**Diagnosis of UTI**

*Quick Reference Guide for Primary Care*

For consultation and local adaptation

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**Urine submissions to microbiology laboratories vary greatly from 40/1000 to 160/1000 patients.**

- **Consider whether urine culture is needed**
- **Do not send urines in asymptomatic unless antenatal**

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### THE ELDERLY:

Asymptomatic bacteriuria in the elderly is very common and is not related to increased morbidity or mortality.¹

- Investigation and treatment will increase side-effects and medicalise the condition²,³
- Only sample if: two signs of infection, especially dysuria, pyrexia >38°C or new incontinence.²,³

### ACUTE UNCOMPROMICATED UTI IN ADULT WOMEN: Affects up to 15% of women each year⁴

Routine urine culture is unnecessary.² Use symptoms, urine appearance and dipstick urine tests to diagnose UTI and reduce antibiotic use and unnecessary laboratory investigations⁵-¹¹

- 50% of women with symptoms of UTI have negative culture and symptoms are due to inflammation of the urethra – the ‘so-called’ urethral syndrome.¹²

### ASSESS SYMPTOMS

<table>
<thead>
<tr>
<th>Symptom(s) Present</th>
<th>Action</th>
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</table>
| ≥ 3 typical symptoms of UTI  
dysuria; urgency; frequency, polyuria; suprapubic tenderness; haematuria¹²,¹⁴ | Perform dipstick test with nitrite*  
Positive nitrite +/- leucocyte +/- protein  
Negative nitrite & leucocyte positive blood or protein |
| Mild or ≤ 2 symptoms of UTI (as above) | Obtain urine specimen  
Examine  
Positive nitrite +/- leucocyte +/- protein  
Negative nitrite positive leucocyte¹⁵  
Negative nitrite & leucocyte positive blood or protein |
| UTI very unlikely  
Review time of specimen*  
UTI or urethral syndrome  
Consider other diagnosis¹⁵ | Urine NOT cloudy  
91% negative culture  
DO NOT TREAT |
| UTI or urethral syndrome | Urine NOT cloudy  
91% negative culture  
DO NOT TREAT |

* Nitrite is produced by the action of bacterial nitrate reductase in urine. As contact time between bacteria and urine is needed, morning specimens are most reliable.¹⁷ Leucocyte esterase detects intact and lysed leucocytes produced in inflammation. Haematuria and proteinuria occur in UTI but are also present in other conditions. When reading test WAIT for the time recommended by manufacturer.

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### LABORATORY TESTING FOR CULTURE AND SENSITIVITY SHOULD BE PERFORMED IN¹⁸,¹⁹

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
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</table>
| Pregnancy ²⁰ -  
in all at first antenatal visit to detect asymptomatic bacteriuria which is associated with pyelonephritis and premature delivery¹⁸,²¹  
if symptomatic, for investigation of possible UTI  
Suspected UTI in children, any sick child and every young child with unexplained fever²²,²³  
Suspected pyelonephritis²⁴ (temp ≥ 39.4; rigors; nausea; vomiting; diarrhoea; loin pain or tenderness)  
Suspected UTI in men¹⁰ | Catheterised patients: Send sample only if features of systemic infection, as bacteriuria is usual.²⁴,²⁵  
Failed antibiotic treatment or persistent symptoms²⁴,²⁶  
Community multi-resistant E. coli with Extended-spectrum Beta-lactamase enzymes are increasing so perform culture in all treatment failures. ESBLs are multi-resistant but usually remain sensitive to nitrofurantoin  
abnormalities of genitourinary tract  
renal impairment. |

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**C**  
In sexually active young men and women with urinary symptoms consider *Chlamydia trachomatis*
**SAMPLING**

- **B** In women: the specimen should be mid-stream - cleansing with water does not reduce contamination. Antiseptic leads to false negatives. Holding the labia apart reduces contamination but may not be practical.
- In toddlers: potties washed in hot water (60°C) with washing up liquid are suitable for collection.
- In infants: urine collection pad in a nappy may be used. Bag urines are often contaminated.
- Refrigerate specimens to prevent bacterial overgrowth, or use specimen pots containing boric acid.

**HOW DO I INTERPRET A CULTURE RESULT?**

- Culture of single organisms $\geq 10^4$ colony forming units (CFUs)/mL with urinary symptom is usually diagnostic of UTI.
- *Escherichia coli* or *Staphylococcus saprophyticus* significant if $\geq 10^3$ CFU/mL.
- White blood cells: $\geq 10^4$/mL (10^7 WBC/L) is considered to represent inflammation.
- Pyuria may be absent in childhood UTI.
- In adults ‘no white cells present’ indicates no inflammation and reduces significance of culture.
- Consider *Chlamydia trachomatis* (if 16-24 years), other vaginal infections, other non-culturable organisms or renal pathology.
- Presence indicates perineal contamination, which reduces significance of culture.

**KEY**

<table>
<thead>
<tr>
<th>Study design</th>
<th>Recommendation grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good recent systematic review of studies</td>
<td>A+</td>
</tr>
<tr>
<td>One or more rigorous studies, not combined</td>
<td>A-</td>
</tr>
<tr>
<td>One or more prospective studies</td>
<td>B+</td>
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<tr>
<td>One or more retrospective studies</td>
<td>B-</td>
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<tr>
<td>Formal combination of expert opinion</td>
<td>C</td>
</tr>
<tr>
<td>Informal opinion, other information</td>
<td>D</td>
</tr>
</tbody>
</table>

**References**


8. Hiscoke C, Yoxall H, Greig D, Lightfoot NF. Validation of a method for the rapid diagnosis of urinary tract infection suitable for use in general practice. *Brit J Gen Pract* 1990;40:403-405. (Based on all GP and hospital specimens received in the laboratory. 20% significant bacteriuria >105 CFU/mL. Nitrite and appearance 96% NPV, 46% PPV.)


15. European Urinalysis Guidelines. Eds. Kouri T, Flogazzi G, Gant V, Hallender H, Hofmann W, Guder WG. *Scand J Clin Lab Invest* 2000;60:20. (Neutrophils are found in UTI and also glomerulonephritis, interstitial nephritis and aseptic cystitis. The appearance of lymphocytes in urine is associated with chronic inflammatory conditions, viral diseases and renal transplant rejection. Macrophages are also suggested to reflect eg inflammatory activity of renal disease. Haematuria remains a major sign of urinary tract and renal disease. It may also reflect a general bleeding tendency. Haematuria for physiological reasons (strenuous exercise) and vaginal contamination (menstruation). This paper also has detailed guidelines (aimed at laboratory staff) for interpretation of urine culture and microscopy.


17. Czerwinski AW, Wilkerson RG, Merrill JA, Braden B et al. Further evaluation of the Griess test to detect significant bacteriuria. Part II *Am J Obstet Gynaecol* 1971;110:677-81. (Early morning urines give more accurate nitrite results, as bacteria must be in contact with the urine for sufficient time to allow reduction of nitrates to nitrites.)


29. Lifshitz WE, Kramer L. Outpatient urine culture. *Arch Intern Med* 2000;150:2537-40. (There was no difference in contamination between urine specimen with no technique versus perineal cleansing and spreading of the labia.)

30. Rees JC, Vernon S, Pedler SJ, Coulthard MG. Collection of urine from washed-up potties. *Lancet* 1996;348:197. (Washing up liquid with hot water at 60°C can be used to wash potties before taking a specimen)


**Other general reading on laboratory diagnosis of UTI**


Kass EH. Asymptomatic infections of the urinary tract. *Trans Assoc Am Phys* 1956;56-63. (Description of >10⁵ CFU/mL as significant if found in two consecutive urines).


**Treatment advice can be found on our website:**


We welcome, in fact encourage, opinions on the advice given and future topics we should cover. We would be most appreciative if you could email any evidence or references that support your requests for change so that we may consider them at our annual review.

Comments should be submitted to Dr Clodina McNulty, Head, HPA Primary Care Unit, Microbiology Laboratory, Gloucestershire Royal Hospital, Great Western Road, Gloucester GL1 3NN.

Email: clodina.mcnulty@hpa.org.uk or jill.whiting@hpa.org.uk