 5s. **[2017]**

1.1.5.3 Use dipstick testing for infants and children 3 months or older but younger than 3 years with suspected UTI.

- If both leukocyte esterase and nitrite are negative: do not start antibiotic treatment; do not send a urine sample for microscopy and culture unless at least 1 of the criteria in recommendation 1.1.6.1 apply.
- If leukocyte esterase or nitrite, or both are positive: start antibiotic treatment; send a urine sample for microscopy and culture. **[2017]**

1.1.5.4 The urine-testing strategy shown in table 2 is recommended for children aged 3 years or older[1]. **[2007]**

1.1.5.5 Follow the guidance in table 3 on interpreting microscopy results. **[2007]**

[1] Assess the risk of serious illness in line with the NICE guideline on fever in under 5s to ensure appropriate urine tests and interpretation, both of which depend on the child's age and risk of serious illness.

Table 2 Urine-testing strategies for children 3 years or older

Dipstick testing for leukocyte esterase and nitrite is diagnostically as useful as microscopy and culture, and can safely be used.	
If both leukocyte esterase and nitrite are positive	The child should be regarded as having UTI and antibiotic treatment should be started. If a child has a high or intermediate risk of serious illness and/or a past history of previous UTI, a urine sample should be sent for culture.
If leukocyte esterase is negative and nitrite is positive	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.
If leukocyte esterase is positive and nitrite is negative	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). Leukocyte esterase may be indicative of an infection outside the urinary tract which may need to be managed differently.
If both leukocyte esterase and nitrite are negative	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. Other causes of illness should be explored.

Table 3 Guidance on the interpretation of microscopy results

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

1.1.6 Indication for culture

1.1.6.1 Urine samples should be sent for culture:

- in infants and children who are considered to have acute pyelonephritis/upper urinary tract infection (see 1.1.8.1)
- in infants and children with a high to intermediate risk of serious illness
- in infants under 3 months
- in infants and children with a positive result for leukocyte esterase or nitrite
- in infants and children with recurrent UTI
- in infants and children with an infection that does not respond to treatment within 24–48 hours, if no sample has already been sent

- when clinical symptoms and dipstick tests do not correlate. **[2017]**

1.1.7 History and examination on confirmed UTI

1.1.7.1 The following risk factors for UTI and serious underlying pathology should be recorded:

- 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
- poor growth
- high blood pressure. **[2007]**

1.1.8 Clinical differentiation between acute pyelonephritis/upper urinary tract infection and cystitis/lower urinary tract infection

1.1.8.1 Infants and children who have bacteriuria and fever of 38°C or higher should be considered to have acute pyelonephritis/upper urinary tract infection. Infants and children presenting with fever lower than 38°C with loin pain/tenderness and bacteriuria should also be considered to have acute pyelonephritis/upper urinary tract infection. All other infants and children who have bacteriuria but no systemic symptoms or signs should be considered to have cystitis/lower urinary tract infection. **[2007]**

1.1.9 Laboratory tests for localising UTI

1.1.9.1 C-reactive protein alone should not be used to differentiate acute pyelonephritis/upper urinary tract infection from cystitis/lower urinary tract infection in infants and children. **[2007]**

1.1.10 Imaging tests for localising UTI

1.1.10.1 The routine use of imaging in the localisation of a UTI is not recommended. **[2007]**

1.1.10.2 In the rare instances when it is clinically important to confirm or exclude acute pyelonephritis/upper urinary tract infection, power Doppler ultrasound is recommended. When this is not available or the diagnosis still cannot be confirmed, a dimercaptosuccinic acid (DMSA) scintigraphy scan is recommended. **[2007]**

1.2 Acute management

Note that the antibiotic requirements for infants and children with conditions that are outside the scope of this guideline (for example, infants and children already known to have significant pre-existing uropathies) have not been addressed and may be different from those given here.

1.2.1.1 Infants and children with a high risk of serious illness should be referred urgently to the care of a paediatric specialist. **[2007]**

1.2.1.2 Infants younger than 3 months with a possible UTI should be referred immediately to the care of a paediatric specialist. Treatment should be with parenteral antibiotics in line with the NICE guideline on fever in under 5s.

1.2.1.3 For infants and children 3 months or older with acute pyelonephritis/upper urinary tract infection:

- consider referral to a paediatric specialist
- treat with oral antibiotics for 7–10 days. The use of an oral antibiotic with low resistance patterns is recommended, for example cephalosporin or co-amoxiclav
- if oral antibiotics cannot be used, treat with an intravenous (IV) antibiotic agent such as cefotaxime or ceftriaxone for 2–4 days followed by oral antibiotics for a total duration of 10 days. **[2007]**

1.2.1.4 For infants and children 3 months or older with cystitis/lower urinary tract infection:

- Treat with oral antibiotics for 3 days. The choice of antibiotics should be directed by locally developed multidisciplinary guidance. Trimethoprim, nitrofurantoin, cephalosporin or amoxicillin may be suitable.
- The parents or carers should be advised to bring the infant or child for reassessment 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. **[2007]**

1.2.1.5 For infants and children who receive aminoglycosides (gentamicin or amikacin), once daily dosing is recommended. **[2007]**

1.2.1.6 If parenteral treatment is required and IV treatment is not possible, intramuscular treatment should be considered. **[2007]**

1.2.1.7 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. **[2007]**

1.2.1.8 Asymptomatic bacteriuria in infants and children should not be treated with antibiotics. **[2007]**

1.2.1.9 Laboratories should monitor resistance patterns of urinary pathogens and make this information routinely available to prescribers. **[2007]**

1.2.2 Prevention of recurrence

1.2.2.1 Dysfunctional elimination syndromes and constipation should be addressed in infants and children who have had a UTI. **[2007]**

1.2.2.2 Children who have had a UTI should be encouraged to drink an adequate amount. **[2007]**

1.2.2.3 Children who have had a UTI should have ready access to clean toilets when required and should not be expected to delay voiding. **[2007]**

1.2.3 Antibiotic prophylaxis

1.2.3.1 Antibiotic prophylaxis should not be routinely recommended in infants and children following first-time UTI. **[2007]**

1.2.3.2 Antibiotic prophylaxis may be considered in infants and children with recurrent UTI. **[2007]**

1.2.3.3 Asymptomatic bacteriuria in infants and children should not be treated with prophylactic antibiotics. **[2007]**

1.3 Imaging tests

1.3.1.1 Infants and children with atypical UTI (see box 1) should have ultrasound of the urinary tract during the acute infection to identify structural abnormalities of the urinary tract such as obstruction, as outlined in tables 4, 5 and 6. This is to ensure prompt management. **[2007]**

1.3.1.2 For infants younger than 6 months with first-time UTI that responds to treatment, ultrasound should be carried out within 6 weeks of the UTI, as outlined in table 4. **[2007]**

1.3.1.3 For infants and children aged 6 months and older with first-time UTI that responds to treatment, routine ultrasound is not recommended unless the infant or child has atypical UTI, as outlined in tables 5 and 6. **[2007]**

1.3.1.4 Infants and children who have had a lower urinary tract infection should undergo ultrasound (within 6 weeks) only if they are younger than 6 months or have had recurrent infections. **[2007]**

1.3.1.5 A DMSA scan 4–6 months following the acute infection should be used to detect renal parenchymal defects, as outlined in tables 4, 5 and 6. **[2007]**

1.3.1.6 If the infant or child has a subsequent UTI while awaiting DMSA, the timing of the DMSA should be reviewed and consideration given to doing it sooner. **[2007]**

1.3.1.7 Routine imaging to identify VUR is not recommended for infants and children who have had a UTI, except in specific circumstances, as outlined in tables 4, 5 and 6. **[2007]**

1.3.1.8 When a micturating cystourethrogram (MCUG) is performed, prophylactic antibiotics should be given orally for 3 days with MCUG taking place on the second day. **[2007]**

1.3.1.9 Infants and children who have had a UTI should be imaged as outlined in tables 4, 5 and 6. **[2007]**

Table 4 Recommended imaging schedule for infants younger than 6 months

Test	Responds well to treatment within 48 hours	Atypical UTI[a]	Recurrent UTI[a]
Ultrasound during the acute infection	No	Yes[c]	Yes
Ultrasound within 6 weeks	Yes[b]	No	No
DMSA 4–6 months following the acute infection	No	Yes	Yes
MCUG	No	Yes	Yes

[a] See box 1 for definition

[b] If abnormal consider MCUG

[c] In an infant or child with a non-*E. coli*-UTI, responding well to antibiotics and with no other features of atypical infection, the ultrasound can be requested on a non-urgent basis to take place within 6 weeks

Table 5 Recommended imaging schedule for infants and children 6 months or older but younger than 3 years

Test	Responds well to treatment within 48 hours	Atypical UTI[a]	Recurrent UTI[a]
Ultrasound during the acute infection	No	Yes[c]	No
Ultrasound within 6 weeks	No	No	Yes
DMSA 4–6 months following the acute infection	No	Yes	Yes
MCUG	No	No[b]	No[b]

[a] See box 1 for definition

[b] While MCUG should not be performed routinely it should be considered if the following features are present:

- dilatation on ultrasound
- poor urine flow
- non-*E. coli*-infection
- family history of VUR.

[c] In an infant or child with a non-*E. coli*-UTI, responding well to antibiotics and with no other features of atypical infection, the ultrasound can be requested on a non-urgent basis to take place within 6 weeks

Table 6 Recommended imaging schedule for children 3 years or older

Test	Responds well to treatment within 48 hours	Atypical UTI[a]	Recurrent UTI[a]
Ultrasound during the acute infection	No	Yes[b c]	No
Ultrasound within 6 weeks	No	No	Yes[b]
DMSA 4–6 months following the acute infection	No	No	Yes
MCUG	No	No	No

[a] See box 1 for definition

[b] Ultrasound in toilet-trained children should be performed with a full bladder with an estimate of bladder volume before and after micturition.

[c] In a child with a non-*E. coli*-UTI, responding well to antibiotics and with no other features of atypical infection, the ultrasound can be requested on a non-urgent basis to take place within 6 weeks

Box 1 Definitions of atypical and recurrent UTI

Atypical UTI includes:

- seriously ill (for more information refer to the NICE guideline on fever in under 5s)
- poor urine flow
- abdominal or bladder mass
- raised creatinine
- septicaemia
- failure to respond to treatment with suitable antibiotics within 48 hours
- infection with non-*E. coli* 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.

1.4 Surgical intervention

1.4.1.1 Surgical management of VUR is not routinely recommended. **[2007]**

1.5 Follow-up

1.5.1.1 Infants and children who do not undergo imaging investigations should not routinely be followed up. **[2007]**

1.5.1.2 The way in which the results of imaging will be communicated should be agreed with the parents or carers or the young person as appropriate. **[2007]**

1.5.1.3 When results are normal, a follow-up outpatient appointment is not routinely required. Parents or carers should be informed of the results of all the investigations in writing. **[2007]**

1.5.1.4 Infants and children who have recurrent UTI or abnormal imaging results should be assessed by a paediatric specialist. **[2007]**

1.5.1.5 Assessment of infants and children with renal parenchymal defects should include height, weight, blood pressure and routine testing for proteinuria. **[2007]**

1.5.1.6 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 or lifestyle risk factors for hypertension. **[2007]**

1.5.1.7 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 paediatric nephrologist to slow the progression of chronic kidney disease. **[2007]**

1.5.1.8 Infants and children who are asymptomatic following an episode of UTI should not routinely have their urine re-tested for infection. **[2007]**

1.5.1.9 Asymptomatic bacteriuria is not an indication for follow-up. **[2007]**

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

1.6.1.1 Healthcare professionals should ensure that when a child or young person has been identified as having a suspected UTI, they and their parents or carers as appropriate are given information about the need for treatment, the importance of completing any course of treatment and advice about prevention and possible long-term management. **[2007]**

1.6.1.2 Healthcare professionals should ensure that children and young people, and their parents or carers as appropriate, are aware of the possibility of a UTI recurring and understand the need for vigilance and to seek prompt treatment from a healthcare professional for any suspected reinfection. **[2007]**

1.6.1.3 Healthcare professionals should offer children and young people and/or their parents or carers appropriate advice and information on:

- prompt recognition of symptoms
- urine collection, storage and testing
- appropriate treatment options
- prevention
- the nature of and reason for any urinary tract investigation
- prognosis
- reasons and arrangements for long-term management if required. **[2007]**

Putting this guideline into practice

[This section will be finalised after consultation]

NICE has produced tools and resources [link to tools and resources tab] to help you put this guideline into practice.

Putting recommendations into practice can take time. How long may vary from guideline to guideline, and depends on how much change in practice or services is needed. Implementing change is most effective when aligned with local priorities.

Changes recommended for clinical practice that can be done quickly – like changes in prescribing practice – should be shared quickly. This is because healthcare professionals should use guidelines to guide their work – as is required by professional regulating bodies such as the General Medical and Nursing and Midwifery Councils.

Changes should be implemented as soon as possible, unless there is a good reason for not doing so (for example, if it would be better value for money if a package of recommendations were all implemented at once).

Different organisations may need different approaches to implementation, depending on their size and function. Sometimes individual practitioners may be able to respond to recommendations to improve their practice more quickly than large organisations.

Here are some pointers to help organisations put NICE guidelines into practice:

1. **Raise awareness** through routine communication channels, such as email or newsletters, regular meetings, internal staff briefings and other communications with all relevant partner organisations. Identify things staff can include in their own practice straight away.

2. **Identify a lead** with an interest in the topic to champion the guideline and motivate others to support its use and make service changes, and to find out any significant issues locally.

3. **Carry out a baseline assessment** against the recommendations to find out whether there are gaps in current service provision.

4. **Think about what data you need to measure improvement** and plan how you will collect it. You may want to work with other health and social care organisations and specialist groups to compare current practice with the recommendations. This may also help identify local issues that will slow or prevent implementation.

5. **Develop an action plan**, with the steps needed to put the guideline into practice, and make sure it is ready as soon as possible. Big, complex changes may take longer to implement, but some may be quick and easy to do. An action plan will help in both cases.

6. **For very big changes** include milestones and a business case, which will set out additional costs, savings and possible areas for disinvestment. A small project group could develop the action plan. The group might include the guideline champion, a senior organisational sponsor, staff involved in the associated services, finance and information professionals.

7. **Implement the action plan** with oversight from the lead and the project group. Big projects may also need project management support.

8. **Review and monitor** how well the guideline is being implemented through the project group. Share progress with those involved in making improvements, as well as relevant boards and local partners.

NICE provides a comprehensive programme of support and resources to maximise uptake and use of evidence and guidance. See our into practice pages for more information.

Also see Leng G, Moore V, Abraham S, editors (2014) Achieving high quality care – practical experience from NICE. Chichester: Wiley.

Context

In the past 30–50 years, the natural history of urinary tract infection (UTI) in children has changed as a result of the introduction of antibiotics and improvements in healthcare. This change has contributed to uncertainty about the most appropriate and effective way to manage UTI in children, and whether or not investigations and follow-up are justified.

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. Collecting urine and interpreting results are not easy in this age group, so it may not always be possible to unequivocally confirm the diagnosis.

Current management, which includes imaging, prophylaxis and prolonged follow-up, has placed a heavy burden on NHS primary and secondary care resources. It is costly, based on limited evidence and is unpleasant for children and distressing for their parents or carers. The guideline has been developed with the aim of providing guidance on several aspects of UTI in infants and children from birth up to the age of 16 years, including: when to consider the diagnosis of UTI in sick and/or symptomatic infants and children who were previously healthy; urine collection for the diagnosis of UTI in infants and children; tests to establish or exclude UTI;

treatment, including symptomatic reinfection; use of prophylactic antibiotics and investigations to assess the structure and function of the urinary tract; referral to secondary and tertiary care; surgical intervention; long-term follow-up; and advice to give to parents or carers, including what to do if another UTI occurs.

Areas not addressed by the guideline include children with urinary catheters in situ, children with neurogenic bladders, children already known to have significant pre-existing uropathies, children with underlying renal disease (for example, nephrotic syndrome), immunosupressed children, and infants and children in intensive care units. It also does not cover preventive measures or long-term management of sexually active girls with recurrent UTI.

In 2017, we updated the recommendations on urine testing strategies for infants and children under 3 years.

More information

To find out what NICE has said on topics related to this guideline, see our web page on urological conditions.

Recommendations for research

In 2007, the guideline committee made the following recommendations for research. The committee's full set of research recommendations is detailed in the full guideline.

1 Antibiotic prophylaxis

Well-designed randomised, double-blind, placebo-controlled trials are required to determine the effectiveness of prophylactic antibiotics for preventing subsequent symptomatic UTIs and renal parenchymal defects in children.

Why this is important

A high proportion of girls and a minority of boys with UTI develop further infections, which may be acutely distressing, associated with systemic illness and possible subsequent renal damage. Renal damage is most likely in children with high grade vesicoureteric reflux (VUR) and this is the reason for some of the imaging tests

previously recommended. Prophylactic antibiotics have been used on the assumption that they prevent these problems. However, chronic antibiotic use has a number of disadvantages for the individual as well as the population as a whole. Formal evaluation of whether prophylactic antibiotics can prevent the distressing symptoms and scarring associated with recurrent UTI would affect not only the use of antibiotics, but also the imaging investigations recommended.

2 Surgical intervention

Well-designed randomised placebo-controlled trials are required to determine the effectiveness of prophylaxis or various surgical procedures for the management of VUR in preventing recurrent UTI or renal parenchymal defects.

Why this is important

Management strategies for children with recurrent UTI have been based on the assumption that prevention of UTI and/or renal parenchymal defects by surgery or prophylaxis is more effective in preventing renal damage than treating symptomatic infections promptly whenever they occur. In addition, there have been recent developments in minimally invasive surgery which have been shown to be relatively safe and effective in reducing or eliminating VUR. Studies comparing these interventions with adequate controls are recommended to establish the benefit of surgery in preventing recurrent symptomatic infection and renal damage.

3 Long-term risk

A well designed cohort study investigating long-term outcomes including renal scarring and renal function of children who have had UTI should be conducted in the UK.

Why this is important

UTI and VUR in young children have been shown to be associated with both congenital and acquired renal damage. Progressive scarring is well documented in children with high grade VUR and recurrent UTI. Scarring has been associated with severe hypertension, proteinuria, complications in pregnancy and progression to established renal failure. These risks are likely to be greater in children with bilateral renal parenchymal defects. However, the frequency and magnitude of these risks for

children with unilateral and bilateral renal damage are unclear. Knowledge of the risk of serious or progressive complications would be useful to determine the management of children with first-time and recurrent UTIs.

Update information

New recommendation have been added for the urine testing strategies for infants and children under 3 years.

These are marked as:

- **[2017]**

NICE proposes to delete some recommendations from the 2007 guideline, because either the evidence has been reviewed and the recommendations have been updated, or NICE has updated other relevant guidance and has replaced the original recommendations. Recommendations that have been deleted or changed sets out these recommendations and includes details of replacement recommendations. Where there is no replacement recommendation, an explanation for the proposed deletion is given.

Where recommendations are shaded in grey and end **[2007]**, the evidence has not been reviewed since the original guideline.

See also the original NICE guideline and supporting documents.

Recommendations that have been deleted or changed

Recommendations to be deleted

Recommendation in 2007 guideline	Comment
All infants younger than 3 months with suspected UTI (see table 1) should be referred to paediatric specialist care and a urine sample should be sent for urgent microscopy and culture. These infants should be managed in accordance with the recommendations for this age group in the NICE guideline on fever in under 5s.	1.1.5.2 Refer all infants under 3 months with a suspected UTI (see table 1) to paediatric specialist care, and • send a urine sample for urgent microscopy and culture • manage in line with the NICE guideline on fever in under 5s.

<table>
<tr>
<td colspan="2">Urgent microscopy and culture is the preferred method for diagnosing UTI in this age group; this should be used where possible.</td>
<td rowspan="3">Replaced by:
1.1.5.3 Use dipstick testing for infants and children 3 months or older but younger than 3 years with suspected UTI.
• If both leukocyte esterase and nitrite are negative: do not start antibiotic treatment; do not send a urine sample for microscopy and culture unless at least 1 of the criteria in recommendation 1.1.6.1 apply.
• If leukocyte esterase or nitrite, or both are positive: start antibiotic treatment; send a urine sample for microscopy and culture.</td>
</tr>
<tr>
<td>If the infant or child has specific urinary symptoms</td>
<td>Urgent microscopy and culture should be arranged and antibiotic treatment should be started.
When urgent microscopy is not available, a urine sample should be sent for microscopy and culture, and antibiotic treatment should be started.</td>
</tr>
<tr>
<td>If the symptoms are non-specific to UTI</td>
<td>For an infant or child with a high risk of serious illness: the infant or child should be urgently referred to a paediatric specialist where a urine sample should be sent for urgent microscopy and culture. Such infants and children should be managed in line with the NICE guideline on fever in under 5s.
For an infant or child with an intermediate risk of serious illness: if the situation demands, the infant or child may be referred urgently to a paediatric specialist. For infants and children who do not require paediatric specialist referral, urgent microscopy and culture should be arranged. Antibiotic treatment should be started if microscopy is positive (see table 5). When urgent microscopy is not available, dipstick testing may act as a</td>
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</table>

	substitute. The presence of nitrites suggests the possibility of infection and antibiotic treatment should be started (see table 4). In all cases, a urine sample should be sent for microscopy and culture. For an infant or child with a low risk of serious illness: microscopy and culture should be arranged. Antibiotic treatment should only be started if microscopy or culture is positive.	
1.1.6.1 Urine samples should be sent for culture: • in infants and children who have a diagnosis of acute pyelonephritis/upper urinary tract infection (see 1.1.8.1) • in infants and children with a high to intermediate risk of serious illness • in infants and children under 3 years • in infants and children with a single positive result for leukocyte esterase or nitrite • in infants and children with recurrent UTI • in infants and children with an infection that does not respond to treatment within 24–48 hours, if no sample has already been sent • when clinical symptoms and dipstick tests do not correlate.		Replaced by: 1.1.6.1 Urine samples should be sent for culture: • in infants and children who are considered to have acute pyelonephritis/upper urinary tract infection (see 1.1.8.1) • in infants and children with a high to intermediate risk of serious illness • in infants under 3 months • in infants and children with a positive result for leukocyte esterase or nitrite • in infants and children with recurrent UTI • in infants and children with an infection that does not respond to treatment within 24–48 hours, if no sample has already been sent • when clinical symptoms and dipstick tests do not correlate.

1

2 ISBN: