PRIMARY CARE MANAGEMENT OF RECURRENT UTI

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PCUS
Primary Care Urology Society

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RECURRENT UTI

• NICE CG 112

• Published October 2018

• www.nice.org.uk/guidance/ng112
WHAT IS THE DEFINITION OF RECURRENT UTI?

- No universally accepted definition

- Most commonly used is “2 in 6 months or 3 in a year”
  
  Schoof and Hill 2005
  Hooton and Stamm 2006

- Estimated 20-50% of young women with UTI will have another within a year


- Finnish study showed older (>55yrs) more likely to have recurrence in first year (53% vs 36%)

  Ikaheimo Clin Infect Dis 1996
50% of all women will have a UTI in their lifetime

Nearly 20% of women who have one UTI will have another

30% of those will have yet another UTI (recurrent)

80% of those, 2.4% of all women, will have very frequent UTI
Antimicrobial resistance....

- Successful surgery
- Cancer chemotherapy
- Immunotherapies

AMR the end of modern medicine

Estimates of Burden of Antibacterial Resistance

European Union
- Population 506m
- 25,000 deaths per year
- 2.5m extra hospital days
- Overall societal costs (€ 900 million, hosp. days)
- Approx. €1.5 billion per year

Thailand
- Population 70m
- >30,000 deaths
- >3.2m hospital days
- Overall societal costs
- US$ 8.6-292.8 mill. direct
- US$1.3 billion indirect

United States
- Population 306m
- >23,000 deaths
- >2.0m illnesses
- Overall societal costs
- Up to $20 mill. direct
- Up to $35 billion indirect

Global information is insufficient to show complete disease burden impact and costs

WHO Antimicrobial Resistance Global Report on Surveillance 2014

Antimicrobial resistance by 2050 threatens:

- A reduction in the world economy of 0.1-3.1%


Taken from ARK-hospital presentation – Elizabeth Cross 2017
URINE DIPSTICK TESTING / MC&S
• Diagnosis of UTI should be based on a combination of:
  • clinical diagnosis based on typical symptoms
  • microbiological diagnosis by appropriate use of urine dipsticks and urine culture where indicated
  • past response to antibiotic treatment of isolated episodes of acute UTI

• A diagnosis of UTI can be considered if the patient has a strong symptom profile, even in the absence of culture-positive urine or dipstick confirmation
  • fever can be useful to differentiate inflammatory and infective causes
  • previous response to antibiotics for similar symptoms also supports this diagnosis
Prevalence of asymptomatic bacteriuria in seniors over 70:

- in long term care 50%
- in the community 19%

High Prevalence of Asymptomatic Bacteriuria

- The bladder is normally colonized in many elderly people
- A positive urinalysis or culture in the absence of symptoms reveals colonization not infection
- Treatment of asymptomatic bacteriuria is not recommended

It’s Hard to Ignore A Positive Test

Habitual Testing + Prevalent Colonization = Unnecessary prescriptions & missing the real diagnosis
<table>
<thead>
<tr>
<th>Myth</th>
<th>Fact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive urine culture and abnormal urinalysis (positive nitrates</td>
<td>Positive urine culture and abnormal urinalysis in a resident without symptoms is consistent with asymptomatic bacteriuria – that is,</td>
</tr>
<tr>
<td>or leukocytes, increased white blood cells or pyuria) always</td>
<td>colonization – not infection. Treatment with antibiotics is not indicated.</td>
</tr>
<tr>
<td>indicates a urinary tract infection and requires antibiotics.</td>
<td></td>
</tr>
<tr>
<td>Positive urine culture in resident with chronic indwelling</td>
<td>A chronic indwelling catheter is associated with bacteriuria 100% of the time. There is no need to treat unless the resident has</td>
</tr>
<tr>
<td>catheter always indicates a urinary tract infection and requires</td>
<td>symptoms of a UTI.</td>
</tr>
<tr>
<td>antibiotics.</td>
<td></td>
</tr>
<tr>
<td>Elderly residents often have urinary tract infection with no</td>
<td>• A change in mental status or delirium is a non-specific symptom and may accompany a change in conditions such as dehydration,</td>
</tr>
<tr>
<td>symptoms except a change in mental status or delirium.</td>
<td>constipation, adverse drug effect, pneumonia, urinary retention, metabolic problems, head trauma, environmental changes or</td>
</tr>
<tr>
<td></td>
<td>sensory deprivation.</td>
</tr>
<tr>
<td></td>
<td>• Mental status change requires an exploration of alternative causes and may not require antibiotics for UTI unless there are</td>
</tr>
<tr>
<td></td>
<td>more specific signs or symptoms that point to that diagnosis.</td>
</tr>
<tr>
<td>In an elderly population, urinary tract infections often present</td>
<td>Nonspecific symptoms can be seen in many conditions such as dehydration or adverse drug effect. Diagnosing and treating UTIs</td>
</tr>
<tr>
<td>with nonspecific symptoms (e.g., falls, functional decline).</td>
<td>based on these nonlocalizing symptoms not only results in inappropriate antibiotic use, it also completely misses the real diagnosis.</td>
</tr>
<tr>
<td>Cloudy or malodorous urine is always diagnostic of a urinary tract</td>
<td>These changes may be seen in asymptomatic bacteriuria. Other causes can include dehydration, certain medications and diet.</td>
</tr>
<tr>
<td>infection.</td>
<td></td>
</tr>
</tbody>
</table>
**Diagnosis and Management of Suspected UTI in Older People**

Decision aide: guide management of patients/residents with fever defined as temperature >37.5°C or 1.5°C increase above baseline occurring at least two occasions in last 12 hours.

Hypothermia (temperature of <36°C) may also indicate infection, especially those with comorbidities.

Be alert to non-specific symptoms of infection such as abdominal pain, alteration of behaviour or loss of alertness.

**Manage following local antibiotic policy**

**Are there any symptoms suggestive of non-urinary infection?**

- Respiratory: shortness of breath, cough, purulent sputum, new pleural, chest pain
- Gastrointestinal: nausea/vomiting, new abdominal pain, new onset diarrhoea
- Skin/soft tissue: new redness, warmth, swelling, purulent discharge

**YES**

**Does the patient/resident have a urinary catheter?**

YES

**Does patient/resident have two or more of following symptoms?**

- Dysuria
- Urgency
- Frequency
- Urging urination
- Shaking chills (sgns)
- Flank or suprapubic pain
- Frank haematuria
- New onset or worsening of pre-existing confusion/agitation

**YES**

**UTI likely**

**UTI unlikely but continue to monitor symptoms**

**NO**

**NO**

**UTI unlikely but continue to monitor symptoms**

**Does patient/resident have one or more of following symptoms?**

- Shaking chills (sgns)
- New controversial tenderness
- New onset defrump

**YES**

**UTI likely**

**UTI unlikely but continue to monitor symptoms**

- Assess if retention or sub-acute retention of urine is likely (eg. blocked catheter or distended bladder)
- Do not use dipstick test in diagnosis of UTI in older people
- Obtain a sample for urine culture and send to Microbiology
- Start antibiotic therapy following local policy or as advised by Microbiology
- If patient has urinary catheter, remove and replace it. Consider the ongoing need for a long term catheter in consultation with specialist
- Consider use of analgesia (paracetamol or ibuprofen) to relieve pain
- Consider admission to hospital if patient has fever with chills or new onset hypotension (low blood pressure)
- Review response to treatment daily and if no improvement of symptoms or deterioration, consider admission to hospital or an increased level of care

**Developed by the Scottish Antimicrobial Prescribing Group - www.cutsbadmedicines.org.uk/coa/**
Decision aid to guide management of patients/residents with fever defined as temperature >37.9°C or 1.5°C increase above baseline occurring on at least two occasions in last 12 hours.

Hypothermia (low temperature of <36°C) may also indicate infection, especially those with comorbidities.

Be alert to non-specific symptoms of infection such as abdominal pain, alteration of behaviour or loss of diabetes control.

Are there any symptoms suggestive of non-urinary infection?

- Respiratory - shortness of breath, cough or sputum production, new pleuritic chest pain
- Gastrointestinal - nausea/vomiting, new abdominal pain, new onset diarrhoea
- Skin/soft tissue - new redness, warmth, swelling, purulent drainage

Manage following local antibiotic policy
Does the patient/resident have a urinary catheter?

YES

Does patient/resident have one or more of following symptoms?
- shaking chills (rigors)
- new costovertebral tenderness
- new onset delirium

NO

UTI unlikely but continue to monitor symptoms

YES

UTI likely

NO

Does patient/resident have two or more of following symptoms?
- dysuria
- urgency
- frequency
- urinary incontinence
- shaking chills (rigors)
- flank or suprapubic pain
- frank haematuria
- new onset or worsening of pre-existing confusion/agitation

NO

UTI unlikely but continue to monitor symptoms
UTI likely

- Assess if retention or sub-acute retention of urine is likely (e.g. blocked catheter or distended bladder)
- DO NOT use dipstick test in diagnosis of UTI in older people
- Obtain a sample for urine culture and send to Microbiology
- Start antibiotic therapy following local policy or as advised by Microbiology
- If patient has a urinary catheter, remove and replace it. Consider the ongoing need for a long term catheter in consultation with specialists
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- Review response to treatment daily and if no improvement of symptoms or deterioration, consider admission to hospital or an increased level of care.

Developed by the Scottish Antimicrobial Prescribing Group • www.scottishmedicines.org.uk/SAPG/
WHO TO SCAN?

• Consider referral for urinary tract ultrasound (including post-void residual volume) in patients:
  – with very frequent infections
  – with recurrent *Proteus* infections (due to their association with renal calculi)
  – who do not respond to treatment
  – with post-micturition symptoms, such as a sensation of incomplete emptying, or those with a palpable bladder
CASE STUDY 1

• Fiona is a 23 year old female. Over the last 12 months, she has had multiple urinary tract infections. She is sometimes able to self manage these, buying ‘sachets’ over the counter and increasing fluid intake – but has also had to take time off work on 5 occasions to see her GP for an antibiotic prescription. She is fed up.

• What would you do?
CASE STUDY 2

• Maggie is a 52 year old female. Over the last 18 months she has been increasingly bothered by recurrent episodes of 'cystitis'. She has not had a problem with UTI's in the past. She has had several courses of antibiotics. MSU's show pyuria, often with growth of E coli.

• What would you do?
CASE STUDY 3

• Anne is 64. She has had a number of episodes recently of cystitis like symptoms – frequency, urgency, dysuria. Her urine is cloudy during these episodes. Urine dip sometimes shows pyuria, lab tests are often negative. Her symptoms respond to short courses of antibiotics, but never completely settle. Within 2 or 3 weeks after completing a course of antibiotics, her symptoms return. She does not have any haematuria, either visibly or on dipstick testing.

• What would you do?
ANTIBIOTICS
SELF START ANTIBIOTICS

• 85-95% of women with previous UTI can self diagnose successfully (Gupta et al. Ann Intern Med 2001)
• Clinical and Microbiological cure rates > 90%
• Best used in motivated women with previous culture confirmed cystitis (Hooton NEJM 2012)

• Advantages are less antimicrobial exposure and high patient satisfaction rates
• Post coital antibiotics reserved for group where it has been identified as the dominant risk factor.
PROPHYLACTIC ANTIBIOTICS

• Single dose antibiotic prophylaxis – for triggers

• Long term prophylaxis can range from 4 mths to 5 yrs!!

• 95% will remain UTI free but 50% relapse following cessation (Nicolle et al. Am J Med 2002)

• Cochrane review of RCT’s - RR 0.21 for single recurrence (NNT 1.85) but RR after prophylaxis 0.82 (Albert et al. Cochrane Database 2004)

• Single randomised study found prophylactic nitrofurantoin superior to oestrogen (Raz et al Clin Infect Dis 2003)
# Antibiotic Prophylaxis

## Microbiological UTI during prophylaxis

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Antibiotic n/N</th>
<th>Placebo n/N</th>
<th>Risk Ratio</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>195</td>
<td>177</td>
<td>1.000%</td>
<td>0.21 [0.13, 0.34]</td>
</tr>
</tbody>
</table>

Total (95% CI): 24 (Antibiotic), 116 (Placebo)

Heterogeneity: Test = 1.71; Chi² = 13.90, df = 10 (P = 0.18); I² = 28%

Test for overall effect: Z = 6.36 (P < 0.0001)

NNT (to 1.85)

## Microbiological UTI after completion of prophylaxis

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Antibiotic n/N</th>
<th>Placebo n/N</th>
<th>Risk Ratio</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>44</td>
<td>26</td>
<td>1.000%</td>
<td>0.82 [0.44, 1.53]</td>
</tr>
</tbody>
</table>

Total (95% CI): 23 (Antibiotic), 15 (Placebo)

Heterogeneity: Test = 1.66; Chi² = 4.38, df = 2 (P = 0.11); I² = 54%

Test for overall effect: Z = 6.22 (P = 0.53)

NON-ANTIBIOTIC MEASURES
D-MANNOSE

- Sugar – postulated to inhibit bacterial adherence to urothelium
- 1 x RCT: vs Nitrofurantoin vs nothing
- 308 women with hx of rUTI
- 98 had continued rUTI:
  - 15 in D-mannose arm
  - 21 in NF arm
  - 62 in no treatment arm

Kranjec et al. World J Urol 2014; 32: 79-84
CRANBERRY

- Postulated to acidify urine and reduce bacterial adhesion/prevent fimbrial expression
- Some evidence that rUTIs reduced but optimum dose /duration unclear.
- Original Cochrane review (2008) identified some benefit

**BUT**

Meta-analyses in updated review (2012) showed that compared with placebo, water or non-treatment,

“cranberry products did not significantly reduce the occurrence of symptomatic UTI overall” (RR 0.86, 95% CI 0.71 to 1.04)

Jepson et al. Cochrane Database 2012

- Recent evidence review: 3 new papers suggesting cranberry does have a protective effect

Kranz et al Eur Urol Focus 2018
TOPICAL OESTROGENS

• Falling oestrogen levels lead to a change in vaginal flora and pH

• Local oestrogen can reverse this without SE of systemic oestrogen
  Esposito et al. Gynaecological Endocrinology 1991

• Systematic review found no reduction in UTIs with oral oestrogen but showed vaginal preparations superior to placebo (RR 0.25/0.64)
  Perrotta et al. Cochrane Database 2008

<table>
<thead>
<tr>
<th>Vaginal oestriol</th>
<th>Raz 1993</th>
<th>8/50</th>
<th>27/43</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eriksen 1999</td>
<td>27/53</td>
<td>44/55</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>D+L Subtotal</td>
<td>(I-squared = 85.3%, p = 0.009)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-H Subtotal</td>
<td>0.25 (0.13, 0.50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.64 (0.47, 0.86)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.42 (0.16, 1.10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.48 (0.36, 0.64)</td>
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</tr>
</tbody>
</table>
METHENAMINE HIPPURATE

- Methenamine has antibacterial properties - hydrolysed to formaldehyde in acid urine
- Systematic review highlighted heterogeneity of data but some studies report reduction in symptomatic UTIs (RR 0.24)
- Ineffective in pts with neuropathic bladder / abnormal renal tract.
- “There is a need for further large well-conducted RCTs to clarify…”

Lee et al. Cochrane Database 2012
WHO TO REFER

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

1. NICE Suspected Cancer Referral Guidelines 2015
WHO TO REFER

- pregnant women
- men with 2 or more UTI
- patients with recurrent or severe pyelonephritis
- patients infected with resistant bacteria
- patients with recurrent UTI associated with structural or functional abnormalities of the urinary tract
- patients with recurrent UTI associated with atypical infections, such as tuberculosis or schistosomiasis
- catheterised patients, in whom misdiagnosis is common because of colonisation (treat only when symptomatic)
- patients with immunity compromised as a result of drugs or diseases
- patients with chronic renal failure with oliguria, who should be seen by the renal team because of the risk of renal deterioration
UTI (recurrent): antimicrobial prescribing

NICE (National Institute for Health and Care Excellence)

Self-care
- Behavioural and personal hygiene measures include adequate fluid intake, not delaying urination, wiping from front to back, not douching or wearing tight underwear.
- When considering D-mannose, take account of severity and frequency of symptoms, risk of complications, and preference for self-care.
- Triggers include sexual intercourse.

Treatments
- When considering vaginal oestrogen, take account of severity and frequency of symptoms, risk of complications, benefits for other symptoms (vaginal dryness), possible adverse effects (breast tenderness and vaginal bleeding), unknown long-term endometrial safety and preferences for treatment.
- Review vaginal oestrogen treatment at least every 6 months.
- When considering antibiotics, take account of severity and frequency of symptoms, risk of complications and long-term antibiotic use, previous results of urine culture and susceptibility, previous antibiotic use and preferences for treatment.

Background
- Recurrent UTI includes lower UTI (cystitis) and upper UTI (acute pyelonephritis).
- Recurrent UTI may be due to relapse (same strain of bacteria) or reinfection (different strain or species of bacteria).

NICE uses ‘offer’ when there is more certainty of benefit and ‘consider’ when evidence of benefit is less clear.

Preventing urinary tract infection in people with recurrent UTI

- Advise about behavioural and personal hygiene measures to reduce the risk of UTI.
- Explain inconclusive evidence that cranberry products and probiotics reduce risk.

Non-pregnant woman with no improvement after behavioural and personal hygiene measures?

- Consider self-care with D-mannose.
- Consider vaginal (not oral) oestrogen for postmenopausal women.

If no improvement (or not appropriate), consider single-dose antibiotic prophylaxis for exposure to triggers:

When single-dose antibiotic prophylaxis given, advise:
- how to use
- possible adverse effects, particularly diarrhea and nausea
- returning for review after 3 months or other agreed time
- seeking medical help if symptoms of an acute UTI develop.

If no improvement or no triggers, consider continuous antibiotic prophylaxis:

When continuous antibiotic prophylaxis given, advise:
- risk of resistance with long-term antibiotics
- possible adverse effects, particularly diarrhea and nausea
- returning for review after 3 months or other agreed time
- seeking medical help if symptoms of an acute UTI develop.

If no improvement after behavioural and personal measures, consider continuous antibiotic prophylaxis.

If no improvement after behavioural and personal hygiene measures, consider continuous antibiotic prophylaxis.

Pregnant woman, or Man, or Child or young person under 16 years, or Any person with recurrent upper UTI?

Refer for specialist assessment and investigations.
# UTI (recurrent): antimicrobial prescribing

## Choice of antibiotic: people aged 16 years and over

<table>
<thead>
<tr>
<th>Antibiotic prophylaxis</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First choice</strong></td>
<td></td>
</tr>
<tr>
<td>Trimethoprim†</td>
<td>100 mg single dose, or 100 mg at night continuously</td>
</tr>
<tr>
<td>Nitrofurantoin - if eGFR ≥45 ml/minute³</td>
<td>50 to 100 mg single dose, or 50 to 100 mg at night continuously</td>
</tr>
<tr>
<td><strong>Second choice</strong></td>
<td></td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>250 mg single dose, or 250 mg at night continuously</td>
</tr>
<tr>
<td>Cefalexin</td>
<td>125 mg single dose, or 125 mg at night continuously</td>
</tr>
<tr>
<td>Pivmecillinam⁺</td>
<td>200 mg single dose, or 200 mg at night continuously</td>
</tr>
</tbody>
</table>

1. See [BNF](https://www.gov.uk/government/publications/nice-guidance) for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breast-feeding.
2. Choose antibiotics according to recent culture and susceptibility results where possible, with rotational use based on local policies. Select a different antibiotic for prophylaxis if treating an acute UTI.
3. Doses given are by mouth using immediate-release medicines, unless otherwise stated.
5. Avoid at term in pregnancy; may produce neonatal haemolysis (BNF, April 2018).
6. Not known to be harmful in pregnancy, but manufacturer advises avoid (BNF, April 2018).

Abbreviations: eGFR, estimated glomerular filtration rate.

## Choice of antibiotic: children and young people under 16 years

<table>
<thead>
<tr>
<th>Antibiotic prophylaxis</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Children under 3 months</strong></td>
<td></td>
</tr>
<tr>
<td>Refer to paediatric specialist</td>
<td></td>
</tr>
<tr>
<td><strong>Children aged 3 months and over (specialist advice only)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>First choice</strong></td>
<td></td>
</tr>
<tr>
<td>Trimethoprim</td>
<td>3 to 5 months, 2 mg/kg at night (maximum 100 mg per dose) or 12.5 mg at night 6 months to 5 years, 2 mg/kg at night (maximum 100 mg per dose) or 25 mg at night 6 to 11 years, 2 mg/kg at night (maximum 100 mg per dose) or 50 mg at night 12 to 17 years, 100 mg at night</td>
</tr>
<tr>
<td>Nitrofurantoin - if eGFR ≥45 ml/minute³</td>
<td>3 months to 11 years, 1 mg/kg at night 12 to 17 years, 50 to 100 mg at night</td>
</tr>
<tr>
<td><strong>Second choice</strong></td>
<td></td>
</tr>
<tr>
<td>Cefalexin</td>
<td>12.5 mg/kg at night (maximum 125 mg per dose)</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>1 to 11 months, 62.5 mg at night 1 to 4 years, 125 mg at night 5 to 17 years, 250 mg at night</td>
</tr>
</tbody>
</table>

1. See [BNF for children](https://www.gov.uk/government/publications/nice-guidance) for appropriate use and dosing in specific populations, for example, hepatic impairment and renal impairment.
2. Choose antibiotics according to recent culture and susceptibility results where possible. If 2 or more antibiotics are appropriate, choose the antibiotic with the lowest acquisition cost.
3. The age bands apply to children of average size and, in practice, the prescriber will use the age bands in conjunction with other factors such as the severity of the condition and the child's size in relation to the average size of children of the same age. Doses given are by mouth using immediate release medicines, unless otherwise stated.

Abbreviations: eGFR, estimated glomerular filtration rate.

When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.
Diagnosis

- Symptoms (see 'Typical symptoms' box)
- Diagnostic tools (see 'Diagnostic tools' box)
- Previous response to treatment for acute episodes of UTI

You can consider diagnosis of UTI if patient has a strong symptom profile, even in the absence of culture-positive urine or dipstick confirmation if leucocytes are present.

Patient with recurrent UTI

(confirmed by clinical history, diagnostic tools, two UTIs in past 6 months or three UTIs in past 12 months)

Uncomplicated rUTI

- No structural or functional abnormality of the urinary tract
- Non-pregnant woman
- Typical causative pathogen(s)

Lifestyle modifications

- Fluid intake in patients with inadequate fluid intake
- Treat constipation/diarrhoea
- Post-coital voiding
- Optimise diabetic control

Symptoms persist

Typical symptoms of UTI

- Dysuria
- Frequency
- Suprapubic tenderness
- Urgency
- Polyuria
- Haematuria

Note: elderly patients are often unable to provide a history of acute urinary symptoms due to delirium or dementia

Diagnostic tools

- Dipstick (do not use for catheterised patients or asymptomatic patients)
- Midstream urine (add clinical details to request form)
- Consider urinary tract ultrasound (including post-void residual volume) in Proteus infections and non-responders
- Urine culture
- Urine microscopy
- Urinary tract ultrasound
- Cystoscopy

Complicated rUTI

- Pregnant
- Men
- Structural or functional abnormality of the urinary tract
- Atypical infections (e.g., tuberculosis and schistosomiasis)
- Resistant bacteria

Consider specialist referral according to local pathways

Red flag

- Persistent haematuria
- Referral for suspected cancer
CASE STUDY 1

• Fiona is a 23 year old female. Over the last 12 months, she has had multiple urinary tract infections. She is sometimes able to self manage these, buying ‘sachets’ over the counter and increasing fluid intake – but has also had to take time off work on 5 occasions to see her GP for an antibiotic prescription. She is fed up.

• What would you do?
CASE STUDY 2

• Maggie is a 52 year old female. Over the last 18 months she has been increasingly bothered by recurrent episodes of 'cystitis'. She has not had a problem with UTI's in the past. She has had several courses of antibiotics. MSU's show pyuria, often with growth of E coli.

• What would you do?
• Anne is 64. She has had a number of episodes recently of cystitis like symptoms – frequency, urgency, dysuria. Her urine is cloudy during these episodes. Urine dip sometimes shows pyuria, lab tests are often negative. Her symptoms respond to short courses of antibiotics, but never completely settle. Within 2 or 3 weeks after completing a course of antibiotics, her symptoms return. She does not have any haematuria, either visibly or on dipstick testing.

• What would you do?
“Computers in the future may weigh no more than 1.5 tons”

Popular Mechanics, 1949

I think there is a world market for maybe 5 computers”

Thomas Watson, Chairman of IBM, 1943
SUMMARY

- Avoid treating ASB as recurrent UTI
- A negative dip / MSU does NOT exclude UTI
- Women with recUTI know when they have an infection – believe them
- Think non-antibiotic prophylaxis wherever possible
- Refer complicated recUTI for urological assessment