Flowchart for infants/children under 16 years with suspected UTI

Consider UTI in any sick child and every young child with unexplained fever

- Check temperature and symptoms in all infants/children:
  - unexplained fever 38°C or more OR
  - loin pain/tenderness suggesting pyelonephritis

- Infants younger than 3 months:
  - Most common symptoms: fever, vomiting, lethargy, irritability, poor feeding, failure to thrive
  - Less common: abdominal pain, jaundice, haematuria, offensive urine

- Infant or child over 3 months with suspected UTI:
  - Most common symptoms: fever, frequency, dysuria, abdominal pain, loin tenderness, vomiting, poor feeding, dysfunctional voiding, changes to continence
  - Less common: lethargy, irritability, haematuria, offensive urine, failure to thrive, malaise, cloudy urine

**Consider referral** to a paediatric specialist

- Test urine within 24 hours
- If urine test positive, treat with antibiotic using NICE/PHE guideline on pyelonephritis: antimicrobial prescribing

- Refer urgently to paediatric specialist care AND send a urine sample for urgent microscopy and culture

- Perform a urine dipstick test

- **POSITIVE nitrite AND POSITIVE leucocyte**
  - Treat as UTI
  - Send urine for culture if:
    - under 3 years
    - suspected pyelonephritis
    - risk of serious illness
    - past UTI
    - no response to treatment and urine sample not already sent

- **POSITIVE nitrite NEGATIVE leucocyte**
  - Treat as UTI
  - Send urine for culture if dipstick on fresh urine sample
  - Send urine for culture to confirm diagnosis and reassess with result
  - Repeat urine if not fresh (as old samples can give false positives)

- **NEGATIVE nitrite POSITIVE leucocyte**
  - Send urine for culture
  - **Under 3 years:** start antibiotic and reassess with culture result
  - **Over 3 years:** only start antibiotics if good clinical evidence of UTI; leucocytes may indicate infection outside urinary tract

- **NEGATIVE nitrite AND NEGATIVE leucocyte**
  - UTI unlikely
  - Do not start antibiotics
  - Exclude other causes
  - Send urine for culture if:
    - suspected pyelonephritis
    - risk of serious illness
    - under 3 months
    - recurrent UTI
    - no response to treatment within 24-48 hours and urine sample not sent
    - symptoms and dipsticks results do not correlate

In ALL follow NICE/PHE guideline on lower UTI: antimicrobial prescribing, safety-net and give self-care advice: advise carer to bring the infant or child for reassessment if the infant or child is not improved or worse after 24–48 hours

Refer to NICE CG54 for other things to consider in suspected UTI in children
For treatment refer to joint NICE/PHE guidance: NICE/PHE guidelines on UTI (lower): antimicrobial prescribing or NICE/PHE guidelines on pyelonephritis (acute): antimicrobial prescribing

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**Key:**
- Urgent alert
- UTI signs/symptoms
- Action advised
- Other advice
### Key points for infants/children under 16 years with suspected UTI

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<tr>
<th>Sampling in children:</th>
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<tr>
<td>• if sending a urine culture, obtain sample before starting antibiotics</td>
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<td>• if child has alternative site of infection do not test urine unless remains unwell - then test within 24 hours</td>
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<td>• in infants/toddlers, clean catch urine advised; gentle suprapubic cutaneous stimulation using gauze soaked in cold fluid helps trigger voiding; clean catch urine using potties cleaned in hot water with washing up liquid; nappy pads cause more contamination, and parents find bags more distressing</td>
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<td>• if non-invasive not possible consider: catheter sample, or suprapubic aspirate (with ultrasound guidance)</td>
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<td>• culture urine within 4 hours of collection, if this is not possible refrigerate, or use boric acid preservative. Boric acid can cause false negative culture if urine not filled to correct mark on specimen bottle</td>
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<th>Interpretation of culture results in children:</th>
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<td>• single organism $\geq 10^6$ cfu/L ($10^3$ cfu/mL) may indicate UTI in voided urine</td>
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<td>• any growth from a suprapublic aspirate is significant</td>
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<tr>
<td>• pyuria $\geq 10^7$ WBC/L ($10^4$ WBC/mL) usually indicate UTI, especially with clinical symptoms but may be absent</td>
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<th>Other diagnostic tests:</th>
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<td>do not use CRP to differentiate upper UTI from lower UTI</td>
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<td>Ultrasound:</td>
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<td>• if proven UTI is atypical (seriously ill, poor urine flow, abdominal or bladder mass, raised creatinine, septicaemia, failure to respond to antibiotic within 48 hours, non-$E. coli$ infection): ultrasound all children in acute phase and undertake renal imaging within 4-6 months if under 3 years</td>
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<td>• ALL ages with recurrent UTI</td>
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<tr>
<td>• for children under 6 months OR those with non-$E. coli$ UTI: ultrasound within 6 weeks if UTI not atypical AND responding to antibiotics</td>
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Refer to NICE CG54 for other things to consider in suspected UTI in children
For treatment refer to joint NICE/PHE guidance: NICE guidelines on UTI (lower): antimicrobial prescribing or NICE guidelines on pyelonephritis (acute): antimicrobial prescribing