### Treating Your Infection – Urinary Tract Infection (UTI)

For women outside care homes with suspected uncomplicated urinary tract infections (UTIs) or uncomplicated recurrent UTIs

#### Possible urinary symptoms

| Frequency:  passing urine (wee) more often than usual. 1 | Dysuria: burning pain when passing urine. 1,2 |
| Urgency:  feeling the need to pass urine immediately. 1 |
| Haematuria:  blood in your urine. 1 |
| Nocturia:  needing to pass urine in the night. 3 |
| Suprapubic pain:  pain in your lower tummy. 1 |
| Other things to consider: |
| Recent sexual history 2,4 |
| • Some sexually transmitted infections (STIs) can have symptoms similar to those of a UTI. 5 |
| • Inflammation due to sexual activity can feel similar to the symptoms of a UTI. 3 |

#### The outcome

- Mild, or 1 to 2, symptoms or vaginal discharge (or both) 6
  - Antibiotics less likely to help. 5
  - Usually lasts 5 to 7 days. 23
- Severe, or 3 or more, symptoms and no vaginal discharge 5
  - Antibiotics are likely to help; 1,12 symptoms:
    - Should start to improve within 48 hours. 11
    - Usually last 3 days. 1

#### Recommended care

- Self-care and pain relief 7
  - Symptoms are likely to get better on their own. 6,8
- Antibiotic prescription 9
  - Immediate treatment with antibiotics, 3,14,15 plus self-care. 7

#### Types of urinary tract infection (UTI)

- UTIs are caused by bacteria getting into your urethra or bladder, usually from your gut. 16 Infections may occur in different parts of the urinary tract. 16
  - Kidneys (make urine) 16
    - Infection in the upper urinary tract 16
      - Pyelonephritis (pie-lo-nef-right-is)
  - Bladder (stores urine) 16
    - Infection in the lower urinary tract 16
      - Cystitis (sis-tight-is)
  - Urethra (takes urine out of the body) 16
    - Infection or inflammation in the urethra 16
      - Urethritis (your-ith-right-is)

#### Options to help prevent a UTI

- It may help you to consider these risk factors: 17
- Stop the spread of bacteria from your gut into your bladder. 17
  - Wipe from front (vagina) to back (bottom) when you go to the toilet. 25
- Avoid waiting to pass urine. 17
  - Pass urine as soon as you need a wee. 17
  - Go for a wee after having sex to flush out any bacteria that may be near the opening to the urethra. 17,26
- Wash the external vagina area with water before and after sex to wash away any bacteria that may be near the opening to the urethra. 1,25
- Drink enough fluids to make sure you wee regularly throughout the day, especially during hot weather. 17,18
- If you have a recurrent UTI, also consider the following: 17
  - Cranberry products: Some women find these effective, but there is currently little evidence to support this. 17
  - After the menopause: You could consider topical hormonal treatment, 17,26 for example, vaginal creams. 26

#### Self-care to help yourself get better more quickly

- Drink enough fluids to stop you feeling thirsty. Aim to drink 6 to 8 glasses, including water, decaffeinated and sugar-free drinks. 17,18
- Take paracetamol or ibuprofen at regular intervals for pain relief, if you have had no previous side effects. 21
- You could try taking cranberry capsules or cystitis sachets. These are effective for some women. There is currently little evidence to support their use. 21
- Consider the risk factors in the ‘Options to help prevent UTI’ column to reduce future UTIs. 17

#### When should you get help?

Contact your GP practice or contact NHS 111 (England), NHS 24 (Scotland dial 111), or NHS direct (Wales dial 0845 4647) or GP practice (N.Ireland)

#### Antibiotic resistance

- Antibiotics may not always be needed, only take them after advice from a health professional. 17
- This way they are more likely to work if you have a UTI in the future. 28
- Antibiotics taken by mouth, for any reason, affect our gut bacteria. 29
  - These bacteria become resistant to antibiotics we take. 29
- Antibiotic resistance means that the antibiotics cannot kill that bacteria. 27,29
- The gut bacteria that cause UTIs are twice as likely to be resistant to antibiotics for at least 6 months after you have taken any antibiotic. 29
- Common side effects to taking antibiotics include thrush, rashes, vomiting and diarrhoea. 30
References:


   **RATIONALE:** A SIGN guideline, outlining symptoms of bacterial urinary tract infections as: dysuria; frequency of urination; suprapubic tenderness; urgency; polyuria; haematuria. Expert consensus is that, in women with symptoms of vaginal itch or discharge, alternative diagnoses to UTI should be explored. This guideline also provides details of UTI symptoms suggestive of pyelonephritis, including: loin pain; flank tenderness; fever; rigors; other manifestations of systemic inflammatory response, and suggests admission to hospital if there is no response to antibiotic treatment within 24 hours.


   **RATIONALE:** A systematic review of diagnostic studies, aiming to review the accuracy and precision of history taking and physical examination for the diagnosis of UTI in women. Results indicated that the presence of vaginal discharge or vaginal irritation substantially reduced the probability of UTI to around 20%. Additionally, this review states that dysuria with frequency together increase the chances of UTI to 90%. This review also identifies symptoms of pyelonephritis as: fever; back pain; nausea; vomiting.


   **RATIONALE:** An editorial, exploring the prevalence of nocturia in different age groups of both men and women with lower urinary tract infections. Results indicate that whilst nocturia is more prevalent in adults over the age of 75, it does occur in all ages with bacterial urinary tract infections. As there is no universally accepted definition of nocturia, there is a wide variation in the reported prevalence of nocturia. Nevertheless, nocturia is a common symptom, with similar prevalence in both men and women across all ages, with proven UTI (men 16% to 55%; women 9% to 51%).


   **RATIONALE:** A case-control study of two populations in Seattle (USA), in which 229 university women and female health maintenance organisation enrollees with recurrent urinary tract infections were recruited. Independent risk factors for recurrent UTIs included: intercourse frequency within the previous month without washing (OR 5.8; 95% CI 3.1 to 10.6); spermicide use in the last 12 months (OR 1.8; 95% CI 1.1 to 2.9); new sexual partner during the past year (OR 1.9; 95% CI 1.2 to 3.2). Advice is given on how to prevent recurrent UTIs, including: voiding after intercourse;
increased fluid intake; avoiding use of condoms with spermicide-coated lubricants.


**RATIONALE:** A cross-sectional sample study, aiming to determine if urinary symptoms or urinary tract infections were associated with sexually transmitted infections, and which history, clinical, and laboratory findings could distinguish these infections in symptomatic women. 296 sexually active females between the ages of 14 and 22 attending a hospital-based teen health centre or emergency department were recruited. Genitourinary symptoms, medical and sexual history, and urinalysis results were recorded. An STI was defined as a vaginal swab positive for *Trichomonas vaginalis*, or a urine nucleic acid amplification test positive for *Neisseria gonorrhoeae*, or *Chlamydia trachomatis*. A urine culture with >10,000 colonies of a single pathogen was considered to be a positive UTI. In the full sample, prevalence of UTI and STI were 17% and 33%, respectively, and neither urinary symptoms or confirmed UTI were significantly associated with STI. Further analyses of the 51% with urinary symptoms indicated that positive urine leukocytes, more than one partner in the last three months, and a history of STI predicted STI. Urinalysis results identified four groups: normal urinalysis (67% had no infection); positive nitrites or protein (55% had UTI); positive leukocytes or blood (62% had STI); both nitrites/protein and leukocytes/blood positive (28% had STI and 65% had UTI). The authors conclude that, since there is a similarity in symptoms, adolescent females with urinary symptoms should be tested for both UTI and STIs. Urinalysis results may also be helpful to direct initial therapy.


**RATIONALE:** A PHE guideline, suggesting that, if a patient presents with three or more severe symptoms of UTI and no vaginal discharge or irritation, empirical antibiotic treatment should be given. If a patient presents with two mild symptoms of UTI, a urine specimen should be obtained and self-management advice should be given. In this case, antibiotics are less likely to be required, as most clear up with no treatment. If a sample is taken and the urine is not cloudy (97% negative predictive value), another diagnosis should be considered. If the urine is cloudy (92% positive predictive value), a dipstick with nitrite should be performed to confirm a diagnosis. This guideline also states that time should be allowed to review the specimen and treatment options, so a delayed antibiotic strategy can be implemented whilst the urine sample is sent for culture.

RATIONALE: A randomised controlled trial across 42 German general practices, aiming to determine if treatment of symptoms of uncomplicated UTI with ibuprofen can reduce the rate of antibiotic prescriptions without a significant increase in symptoms, recurrences, or complications. 494 women aged between 18 and 65 with typical symptoms of uncomplicated UTI were included and randomly assigned to one of two treatment arms: a single dose of fosfomycin 3g for three days (n=246), or ibuprofen 3 x 400mg for three days (n=248). In both groups, additional antibiotic treatment was subsequently prescribed as necessary for persistent, worsening, or recurrent symptoms. Results indicated that, out of the 248 women in the ibuprofen group, two thirds treated symptomatically recovered without any antibiotics. Recurrent urinary tract infections were more common in the fosfomycin group. This trial also indicated that mild to moderate urinary symptoms given an anti-inflammatory agent and not treated with empirical therapy can last for a mean average of 5.6 days. The authors conclude that, although they cannot generally recommend ibuprofen as first-line treatment for uncomplicated UTI in women, the treatment option can be discussed with women with mild to moderate symptoms in a shared decision making approach, or within a strategy of delayed prescribing.


RATIONALE: A prospective, multicentre, randomised double-blind and placebo controlled trial, including 1,143 women over 18 consulting for symptoms suggestive of uncomplicated lower UTI. This trial described natural course as the spontaneous eradication of both symptoms and bacteriuria. Spontaneous cure rate of symptoms was recorded at 28% after seven days, and 37% had neither symptoms nor bacteriuria by five to seven weeks. At seven days, however, the majority of uropathogens responsible for uncomplicated UTIs were starting to be eradicated, including E. coli (170 isolates).


RATIONALE: A prospective cohort study, investigating how many women presenting with UTI symptoms were willing to delay antibiotic treatment when asked by their general practitioner. 137 of 176 women were asked by their GP to delay antibiotic treatment, and 37% (51/137) were willing to delay. After one week, 55% (28/51) of delaying women had not used antibiotics, with 71% (20/28) reporting clinical improvement of cure, and none of the participating women developing pyelonephritis. This study supports the findings of two earlier studies, suggesting that women with UTIs prefer not to take antibiotics, and are open to alternative management approaches, including the delayed use of antibiotics.

**RATIONALE:** A randomised controlled trial of 309 women, to assess five UTI management strategies: empirical antibiotics; empirical delayed (by 48 hours) antibiotics; targeted antibiotics based on a symptom score, a dipstick result, or a positive midstream urine analysis. All participants were also given written information on symptom management specific to their management approach. Patients had 3.5 days of moderately bad symptoms if they took antibiotics immediately, and there were no significant differences in duration or severity of symptoms between the five groups. Patients who waited at least 48 hours to start taking antibiotics reconsulted less (HR 0.57; CI 0.36 to 0.89; p=0.014), but on average had symptoms for 37% longer than those taking immediate antibiotics. The authors conclude that antibiotics targeted with dipstick tests and delayed prescriptions as back-up, or empirical delayed prescriptions, help to reduce antibiotic use.


**RATIONALE:** A collation of six studies, aiming to estimate clinical and dipstick predictors of infection and develop and test clinical scores, and to compare management using clinical and dipstick scores with commonly used alternative strategies. The results showed that, in women with uncomplicated UTI, the negative predictive value when nitrite, leukocytes, and blood are all negative was 76%. The positive predictive value for having nitrite and either blood or leukocytes was 92%. Moderate to severe UTI is defined as having a higher symptom score of two or more of: urine cloudiness; smell; nocturia; dysuria. Results also suggested that women suffer 3.5 days of moderately bad symptoms with immediate antibiotics, and 4.8 days if taking antibiotics is delayed for 48 hours. The authors conclude that, to achieve good symptom control and reduce antibiotic use, clinicians should either offer a 48-hour delayed antibiotic prescription to be used at the patient’s discretion, or target antibiotic treatment by dipsticks (positive nitrite or positive leukocytes and blood) with the offer of a delayed prescription if dipstick results are negative. Those treated with empirical therapy should, however, seek further advice if their symptoms do not start to improve within 48 hours.


**RATIONALE:** An ACOG practice bulletin, suggesting that empirical antibiotics are likely to help in women with three or more symptoms of UTI, and that it is reasonable
to start these without first performing a urine culture. The authors advise that it is common practice to empirically treat women with three or more symptoms of a lower UTI without performing laboratory analyses. It has been considered a cost-effective strategy, decreasing the number of diagnostic tests.


RATIONALE: A systematic review and meta-analysis of 21 studies, involving 6,016 participants. The authors found that trimethoprim/sulfamethoxazole (TMP-SMX) was as effective as fluoroquinolones in achieving short-term (RR 1.0; 95% CI 0.97 to 1.03) and long-term (RR 0.99; 95% CI 0.94 to 1.05) symptomatic cure. Beta-lactam drugs were as effective as TMP-SMX for short-term (RR 0.95; 95% CI 0.81 to 1.12) and long-term (RR 1.06; 95% CI 0.93 to 1.21) symptomatic cure. Short-term cure for nitrofurantoin was similar to that of TMP-SMX (RR 0.99; 95% CI 0.95 to 1.04), as was long-term symptomatic cure (RR 1.01; 95% CI 0.94 to 1.09). Fluoroquinolones were more effective than beta-lactams for short-term bacteriological cure (RR 1.22; 95% CI 1.13 to 1.31). The authors conclude that no differences were observed between the classes of antimicrobials included in this review for the symptomatic cure of uncomplicated UTI. Fluoroquinolones proved more effective than beta-lactams for the short-term bacteriological outcome, with little clinical significance, but should be reserved for the treatment of pyelonephritis. Individualised treatment should take into consideration the predictable susceptibility of urinary pathogens in local areas, possible adverse events, resistance development, and patient preference.


RATIONALE: A systematic review and meta-analysis of five double-blind randomised controlled trials, assessing the benefits of antibiotics versus placebo in 1,407 patients. Antibiotics included were pivmecillinam, nitrofurantoin, cefixime, co-trimoxazole, and amoxicillin. The results of the meta-analysis provided evidence that clinical success was significantly more likely in women treated with antibiotics versus those treated with placebo (OR 4.81; 95% CI 2.51 to 9.21; four RCTs, n=1,062). Antibiotics were also superior to placebo, regarding cure (OR 4.67; 95% CI 2.34 to 9.35; four RCTs, n=1,062); microbiological eradication at the end of treatment (OR 10.67; 95% CI 2.96 to 38.43; three RCTs, n=967); microbiological eradication after the end of treatment (OR 5.38; 95% CI 1.63 to 17.77; three RCTs, n=738); microbiological reinfection or relapse (OR 0.27; 95% CI 0.13 to 0.55; five RCTs, n=843). Adverse events were more likely to occur in antibiotic-treated patients versus placebo-treated patients (OR 1.64; 95% CI 1.10 to 2.44; four RCTs, n=1,068). No difference was found between the compared treatment arms regarding study
withdrawal from adverse events, the development of pyelonephritis, or the emergence of resistance.


**RATIONALE:** A review of the literature, suggesting that bacteriological cure rates with pivmecillinam are consistently more than 85%, therefore suggesting that a three day course is appropriate for the treatment of uncomplicated urinary tract infections. Findings from a range of studies have indicated that: at early post-therapy follow-up, bacteriological cure rate for pivmecillinam is 75%; after four days, there is a satisfactory clinical response in 95% of subjects; after 11 days, 82% of subjects receiving pivmecillinam had achieved clinical cure (95% CI 0.9% to 10.3%). Another clinical trial compared pivmecillinam 200mg TDS for second days, and 400mg BD for three days, compared with placebo. Of the 69% bacteriologically evaluable patients, eight to ten days after therapy, cure rates were 85%, 90%, 79%, and 28%, respectively. This suggests that both seven day regimens were better than the three day regimen (p=0.002), but the seven day TDS regimen showed only a trend to improved outcome (p=0.068). The authors conclude that a seven day treatment regimen gives better outcomes than a three day course, but clinical response may be better than bacteriological response on different types of UTI. The authors also state that the shorter three day course of pivmecillinam would be effective empirical therapy for the majority of women with uncomplicated UTI, particularly premenopausal women.


**RATIONALE:** A NICE guideline, stating that urinary tract infections are caused by the presence and multiplication of micro-organisms in the urinary tract. This guideline states that urinary tract infections can result in several clinical syndromes, including acute and chronic pyelonephritis (infection of the kidney and renal pelvis), cystitis (infection of the bladder), urethritis (infection of the urethra), epididymitis (infection of the epididymis), and prostatitis (infection of the prostate gland). A urinary tract infection is defined by a combination of clinical features and the presence of bacteria in the urine.


**RATIONALE:** An SAPG guideline, providing a thorough overview of the management of recurrent urinary tract infections. This guideline provides advice about simple measures to limit recurrent UTI, including: better hydration; urge initiated voiding and
postcoital voiding; cranberry products; stand-by antibiotics; intra-vaginal or oral oestrogens for post-menopausal women. This guideline also stresses the importance of confirming UTI diagnoses, and investigating underlying causes if simple measures are not effective.


RATIONALE: An ARHAI report, noting that mandatory surveillance over the past ten years has demonstrated a sustained increase in E. coli bacteraemia, that is unexplained by improved diagnosis. The analysis demonstrates that only a small proportion of infections are related to urinary catheterisation. Other risk factors, such as repeated urinary tract infections treated by sub-optimal antibiotic prescribing, and inadequate hydration, have a significant impact. The surveillance report shows that E. coli bacteraemia peaks in the summer months, which may also be due to poor urine output associated with dehydration. The report recommends that: all organisations providing care to patients with indwelling urinary catheters should ensure that the recommendations of EPIC 3 (short-term catheters) and NICE (long-term catheters) are being implemented, and provide evidence of compliance; hydration status must be a priority for those at risk of dehydration, particularly those in hospitals and long-term care facilities; treatment of UTI should be based on local antibiotic resistance patterns, and patients diagnosed with a UTI (especially those with a history of repeated infections) should be subject to a safety-netting procedure to ensure that treatment has been effective.


RATIONALE: A systematic review and meta-analysis of ten randomised controlled trials and 1,494 participants. Administration of cranberry-containing products differed significantly in form, daily dosage, proanthocyanidins content, and dosing frequency. Cranberry-containing products seemed to be more effective in women with recurrent UTIs (RR 0.53; 95% CI 0.33 to 0.83; I²=0%); female populations (RR 0.49; 95% CI 0.34 to 0.73; I²=34%); children (RR 0.33; 95% CI 0.16 to 0.69; I²=0%); cranberry juice users (RR 0.47; 95% CI 0.30 to 0.72; I²=2%); people using cranberry-containing products more than twice daily (RR 0.58; 95% CI 0.40 to 0.84; I²=18%). The authors conclude that cranberry-containing products are associated with a protective effect against UTI. However, the results should be interpreted in the context of substantial heterogeneity across trials.

A systematic review of 24 studies and 4,473 participants, comparing cranberry products with control or alternative treatments. There was a small trend towards fewer UTIs in people taking cranberry products, compared to placebo or no treatment, but this was not a significant finding. Many participants stopped drinking the juice, suggesting it may not be an acceptable intervention. In the long-term, cranberry products were ineffective, possibly due to the lack of potency of the active ingredient. Four of the five studies in women with recurrent UTI (n=594), which included a placebo group, provided data that could be combined in a meta-analysis. Results demonstrated a small, non-significant reduction in the risk of repeat symptomatic UTI with cranberry treatment, compared to placebo or no treatment (RR 0.74; 95% CI 0.42 to 1.31). Two studies in women with recurrent UTI, and one study in children, compared cranberry capsules or syrup with antibiotic prophylaxis. Meta-analysis of the two studies in women showed that cranberry products, compared to antibiotics, were equally as effective in reducing the risk of repeat UTI (RR 1.31; 95% CI 0.85 to 2.02). The study in children also showed that the cranberry products, compared to antibiotics, were equally as effective in reducing the risk of repeat symptomatic UTI (RR 0.69; 95% CI 0.32 to 1.51).

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RATIONALE: A CKS guideline, providing advice for six different scenarios of uncomplicated urinary tract infections in women. For recurrent UTI, this guideline states that cranberry products and urine alkalinising agents should not be recommended, as there is currently no good evidence to support their use. This guideline also states that women should seek medical attention if they develop fever, loin pain, or do not respond to treatment.

RATIONALE: A NICE guideline, stating that people with sepsis may have non-specific, non-localised presentations, such as feeling generally unwell without a high temperature of over 38°C. This guideline presents a risk stratification tool for adults, children and young people aged 12 years and over with suspected sepsis. Where high temperature is recognised as a cause for concern, this guideline also lists a tympanic temperature of less than 36°C as a moderate to high risk criteria for sepsis.

RATIONALE: A UK Sepsis Trust website, stating that if someone has early signs of a flu-like illness, chest infection, diarrhoea and vomiting, or an inability to eat and drink, together with one of the symptoms of sepsis, immediate medical advice should be
sought. This website defines the symptoms of sepsis as: slurred speech; extreme shivering or muscle pain; passing no urine (in a day); severe breathlessness; skin mottled or discoloured.


**RATIONALE:** A UK Sepsis Trust guideline, stating that sepsis is caused by the way the body responds to an infection, which may have started anywhere in the body. This guideline also outlines the symptoms of sepsis as: a drop in blood pressure; fast heart beat; breathlessness; mottled skin; lack of urination; difficulty breathing; confusion and disorientation.


**RATIONALE:** A retrospective study, aiming to determine the association of UTI with genital hygiene practices and sexual activity in pregnant women. 200 pregnant women attending prenatal clinics in Saudi Arabia between January 2011 and June 2014 were included. 80 women who had positive urine cultures were compared with the remaining 120 healthy women. Results indicated that *E. coli* was the infecting organism in 83% of cases. Factors associated with UTI included sexual intercourse more than three times a week (OR=5.62); recent UTI (OR=3.27); not washing genitals pre-coitus (OR=2.16); not washing genitals post-coitus (OR=8.62); wiping genitals from back to front (OR=2.96). The authors state that genital hygiene practices such as frequency of coitus, urinating after coitus, washing genitals pre- and post-coitus, taking baths, frequent replacing of underwear, and wiping genitals from front to back were associated with a reduced frequency of UTIs. Women who usually urinated within 15 minutes of intercourse also had a lower likelihood of developing a UTI than women who did not urinate after intercourse. The authors conclude that urinary tract infection in these women were primarily caused by bacteria from the stool (*E. coli*), and that hygiene habits and sexual behaviour may play a role in the occurrence of UTIs.


**RATIONALE:** A randomised controlled trial, including 108 postmenopausal women, aiming to detect a difference in time until the first recurrence of a urinary tract infection during treatment with an estradiol-releasing silicone vaginal ring, versus no oestrogen treatment. 53 women were randomly assigned to the Estring group, and 55 were assigned to the control group. Results indicated that approximately 45% of the women with the vaginal ring remained free of disease, in comparison to approximately 20% in the control group (p=.008). Estring lowered vaginal pH, and the time to first recurrence was effectively prolonged by Estring treatment. The
authors conclude that the use of vaginal oestrogen can be considered for the prevention of recurrent UTI in postmenopausal women.


**RATIONALE:** A review article, stating that serious infections caused by bacteria that have become resistant to commonly used antibiotics have become a major global healthcare problem in the 21st century. This review states that the single largest cause of antibiotic resistance is the indiscriminate and inappropriate use of antibiotics in outpatient clinics, hospitalised patients, and in the food industry. The authors state that antibiotics should only be taken on advice from a healthcare professional for a bacterial infection that shows susceptibility to that particular antibiotic. This review also states that new mechanisms of resistance have resulted in the simultaneous development of resistance to several antibiotic classes, creating very dangerous multidrug-resistant bacterial strains, also known as 'super-bugs’. The potential negative consequences of this are that they put society at risk for the spread of potentially serious multi-drug resistant bacterial infections.


**RATIONALE:** A retrospective study, in which all bacteria isolated from urine samples with microbiological confirmation of a urinary tract infection in a Spanish reference hospital over a seven year period were analysed. A total of 31,758 uropathogens were isolated, with *Escherichia coli* accounting for the majority of these (55.2%). The authors state that the high incidence of UTIs call for empiric antibiotic treatment in most cases. However, providing rational empiric treatment requires identifying the microorganisms involved and establishing their antibiotic susceptibility patterns, especially with *E. coli*. The authors conclude that nitrofurantoin and fosfomycin can be first-choice antibiotics for the treatment of uncomplicated community-acquired cystitis. However, previous use of these antibiotics can lead to increased resistance, so surveillance studies are required to detect resistance, given that an increase in uropathogen resistance rates may contraindicate its future use.


**RATIONALE:** A systematic review and meta-analysis, aiming to investigate subsequent antibiotic resistance in individuals prescribed antibiotics in primary care. 24 studies were included, 22 of which involved patients with symptomatic infection, and two of which involved healthy volunteers. In five studies of urinary tract bacteria
(14,348 participants), the pooled odds ratio for resistance was 2.5 (95% CI 2.1 to 2.9) within two months of antibiotic treatment, and 1.33 (95% CI 1.2 to 1.5) within 12 months. Studies reporting the quantity of antibiotic prescribed found that longer duration and multiple courses were associated with higher rates of resistance. The authors conclude that individuals prescribed an antibiotic in primary care for a urinary infection develop bacterial resistance to that antibiotic. The effect is greatest in the month immediately following treatment, but may persist for up to 12 months. This effect not only increases the population carriage of organisms resistant to first line antibiotics, but also creates the conditions for increased use of second-line antibiotics in the community.


RATIONALE: A retrospective study, aiming to explore the views of women with urinary tract infections on the acceptability of different strategies for managing the infection, including delayed use of antibiotics, and the cause of infection. 21 women presenting to general practices across Southern England were included. Results indicated that women preferred not to take antibiotics, and were open to alternative management approaches, due to wanting to avoid the side-effects of antibiotic therapy. Most of the participants with experience of antibiotic use had developed thrush, skin rash, and gastrointestinal side-effects as a consequence, and this mediated their desire for antibiotic medication. The authors conclude that if women are asked to delay taking antibiotics, the clinician must address the particular worries that women might have, and explain the rationale for not using antibiotics immediately.