2015/16

Antimicrobial Guide and Management of Common Infections in Primary Care

Strategies to Optimise Prescribing of Antimicrobials in Primary Care

Review 2017
‘Antimicrobial resistance poses a catastrophic threat. If we don’t act now, any one of us could go into hospital in 20 years for minor surgery and die because of an ordinary infection that can’t be treated by antibiotics. And routine operations like hip replacements or organ transplants could be deadly because of the risk of infection.’

Professor Dame Sally Davies, Chief Medical Officer, March 2013

This guideline is a joint initiative between:

Aintree University Hospitals NHS Trust
Alder Hey Children’s NHS Foundation Trust
Liverpool Heart and Chest Foundation Trust
Liverpool Women’s Hospital NHS Foundation Trust
The Royal Liverpool & Broadgreen University Hospitals NHS Trust
Southport & Ormskirk NHS Trust
St Helens & Knowsley Teaching Hospitals NHS Trust
Warrington & Halton Hospitals NHS Foundation Trust
Merseycare NHS Trust
5 Boroughs Partnership
Liverpool Community Health
Liverpool CCG
Knowsley CCG
South Sefton CCG
Southport & Formby CCG
St Helens CCG
Halton CCG
Warrington CCG
West Lancashire CCG
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**Urinary Tract Infections**

### Diagnostic algorithm for UTI in adults

#### Severe or ≥ 3 symptoms of UTI
- Dysuria
- Urgency
- Frequency
- Polyuria
- Suprapubic tenderness

**AND**

- NO vaginal discharge or irritation

**AND**

- Give empirical antibiotic treatment
  - Do not routinely culture as 90% of cases will give a positive result

#### Mild or ≤ 2 symptoms of UTI (as above)

**Obtain urine specimen**

**Urine NOT cloudy**
- 97%*NPV
- Consider other diagnosis

**URINE CLOUDY**
- Perform urine dipstick test with nitrite
  - When reading test WAIT for the time recommended by the manufacturer

**Positive** nitrite, and leucocytes and blood (92% PPV**) or positive nitrite alone

- Probable UTI
  - Treat with first line agents in guideline

**Negative** nitrite
- Positive leucocyte
  - UTI or other diagnosis equally likely
  - Review time of specimen (morning is most reliable)
  - Treat if severe symptoms or consider back-up antibiotic prescription and send urine for culture

- Negative nitrite, leucocytes and blood (76% NPV) or negative nitrite and leucocyte positive blood or protein
  - Laboratory microscopy for red cells is less sensitive than dipstick - UTI Unlikely
  - Consider other diagnosis
  - Reassure and give advice on management of symptoms

*NPV = (Negative Predictive Value) i.e. proportion of people with a negative test who do not have a UTI

**PPV = (Positive Predictive Value) i.e. proportion of people with a positive test who have a UTI

WHEN SHOULD I SEND A URINE SAMPLE FOR CULTURE?

- **Pregnancy:** If symptomatic, for investigation of possible UTI. In all at 1st antenatal visit - as asymptomatic bacteriuria is associated with pyelonephritis & premature delivery.
- Suspected pyelonephritis (*loin pain and fever*).
- Suspected UTI in men
- Impaired host defences e.g. poorly controlled diabetes, immunosuppression
- Suspected UTI in infants and children
- **Failed antibiotic treatment or persistent symptoms.** *E. coli* with *Extended-spectrum Beta-lactamase enzymes* are increasing in the community. ESBLS are multi-resistant but usually remain sensitive to nitrofurantoin or fosfomycin.
- Patients with recurrent UTI, abnormalities of genitourinary tract (e.g. calculus, neurogenic bladder, vesico-ureteric reflux), renal impairment are more likely to have a resistant strain.

OTHER CONSIDERATIONS

See NICE Guideline NG12 Suspected cancer: recognition and referral [https://www.nice.org.uk/guidance/ng12](https://www.nice.org.uk/guidance/ng12)

Bladder cancer
Refer people using a suspected cancer pathway referral (for an appointment within 2 weeks) for bladder cancer if they are:
- aged 45 and over and have:
  - unexplained visible haematuria without urinary tract infection **or**
  - visible haematuria that persists or recurs after successful treatment of urinary tract infection, **or**
- aged 60 and over and have unexplained non-visible haematuria **and** either dysuria or a raised white cell count on a blood test.

Consider non-urgent referral for bladder cancer in people aged 60 and over with recurrent or persistent unexplained urinary tract infection.

Renal cancer
Refer people using a suspected cancer pathway referral (for an appointment within 2 weeks) for renal cancer if they are aged 45 and over and have:
- unexplained visible haematuria without urinary tract infection **or**
- visible haematuria that persists or recurs after successful treatment of urinary tract infection.

Antimicrobial resistance in UTIs
Risk factors for increased resistance in UTIs include: care home resident, recurrent UTI, hospitalisation >7d in the last 6 months, unresolving urinary symptoms, recent travel to a country with increased antimicrobial resistance (outside Northern Europe and Australasia) especially health related, previous known UTI resistant to trimethoprim, cephalosporins or quinolones
If resistance risk send culture for susceptibility testing & give safety net advice.
### URINARY SYMPTOMS in ADULT WOMEN <65

**DO NOT CULTURE ROUTINELY**
In sexually active women with urinary symptoms consider *Chlamydia trachomatis*

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<th>Comments and guidelines for lab testing</th>
</tr>
</thead>
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<tr>
<td><strong>Uncomplicated cystitis in adult women &lt; 65</strong></td>
<td>Fluids and First line: Nitrofurantoin 100mg MR bd for 3 days</td>
<td>Asymptomatic bacteriuria in adults should <strong>NOT</strong> be treated except in pregnancy.</td>
</tr>
<tr>
<td></td>
<td><strong>Second line:</strong> Trimethoprim 200mg bd for 3 days</td>
<td>Renal impairment is unlikely in a young healthy woman.</td>
</tr>
<tr>
<td></td>
<td><strong>If known or suspected renal impairment</strong></td>
<td>Use nitrofurantoin first line if GFR over 45ml/min. If GFR is 30-45ml/min, use only if no alternative.</td>
</tr>
<tr>
<td></td>
<td>Pivmecillinam 400mg stat then 200mg tds for 3 days in total or</td>
<td>Three day course of trimethoprim is appropriate for patients with GFR &gt;30 (CKD stages 1, 2 &amp; 3).</td>
</tr>
<tr>
<td></td>
<td><strong>In penicillin allergy with renal impairment only</strong></td>
<td><strong>Treatment failure:</strong> perform culture in all cases and give <strong>safety net advice.</strong></td>
</tr>
<tr>
<td></td>
<td>Cefalexin 500mg bd for 3 days</td>
<td></td>
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</tbody>
</table>

### PREGNANT WOMEN

<table>
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<tr>
<th>Clinical diagnosis</th>
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<tr>
<td><strong>UTI in Pregnant Women</strong></td>
<td>Fluids and Nitrofurantoin 100mg MR bd for 7 days except at term <strong>or</strong></td>
<td>Send MSU for culture and repeat MSU after treatment completed.</td>
</tr>
<tr>
<td></td>
<td>Cefalexin 500mg tds for 7 days</td>
<td>Confirmed asymptomatic bacteriuria in pregnancy should be treated.</td>
</tr>
<tr>
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<td></td>
<td>Amoxicillin may be suitable where the isolate is sensitive.</td>
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</tbody>
</table>
WOMEN > 65 YEARS and ALL MEN

- Treat the patient, not the urine
- Do not send urine for culture in asymptomatic elderly with positive dipsticks
- Only send urine for culture if two or more signs of infection, especially dysuria, fever > 38 ° or new incontinence.
- Do not treat asymptomatic bacteriuria in the elderly as it is very common.

Treating does not reduce mortality or prevent symptomatic episodes, but increases side effects & antibiotic resistance.

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<tr>
<td><strong>Complicated UTI in women</strong></td>
<td>Fluids and <strong>First line</strong>: Nitrofurantoin 100mg MR bd for 7 days</td>
<td>Submit MSU and <strong>prescribe when sensitivities are known</strong>. If patient suffers repeat infection but has responded to a first line agent on a previous occasion, that same agent should be restarted rather than assuming that an alternative agent will be necessary.</td>
</tr>
<tr>
<td></td>
<td><strong>Second line</strong>: Trimethoprim 200mg bd for 7 days</td>
<td>Trimethoprim dose adjustment if GFR ≤ 30ml/min (<a href="https://www.medicines.org.uk/mcu/medicines/a-z/nitrofurantoin">see BNF</a>); Nitrofurantoin if GFR 30-45ml/min, use only if no alternative.</td>
</tr>
</tbody>
</table>
| | Renal impairment (CKD 4 or 5) ie patients with GFR <30ml/min  
Pivmecillinam 400mg stat then 200mg tds for 7 days in total or  
**In penicillin allergy and renal impairment only**  
Cefalexin 500mg bd for 7 days |  |
| **UTI in Men** | Fluids and **First line**: Nitrofurantoin 100mg MR bd for 7 **days if GFR over 45ml/min**  
**Second line**: Trimethoprim 200mg bd for 7 days | **Submit MSU.**  
Consider referral to urology.  
Consider Chlamydia in sexually active age group.  
**Avoid PSA testing – levels will be raised.**  
Trimethoprim dose adjustment if GFR < 30ml/min ([see BNF](https://www.medicines.org.uk/mcu/medicines/a-z/nitrofurantoin)); Nitrofurantoin if GFR 30-45ml/min, use only if no alternative. |
| | Renal impairment (CKD 4 or 5) ie patients with GFR <30ml/min  
Pivmecillinam 400mg stat then 200mg tds for 7 days in total or  
in **Penicillin allergy and renal impairment only**  
Cefalexin 500mg bd for 7 days |  |
WOMEN and MEN with CATHETERS

- **Treat the patient, not the urine.**
- **Do not treat asymptomatic bacteriuria in those with indwelling catheters,** as bacteriuria is very common and antibiotics increase side effects and antibiotic resistance.
- **Consider need for continued catheterisation**
  - Treatment does not reduce mortality or prevent symptomatic episodes, but increases side effects & antibiotic resistance.
  - Only send urine for culture in catheterised patients if features of systemic infection. However, always:
    - Exclude other sources of infection
    - Check that the catheter drains correctly and is not blocked.
    - If the catheter has been in place for more than 7 days, consider changing it before/when starting antibiotic treatment

Do not give antibiotic prophylaxis for catheter changes unless history of symptomatic UTIs due to catheter change.

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<tr>
<td>Bladder catheter in situ</td>
<td>Treat only if associated with systemic symptoms, e.g. pyrexia, rigors.</td>
<td>1. Ensure high fluid intake.</td>
</tr>
<tr>
<td></td>
<td>Review the need for continued catheterisation</td>
<td>2. Where adequate fluid intake cannot be assured and bladder washout indicated, use saline.</td>
</tr>
<tr>
<td></td>
<td>Prophylactic treatment is not recommended in catheterised patients with recurrent UTIs</td>
<td>3. There is a high incidence of bacteriuria with long-term catheters. Antibiotics do not eliminate these, but lead to the growth of resistant organisms.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Dipstick testing should not be performed on CSU specimens (SIGN guidelines)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Culture of urine is not normally advised</td>
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<tr>
<td></td>
<td></td>
<td>6. Antibiotics will not eradicate asymptomatic bacteriuria: only treat if systemically unwell or pyelonephritis likely. Do not use prophylactic antibiotics for catheter changes unless history of catheter-change associated UTI or trauma.</td>
</tr>
</tbody>
</table>

Dipstick testing should not be performed on CSU specimens (SIGN guidelines).
### Recurrent UTI in Adults

<table>
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<tr>
<th>Clinical diagnosis</th>
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</thead>
<tbody>
<tr>
<td><strong>Recurrent UTI in non-pregnant women (≥2 UTIs in 6 months, or ≥3 in 12 months UTIs/year)</strong></td>
<td>Nitrofurantoin 50mg qds or 100mg m/r bd for 10 days <em>or</em> Trimethoprim 200mg bd for 10 days.</td>
<td>Send MSU in all cases of recurrent infection and alter empirical antibiotic choice according to culture and sensitivity results, if necessary.</td>
</tr>
<tr>
<td>Early recurrence (&lt;4 weeks after initial UTI) suggesting relapse</td>
<td>Nitrofurantoin 50mg qds or 100mg m/r bd for 3 days <em>or</em> Trimethoprim 200mg bd for 3 days (as for simple UTI at initial presentation). Consider rescue packs and post-coital prophylaxis as possible alternatives to long-term antibiotic prophylaxis. Use stat dose for post-coital recurrence (unlicensed indication). Nitrofurantoin 100mg <em>or</em> trimethoprim 100mg stat. A trial of night-time prophylaxis may be considered, for an initial period of 6 months, when other measures have been exhausted. Nitrofurantoin 100mg nocte <em>or</em> Trimethoprim 100mg nocte.</td>
<td>Further local advice on the management of UTI in adults is available via: <a href="http://www.mapofmedicine.com">www.mapofmedicine.com</a> Refer for renal ultrasound scan and consider specialist referral to Urology if significant abnormality or residual volume &gt;100mL is detected. To reduce recurrence, offer lifestyle advice. Refer for renal ultrasound scan and consider specialist referral to Urology if significant abnormality or residual volume &gt;100mL is detected. Advise on pregnancy risk in post-coital use of trimethoprim.</td>
</tr>
<tr>
<td>Later recurrence (&gt;4 weeks after initial UTI)</td>
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</tbody>
</table>

**Recurrent UTI in Men**

Submit MSU and refer to Urology.

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### Other Urological Infections in Adults

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<tr>
<td>UTI in infants &lt; 3 months</td>
<td>Refer immediately to Paediatrician.</td>
<td></td>
</tr>
<tr>
<td>Cystitis / Lower UTI – Infants &amp; children &gt; 3 months</td>
<td>Treat if positive nitrite on dipstick with fluids and Trimethoprim bd for 3 days at treatment dose 2nd line Co-amoxiclav tds for 3 days</td>
<td>Always submit a pre-treatment urine sample, clean catch if possible. If recurrent infection or systemically unwell, refer to Paediatrician.</td>
</tr>
<tr>
<td>Acute pyelonephritis / Upper UTI - Infants &amp; children &gt; 3 months</td>
<td>Co-amoxiclav tds for 7 days</td>
<td>Always submit urine sample, clean catch if possible. Consider referral to Paediatrician, depending on severity or in penicillin allergy.</td>
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