SECTION 18: ANTIMICROBIAL PRESCRIBING

Formulary and Prescribing Guidelines
18.1 Aims

- To provide a simple, safe, effective, economical empirical and evidence based approach to the treatment of common infections
- To minimise the emergence of bacterial resistance in the community

18.2 Principles of Treatment

18.2.1 This guidance is based on the best available evidence but professional judgment should be used and patients should be involved in the decision.

18.2.2 It is important to initiate antibiotics as soon as possible for severe infection. If sepsis is suspected antibiotic treatment should be initiated within an hour preferably by transferring the patient to an acute hospital.

18.2.3 A dose and duration of treatment for adults is usually suggested, but may need modification for age, weight and renal function. In severe or recurrent cases consider a larger dose or longer course.

18.2.4 Have a lower threshold for antibiotics in immunocompromised or those with multiple morbidities; consider culture and seek advice.

18.2.5 Prescribe an antibiotic only when there is likely to be a clear clinical benefit. Prescriptions should state the indication and course length or review date on the medicines chart and in the medical notes.

18.2.6 Consider a no, or delayed, antibiotic strategy for acute self-limiting upper respiratory tract infections e.g. sore throat, sinusitis, otitis media

18.2.7 Limit prescribing over the telephone to exceptional cases.

18.2.8 Use simple generic antibiotics if possible. Avoid broad spectrum antibiotics (e.g. co-amoxiclav, quinolones and cephalosporins) when narrow spectrum antibiotics remain effective, as they increase risk of *Clostridium difficile*, MRSA and resistant UTIs.

18.2.9 Avoid widespread use of topical antibiotics (especially those agents also available as systemic preparations, e.g. fusidic acid).

18.2.10 In pregnancy, take specimens to inform treatment; where possible AVOID tetracyclines, aminoglycosides, quinolones, *high dose* metronidazole (2 g). Short-term use of nitrofurantoin (at term, theoretical risk of neonatal haemolysis) is unlikely to cause problems to the foetus. Trimethoprim is also unlikely to cause problems unless poor dietary folate intake or taking another folate antagonist e.g. antiepileptic. Trimethoprim is unlicensed for use in pregnancy and folate supplementation is recommended particularly in the first trimester due to the theoretical risk of congenital malformations.

18.2.11 For information on the recognition and management of allergies, please refer to CG27 Medical Emergencies

18.2.12 For further information on the antimicrobial choices below, such dosing information in renal and/or hepatic impairment, please refer to the eBNF.

18.2.13 Antibiotics more likely to cause *C. difficile* infection are: quinolones, co-amoxiclav, clindamycin and cephalosporins. If patients develop diarrhoea and *C.
difficile infection is suspected, send a stool sample and treat as per the guidance below.

18.2.14 Fluoroquinolone antibiotics (ciprofloxacin, levofloxacin, ofloxacin) can cause disabling and long-lasting/irreversible side effects of muscles, tendons, bones (including tendonitis and tendon rupture) and the nervous system, and should not be prescribed for:

- non-severe or self-limiting infections, or non-bacterial infections
- mild to moderate infections (such as in acute exacerbation of chronic bronchitis and chronic obstructive pulmonary disease) unless other antibiotics that are commonly recommended for these infections are considered inappropriate (for example, when first-line antibiotics are unsuitable due to resistance, contraindications, or intolerance, or if first-line treatments have failed.)
- uncomplicated cystitis (for which ciprofloxacin or levofloxacin were previously authorised) unless other antibiotics that are commonly recommended are considered inappropriate (for example, when first-line antibiotics are unsuitable due to resistance, contraindications, or intolerance, or if first-line treatments have failed.)

Avoid co-administration with corticosteroids since this could exacerbate fluoroquinolone-induced tendinitis and tendon rupture. Avoid use in patients who have previously had serious adverse reactions with a quinolone or fluoroquinolone antibiotic. Prescribe with special caution in people older than 60 years and for those with renal impairment or solid-organ transplants because they are at a higher risk of tendon injury.

Prescribers of fluoroquinolones should advise patients to stop treatment at the first signs of a serious adverse reaction, such as tendinitis or tendon rupture, muscle pain, muscle weakness, joint pain, joint swelling, peripheral neuropathy, and central nervous system effects, and to contact their doctor immediately for further advice. Fluoroquinolone treatment should be discontinued at the first sign of tendon pain or inflammation in patients and the affected limb or limbs appropriately treated (for example with immobilisation). 18

18.3 Sepsis

Please refer to NICE Guideline 51 for full information on Sepsis.

Whenever a person presents with signs or symptoms that indicate possible infection think ‘could this be sepsis?’ Take into account that people with sepsis may have non-specific, non-localised presentations, for example feeling very unwell, and may not have a high temperature. Pay particular attention to concerns expressed by the person and their family or carers, for example changes from usual behaviour. Assess people who might have
sepsis with extra care if they cannot give a good history (for example, people with English as a second language or people with communication problems).

Assess people with any suspected infection to identify:
- possible source of infection
- factors that increase risk of sepsis
- Any indications of clinical concern, such as new onset abnormalities of behaviour, circulation or respiration.

Refer all people with suspected sepsis outside acute hospital settings for emergency medical care by the most appropriate means of transport (usually 999 ambulance) if:
- they meet any high risk criteria (see tables 1, 2 and 3 of NICE Guideline 51) or
- they are aged under 17 years and their immunity is impaired by drugs or illness and they have any moderate to high risk criteria.

Assess all people with suspected sepsis outside acute hospital settings with any moderate to high risk criteria to:
- make a definitive diagnosis of their condition
- decide whether they can be treated safely outside hospital.

If a definitive diagnosis is not reached or the person cannot be treated safely outside an acute hospital setting, refer them urgently for emergency care.
Provide people with suspected sepsis, who do not have any high or moderate to high risk criteria information about symptoms to monitor and how to access medical care if they are concerned.
## Upper Respiratory Tract Infections: Consider Delayed Antibiotic Prescriptions

<table>
<thead>
<tr>
<th>Infection</th>
<th>First Choice</th>
<th>BNF Dosage / Length of Treatment</th>
<th>Second Choice</th>
<th>BNF Dosage / Length of Treatment</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Acute Sore Throat</td>
<td>Penicillin V</td>
<td>Mild: 500mg QDS or 1g BD 5 – 10 days</td>
<td>Clarithromycin (If Penicillin allergic)</td>
<td>250-500mg BD for 5 days</td>
<td>Majority of sore throats are viral and antibiotics are not indicated. Evidence suggests that antibiotics are clinically useful in less than 1% of cases. Note that all patients taking simvastatin should be advised to stop taking whilst receiving a course of clarithromycin. 10 days penicillin has lower relapse than 5 days in patients under 18 years. Use Fever PAIN scores to guide treatment. See Appendix 1 for the NICE treatment pathway</td>
</tr>
<tr>
<td>Acute Otitis Media in Children 0-18 years</td>
<td>Amoxicillin (refer to NICE NG91 for full list of antibiotics recommended)</td>
<td>Neonate 7-28 days 30mg/kg TDS 1 – 11 months: 125mg TDS 1-4 years: 250mg TDS 5-17 years: 500mg TDS FOR 5 to 7 DAYS</td>
<td>Erythromycin (If penicillin allergic). 1 month to 1 year 2-7 years 8-17 years</td>
<td>125mg QDS or 250mg BD 250mg QDS or 500mg BD 250-500mg QDS or 500mg to 1000mg BD FOR 5 to 7 DAYS</td>
<td>Avoid antibiotics as most get better within 3 days without; they only reduce pain at 2 days and do not prevent deafness. Advise on usual course of infection (3 to 7 days), managing symptoms, including pain, with self-care. Follow NICE treatment algorithm (Appendix 3) to establish options, and further advice to offer (no antibiotic prescription/ back-up antibiotic prescription/ immediate antibiotic prescription/ referral of patient to hospital if severe systemic infection or acute complications, including mastoiditis, meningitis, intracranial abscess, sinus...</td>
</tr>
<tr>
<td>Infection</td>
<td>First Choice</td>
<td>BNF Dosage / Length of Treatment</td>
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<td>BNF Dosage / Length of Treatment</td>
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<tr>
<td>Acute Otitis Media in ADULTS</td>
<td>Amoxicillin</td>
<td>500mg TDS for 5 days</td>
<td>Clarithromycin (if Penicillin allergic)</td>
<td>250-500mg BD for 5 days</td>
<td>Evidence suggests that antibiotics are unlikely to be beneficial unless patient has systemic symptoms. E.g. fever, vomiting.</td>
</tr>
<tr>
<td>Acute Otitis Externa</td>
<td>1st line: Analgesia for pain relief</td>
<td>2% TDS</td>
<td>Otomize® (Dexamathason e 0.1%, neomycin sulphate 3250unit/ml, glacial acetic acid 2%)</td>
<td>Spray THREE times daily for 7 days.</td>
<td>EarCalm® (acetic acid 2%) can be bought Over The Counter (OTC) Cure rates similar at 7 days for topical acetic acid (EarCalm) or antibiotic +/- steroid. If cellulitis or disease extending outside ear canal, start oral antibiotics, refer to ENT department to exclude malignant otitis externa.</td>
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<tr>
<td>Influenza</td>
<td>Oseltamivir unless pregnant</td>
<td>75mg BD for 5 days</td>
<td>Zanamivir (if there is resistance to oseltamivir or severe immunosuppression)</td>
<td>10mg BD (2 inhalations by diskhaler) for 5 days</td>
<td>Annual vaccination is essential for all those at risk of influenza. For otherwise healthy adults antivirals not recommended. Treat ‘at risk’ patients, ONLY within 48 hours of onset &amp; when influenza is circulating in the community or in a care home where influenza is likely. At risk: pregnant (including up to two weeks post-partum), 65 years or over, chronic respiratory disease (including COPD and asthma) significant cardiovascular disease (not hypertension), immunocompromised, diabetes mellitus, chronic neurological, renal or liver disease, morbidity (BMI &gt;40)</td>
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</tbody>
</table>

Doses are for patients with normal renal and hepatic function unless otherwise indicated.
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Acute Rhinosinusitis</strong>&lt;br&gt;(Sinusitis)</td>
<td>Penicillin V&lt;br&gt;For very unwell or worsening symptoms: Co-amoxiclav</td>
<td>500mg QDS for 5 days&lt;br&gt;625mg TDS for 5 days</td>
<td>Penicillin allergy or intolerance: Doxycycline OR Clarithromycin</td>
<td>200mg stat / 100mg OD for 4 days (5 days total)&lt;br&gt;500mg BD for 5 days</td>
<td>Symptoms &lt; 10 days: Avoid antibiotics as 80% resolve in 14 days without, and they only offer marginal benefit after 7 days Use adequate analgesia&lt;br&gt;Symptoms &gt; 10 days: Consider delayed antibiotic when purulent nasal discharge, severe localised unilateral pain, fever, marked deterioration Systemically very unwell or more serious signs/symptoms: Immediate antibiotic Avoid doxycycline in children under 12 and pregnant women See Appendix 1 for NICE treatment algorithm</td>
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<tr>
<td><strong>Suspected meningococcal disease</strong></td>
<td>IV or IM benzylpenicillin OR IV or IM Cefotaxime</td>
<td>Age 10+ years: 1200mg&lt;br&gt;Children 1 - 9 yr: 600mg&lt;br&gt;Children &lt;1 yr: 300mg&lt;br&gt;Age 12+ years: 2gram&lt;br&gt;Child &lt; 12 yrs: 50mg/kg</td>
<td></td>
<td></td>
<td>Transfer all patients to hospital immediately. If time before hospital admission, and non-blanching rash, give IV benzylpenicillin or cefotaxime, unless definite history of anaphylaxis. Rash is not a contraindication (Give IM if vein cannot be found) If known anaphylaxis, do not give antibiotics prior to hospital transfer. 2g cefotaxime is the recommended dose for out of hospital treatment</td>
</tr>
<tr>
<td>Infection</td>
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| LOWER RESPIRATORY TRACT INFECTIONS |              |                                  |               |                                  | Note: Low doses of penicillins are more likely to select out resistance. Do not use quinolone (ciprofloxacin, ofloxacin) first line due to poor pneumococcal activity. Reserve all quinolones (including levofoxacin) for proven resistant organisms. Fluoroquinolone antibiotics (ciprofloxacin, levofoxacin, ofloxacin) can cause disabling and long-lasting/ irreversible side effects of muscles, tendons, bones and the nervous system, and should not be prescribed for mild or moderately severe infections unless other antibiotics cannot be used.  
<p>| Acute cough &amp; bronchitis        | See Appendix 9 |                                  | See Appendix 9 |                                  | See NICE NG120 and algorithm in Appendix 9. Avoid doxycycline in children under 12 and pregnant women. Antibiotic little benefit if no co-morbidity. Consider immediate antibiotic (or backup prescription) if higher risk of complications. Offer an immediate antibiotic if systemically very unwell. Refer to NICE guideline on pneumonia in adults, for recommendations on prescribing antibiotics according to CRP results. Symptom resolution can take 3 weeks.  |
| Acute Exacerbation of COPD      | See Appendix 8 |                                  | See Appendix 8 |                                  | See NICE NG114 and algorithm in Appendix 8. An acute exacerbation of chronic obstructive pulmonary disease (COPD) is a sustained worsening of symptoms from a person's stable state. A range of factors (including viral infections and smoking) can trigger an exacerbation. Many exacerbations (including some severe exacerbations) are not caused by bacterial infections so will not respond to antibiotics. Avoid doxycycline in children under 12, pregnant and breastfeeding women. Treat exacerbations promptly with antibiotics if purulent sputum and increased shortness of breath and/or increased |</p>
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</table>
| **Community Acquired Pneumonia – treatment in the community** | If CRB65=0 Amoxicillin       | 500mg TDS for 7 days            | Doxycycline                 | 200mg stat / 100mg OD for 5* days 500mg BD for 5* days | Use CRB65 score to help guide and review: Each scores 1:  
- Confusion (AMT<8);  
- Respiratory rate >30/min;  
- BP systolic <90 or diastolic ≤ 60;  
- Age > 65 years  
Score 0: suitable for home treatment;  
Score 1-2: hospital assessment or admission  
Score 3-4: urgent hospital admission  
Give immediate IM benzylpenicillin or amoxicillin 1G po if delayed admission/life threatening  
Mycoplasma infection is rare in over 65s  
*Review at 3 days and increase to 7 – 10 days if poor response |
| If CRB65=1 & AT HOME Doxycycline alone | 200 stat / 100mg OD for 7-10 days | Doxycycline                 | 200mg stat / 100mg OD for 5* days 500mg BD for 5* days | Use CRB65 score to help guide and review: Each scores 1:  
- Confusion (AMT<8);  
- Respiratory rate >30/min;  
- BP systolic <90 or diastolic ≤ 60;  
- Age > 65 years  
Score 0: suitable for home treatment;  
Score 1-2: hospital assessment or admission  
Score 3-4: urgent hospital admission  
Give immediate IM benzylpenicillin or amoxicillin 1G po if delayed admission/life threatening  
Mycoplasma infection is rare in over 65s  
*Review at 3 days and increase to 7 – 10 days if poor response |

**URINARY TRACT INFECTIONS.** Refer to Public Health England UTI guidance for diagnosis information:  
Take urine sample if new onset of delirium or one or more UTI symptoms

| UTI (lower), including pregnancy | See Appendix 5                | See Appendix 5                | See NICE NG109 and algorithm in Appendix 5. People > 65 years: do not treat asymptomatic bacteriuria; it is common but is not associated with increased morbidity |
| UTI (catheter)                  | See Appendix 4                | See NICE NG113 and algorithm in Appendix 4. Catheter in situ: antibiotics will not eradicate asymptomatic bacteriuria; only treat if systemically unwell or pyelonephritis likely |

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<th>BNF Dosage / Length of Treatment</th>
<th>Comments</th>
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<tbody>
<tr>
<td>UTI in children</td>
<td>See Appendix 5.</td>
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<td>See Appendix 5.</td>
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<td><strong>Do not use prophylactic antibiotics for catheter changes unless history of catheter-change-associated UTI</strong></td>
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<tr>
<td>See BNF for children for dosage</td>
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<td><strong>See NICE CG54, NG109 and algorithm in Appendix 5.</strong></td>
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<td>Child &lt;3 months: refer urgently for assessment</td>
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<td>Child 3 months or older but younger than 3 years, follow dipstick as per NICE CG54.</td>
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<td>Child 3 years or older:</td>
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<td>- If leukocyte esterase and nitrite positive, start antibiotics</td>
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<td>- If leukocyte esterase negative and nitrite positive, start antibiotics if tested on fresh urine sample and await cultures</td>
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<td></td>
<td></td>
<td>- If leukocyte esterase positive and nitrite negative, do not start antibiotics for UTI unless clinical evidence of UTI</td>
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<td>- If both leukocyte esterase and nitrite negative, do not start antibiotics</td>
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<td><strong>Send pre-treatment MSU for all.</strong></td>
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<td>Imaging: only refer if child &lt;6 months or atypical UTI</td>
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<td>Male children treat and refer</td>
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<td>If under 16 years old and presenting with unexplained fever (≥38°C), test urine sample within 24 hours</td>
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<td>For infants and children 3 months or older with acute pyelonephritis/upper urinary tract infection, treat with antibiotics in line with the NICE guideline</td>
</tr>
</tbody>
</table>

Doses are for patients with normal renal and hepatic function unless otherwise indicated

Approved by Medicines Management Group April 2019
### Infection  |  First Choice |  BNF Dosage / Length of Treatment |  Second Choice |  BNF Dosage / Length of Treatment |  Comments
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| **Acute pyelonephritis** | See Appendix 7. |  | See Appendix 7. |  | **See NICE NG111, and algorithm in Appendix 7.** If admission not needed, send MSU for culture & sensitivities and offer antibiotic. If no response within 48 hours, admit. Second line agents should be dependent upon cultures and sensitivities. |
| | | | | | |
| **Acute Prostatitis** | See Appendix 6. |  | See Appendix 6. |  | **See NICE NG110, and algorithm (Appendix 6).** Send MSU for culture and offer antibiotic. 4-wk course may prevent chronic prostatitis. Quinolones achieve higher prostate levels. |
| | | | | | |

### GASTRO-INTESTINAL TRACT INFECTIONS

| Infection  | Treatment | Dosage / Length of Treatment |  Comments |
--- | --- | --- | ---
| **Oral Candidiasis** | Miconazole oral gel | 20mg/ml QDs (hold in mouth after food) 7 days + 2 days after symptoms resolve 100,000 units/ml | Topical azoles are more effective than topical nystatin. Oral candidiasis is rare in immunocompetent adults Consider undiagnosed risk factors, including HIV Use 50mg fluconazole if extensive/severe candidiasis if HIV or immunocompromised, use 100mg fluconazole. |
| If not tolerated: Nystatin | | | | |
### Infection

<table>
<thead>
<tr>
<th>First Choice</th>
<th>BNF Dosage / Length of Treatment</th>
<th>Second Choice</th>
<th>BNF Dosage / Length of Treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eradication of <em>Helicobacter pylori</em></strong></td>
<td>Suspension</td>
<td>Fluconazole 1ml QDS 7 days + 2 days after symptoms resolve 50mg/100mg (see comments) OD 7-14 days</td>
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<tr>
<td><strong>Penicillin allergy:</strong></td>
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<td>Penicillin allergy:</td>
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<tr>
<td></td>
<td>PPI + Clarithromycin + MTZ</td>
<td>500mg BD 400mg BD Treatment for 7 days</td>
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<tr>
<td><strong>PPI WITH Amoxicillin (AM) PLUS</strong></td>
<td>BD 1g BD</td>
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<td>500mg BD with 400mg BD Treatment for 7 days.</td>
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<td><strong>OR</strong></td>
<td>Metronidazole (MTZ) 500mg BD</td>
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<td><strong>Penicillin allergy:</strong></td>
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<td>Penicillin allergy:</td>
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<tr>
<td></td>
<td>PPI + Clarithromycin + MTZ</td>
<td>500mg BD 400mg BD Treatment for 7 days</td>
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<tr>
<td><strong>Relapse and previous MTZ &amp; clarithromycin:</strong></td>
<td>Use PPI plus clarithromycin &amp; MTZ; In relapse see NICE</td>
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<tr>
<td><strong>Use PPI PLUS amoxicillin, PLUS either tetracycline or levofloxacin</strong></td>
<td>Retest for H. pylori post DU/GU or relapse after second line therapy: using breath or stool test OR consider endoscopy for culture and susceptibility</td>
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<tr>
<td><strong>Clostridium Difficile</strong></td>
<td>1st episode metronidazole</td>
<td>400mg TDS for 10-14 days</td>
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<td>2nd episode / severe/type 027 Oral</td>
<td>125mg QDS. 10-14 days</td>
<td>Fidaxomicin. Consult</td>
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<td>200mg BD 10days</td>
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<td>Stop all unnecessary antibiotics, PPIs and anti-peristaltic agents. 70% respond to metronidazole in 5 days 92% in 14 days. If severe symptoms (T.38.5: WCC&gt; 15, rising creatinine or signs/symptoms of severe colitis, treat with oral vancomycin and consider admission</td>
</tr>
</tbody>
</table>

**Approved by Medicines Management Group April 2019**

Doses are for patients with normal renal and hepatic function unless otherwise indicated.
## GENITAL TRACT INFECTIONS

### STI screening

People with risk factors should be screened for chlamydia, gonorrhoea, HIV, syphilis. Refer individual and partners to GUM service. Risk factors: <25yr, no condom use, recent (<12mth)/frequent change of partner, symptomatic partner, area of high HIV.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Chlamydia trachomatis / urethritis</strong></td>
<td>Doxycycline OR Azithromycin</td>
<td>100mg BD for 7 days 1g as a single dose 1g (off-label use), stat</td>
<td>Azithromycin</td>
<td>1g as a single dose 1g (off-label use), stat</td>
<td>Opportunistically screen all aged 16-24yrs Treat partners and refer to GUM service. <strong>Pregnancy or breastfeeding: azithromycin is the most effective option</strong> Repeat test for cure in all at 3 months Due to lower cure rate in pregnancy, test for cure at least 3 weeks after treatment Avoid doxycycline in Pregnancy &amp; breastfeeding. Sexual partner will require concurrent treatment. For suspected epididymitis in men over 35 years or those with high risk of STI refer to GUM</td>
</tr>
<tr>
<td><strong>For suspected epididymitis in men (&gt;35 years, low risk of STI)</strong></td>
<td>Doxycycline</td>
<td>100mg BD for 14 days</td>
<td>Ofloxacine</td>
<td>400mg BD for 14 days</td>
<td></td>
</tr>
<tr>
<td>Infection</td>
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<td>Second Choice</td>
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<tr>
<td>Vaginal Candidiasis</td>
<td>Clotrimazole</td>
<td>500mg pessary stat OR 10% cream stat OR 100mg pessary for 6 days</td>
<td>Fluconazole (in resistant cases only) Recurrent (&gt;4 episodes/year): Fluconazole</td>
<td>150mg oral capsule stat 150mg oral every 72 hours for 3 doses then weekly for 6 months</td>
<td>All topical and oral azoles give over 70% cure Pregnancy: avoid oral azole, use intravaginal for 7 days</td>
</tr>
<tr>
<td>Bacterial Vaginosis</td>
<td>Metronidazole</td>
<td>400mg BD for 7 days or 2g as a single dose.</td>
<td>Metronidazole 0.75% vaginal gel</td>
<td>One 5g applicatorful at night for 5 nights</td>
<td>Oral metronidazole (MTZ) is as effective as topical treatment but is cheaper. Less relapse with 7 day than 2g stat at 4 weeks. Pregnant/breastfeeding: avoid 2g stat. Treating partners does not reduce relapse</td>
</tr>
<tr>
<td>Trichomoniasis</td>
<td>Metronidazole</td>
<td>2g as a single dose or 400mg BD for 7 days</td>
<td></td>
<td></td>
<td>Avoid metronidazole in first trimester of pregnancy. Also avoid 2g dose in pregnancy. Sexual partner will require concurrent treatment</td>
</tr>
<tr>
<td>Pelvic Inflammatory Disease</td>
<td>Metronidazole + Ofloxacin</td>
<td>400mg BD 400mg BD for 14days</td>
<td>For Gonorrhea: Metronidazole + Doxycycline + Ceftriaxone</td>
<td>400mg BD 14 days 100mg BD 14 days 500mg IM Stat</td>
<td>Refer woman and contacts to GUM service. Always culture for gonorrhoea and chlamydia. 28% of gonorrhoea isolates now resistant to quinolones. If gonorrhoea likely (partner has it, severe symptoms, sex abroad) use ceftriaxone or refer to GUM.</td>
</tr>
</tbody>
</table>

**SKIN & SOFT TISSUE INFECTIONS**

| Impetigo                          | Flucloxacillin       | 250mg - 500mg QDS for 7 days | Clarithromycin (If Penicillin allergic) | 250-500mg BD for 7 days | For extensive, severe, or bullous impetigo, use oral antibiotics Reserve topical antibiotics for very localised lesions to reduce the risk of resistance |
| See BNF for                        | See BNF for          |                                 |                                       |                                 |                                                                           |
### Infection | First Choice | BNF Dosage / Length of Treatment | Second Choice | BNF Dosage/ Length of Treatment | Comments
--- | --- | --- | --- | --- | ---
**children for dosage** | Topical fusidic acid | TDS for 5 days | MRSA only Mupirocin 2% ointment | TDS for 5 days | Reserve mupirocin for MRSA

**Eczema** | If no visible signs of infection use of antibiotics (alone or with steroids) encourages resistance and does not improve healing. In eczema with visible signs of infection, use treatment as in impetigo

**Cellulitis** | Flucloxacillin Co-amoxiclav | 500mg QDS for 7 days. 500/125mg TDS for 7 days. | Clarithromycin (If Penicillin allergic) | 500mg BD for 7 days | If patient afebrile and healthy other than cellulitis, use oral flucloxacillin alone. If river or sea water exposure, discuss with microbiologist. If febrile and ill, admit for IV treatment. For all treatments, if slow response continue for a further 7 days

**Acne vulgaris** | 1<sup>st</sup> Line: Self-care 2<sup>nd</sup> line: Topical retinoid OR Benzoyl Peroxide (2.5%, 4%, 5% and 10%) | OD or BD for at least 6 months OD OD-BD For 6-8 weeks | Clindamycin 1% cream If treatment failure or severe: Oral tetracycline OR Oral doxycycline OR Erythromycin (if unresponsive or intolerant to tetracyclines) | BD for 12 weeks | ---
## Antimicrobial Prescribing

**Approved by Medicines Management Group April 2019**

Doses are for patients with normal renal and hepatic function unless otherwise indicated.

<table>
<thead>
<tr>
<th>Infection</th>
<th>First Choice</th>
<th>BNF Dosage / Length of Treatment</th>
<th>Second Choice</th>
<th>BNF Dosage / Length of Treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leg ulcers</strong></td>
<td>Active infection if cellulitis/increased pain/pyrexia/purulent exudate/odour present</td>
<td>Flucloxacillin 500mg QDS for 7 days. If slow response continue for a further 7 days</td>
<td>Clarithromycin (If Penicillin allergic) 500mg BD for 7 days. If slow response continue for a further 7 days</td>
<td>Ulcers are always colonized. Antibiotics do not improve healing unless active infection. If active infection, send pre-treatment swab. Review antibiotics after culture results</td>
<td></td>
</tr>
<tr>
<td><strong>MRSA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Discuss all active MRSA infection with a microbiologist</td>
</tr>
<tr>
<td><strong>MRSA Decolonisation</strong></td>
<td>Octenisan body wash (whole body, hair on days 2 &amp; 4)</td>
<td>OD for 5 days</td>
<td></td>
<td></td>
<td>High risk colonised patients (e.g. patients with catheters, chronic skin lesions) without active infection refer to ICPG1 section 5 - Prevention &amp; Management of MRSA in CHS &amp; MH Inpatient Services.</td>
</tr>
<tr>
<td><strong>PVL S. aureus</strong></td>
<td>Panton-Valentine Leucocidin (PVL) is a toxin produced by 20.8-46% of S. aureus from boils/abscesses. PVL strains are rare in healthy people but severe. Send swabs if recurrent boils/abscesses. At risk: close contacts in communities, poor hygiene, close contact sports, military training camps, gyms and prisons. If found, suppression therapy should be given but only after primary infection has resolved as treatment is ineffective if lesions are still leaking.</td>
<td>Co-amoxiclav 375mg-625mg TDS for 7 days</td>
<td>If penicillin allergic: Metronidazole PLUS Doxycycline (animal bite) 400 mg TDS 100 mg BD</td>
<td>Human: Thorough irrigation is important Assess risk of tetanus, HIV, hepatitis B&amp;C, rabies Antibiotic prophylaxis is advised Cat: Always give prophylaxis Dog: Give prophylaxis if dogbite/puncture wound, bite to hand, foot, face, joint, tendon, ligament,</td>
<td></td>
</tr>
<tr>
<td>Infection</td>
<td>First Choice</td>
<td>BNF Dosage / Length of Treatment</td>
<td>Second Choice</td>
<td>BNF Dosage / Length of Treatment</td>
<td>Comments</td>
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<tr>
<td><strong>Section 18. Antimicrobial Prescribing</strong></td>
<td></td>
<td></td>
<td><strong>first choice</strong></td>
<td><strong>second choice</strong></td>
<td><strong>Comments</strong></td>
</tr>
</tbody>
</table>
| **Doses are for patients with normal renal and hepatic function unless otherwise indicated** | | | | | \n
<table>
<thead>
<tr>
<th><strong>Infection</strong></th>
<th><strong>First Choice</strong></th>
<th><strong>BNF Dosage / Length of Treatment</strong></th>
<th><strong>Second Choice</strong></th>
<th><strong>BNF Dosage / Length of Treatment</strong></th>
<th><strong>Comments</strong></th>
</tr>
</thead>
</table>
| **Scabies**    | Permethrin      | 5% cream, 2 applications 1 week apart | *If allergy:* Malathion | 0.5% aqueous liquid. 2 applications 1 week apart | **Treat all home & sexual contacts within 24h**
**Treat whole body from ear/chin downwards and under nails. If under 2/elderly, also face/scalp**
**Refer to ICPG1 – Section 8 - Infestations** |
| **Fungal infection – skin** | Topical terbinafine | **BD, 1-4 weeks** | Topical imidazole or *(athlete’s foot only): topical undecanoates (Mycota®)* | **OD - BD for 4-6wks** | **Tertinafine is fungicidal, so treatment time shorter than with fungistatic imidazoles**
**If candida possible, use imidazole**
**If intractable: send skin scrapings to microbiology lab. If infection confirmed, use oral terbinafine/itraconazole**
**Scalp: oral therapy and discuss with specialist** |
| **Fungal infection – fingernail or toenail** | Terbinafine | **250 mg OD Fingers: 6 weeks Toes: 12 weeks** | Itraconazole | **200 mg BD, 7 days monthly Fingers: 2 courses Toes: 3 courses** | **Take nail clippings: start therapy only if infection is confirmed by laboratory**
**Terbinafine is more effective than azoles**
**Liver reactions rare with oral antifungals**
**If candida or non-dermatophyte infection confirmed, use oral itraconazole**
**For children, seek specialist advice**
**To prevent recurrence: apply weekly 1% topical** |

Approved by Medicines Management Group April 2019
Doses are for patients with normal renal and hepatic function unless otherwise indicated
<table>
<thead>
<tr>
<th>Infection</th>
<th>First Choice</th>
<th>BNF Dosage / Length of Treatment</th>
<th>Second Choice</th>
<th>BNF Dosage/ Length of Treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varicella zoster/ chicken pox</td>
<td>Aciclovir</td>
<td>800mg 5 times daily for 7 days</td>
<td></td>
<td></td>
<td>antifungal to entire area. Stop treatment when continual, new, healthy, proximal nail growth</td>
</tr>
<tr>
<td>Consider aciclovir if onset of rash &lt;24h &amp; one of the following: &gt;14yrs or severe pain or dense/oral rash or 2 household case or steroids or smoker</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pregnant/immunocompromised/neonate: seek urgent specialist advice Note: for patients with severe renal impairment (CKD 4-5) dose of aciclovir must be reduced</td>
</tr>
<tr>
<td>Herpes zoster/ Shingles</td>
<td>Aciclovir</td>
<td>800mg 5 times daily for 7 days</td>
<td></td>
<td></td>
<td>Note: for patients with severe renal impairment (CKD 4-5) dose of aciclovir must be reduced</td>
</tr>
<tr>
<td>Infection</td>
<td>First Choice</td>
<td>BNF Dosage / Length of Treatment</td>
<td>Second Choice</td>
<td>BNF Dosage / Length of Treatment</td>
<td>Comments</td>
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</tr>
<tr>
<td><strong>Cold sores</strong></td>
<td>Cold sores resolve after 5 days without treatment. Topical antivirals applied promodally reduce duration by 12-18hrs If frequent, severe and predictable triggers: consider oral prophylaxis – aciclovir 400mg BD for 5-7 days</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**EYE INFECTIONS**

| Conjunctivitis                | Chloramphenicol 0.5% drops or 1% ointment                                    | 2 hourly for 2 days then 4 hourly (whilst awake) 3 – 4 times a day if used alone or at night if in combination with drops | Fusidic acid 1% gel | Use twice a day | Most bacterial conjunctivitis is self-limiting. 65% resolve on placebo by day five therefore treat only if severe Red eye with mucopurulent, not watery discharge. Usually unilateral but may spread Fusidic acid has less Gram-negative activity Treat until 48 hours after resolution of symptoms |

**DENTAL INFECTIONS – derived from the Scottish Dental Clinical Effectiveness Programme 2011 SDCEP Guidelines**

This guidance is not designed to be a definitive guide to oral conditions. It is for GPs for the management of acute oral conditions pending being seen by a dentist or dental specialist. GPs should not routinely be involved in dental treatment and, if possible, advice should be sought from the patient’s dentist, who should have an answer-phone message with details of how to access treatment out-of-hours, or telephone 111.

| Mucosal ulceration and inflammation (simple gingivitis) | Simple saline mouthwash | ½ tsp salt dissolved in glass warm water | 1 minute BD with 5 ml diluted with 5-10 ml water. | Hydrogen peroxide 6% | Rinse mouth for 2 mins TDS with 15ml diluted in ½ glass warm water. | Always spit out after use. Use until lesions resolve or less pain allows oral hygiene. Temporary pain and swelling relief can be attained with saline mouthwash Use antiseptic mouthwash: If more severe & pain limits oral hygiene to treat or prevent secondary infection. The primary cause for mucosal ulceration or inflammation (aphthous ulcers, oral lichen planus, |
### Infection Table

<table>
<thead>
<tr>
<th>Infection</th>
<th>First Choice</th>
<th>BNF Dosage / Length of Treatment</th>
<th>Second Choice</th>
<th>BNF Dosage / Length of Treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>herpes simplex infection, oral cancer) needs to be evaluated and treated.</td>
</tr>
<tr>
<td><strong>Acute necrotising ulcerative gingivitis</strong></td>
<td>If systemic signs/symptoms: Chlorhexidine or hydrogen peroxide as per mucosal ulceration and inflammation advice above</td>
<td></td>
<td>Metronidazole</td>
<td>400 mg TDS for 3 days</td>
<td>Commence metronidazole in the presence of systemic signs and symptoms and refer to dentist for scaling and oral hygiene advice. Use in combination with antiseptic mouthwash (Chlorhexidine 0.2% or hydrogen peroxide 6% as per mucosal ulceration) if pain limits oral hygiene</td>
</tr>
<tr>
<td><strong>Pericoronitis</strong></td>
<td>Amoxicillin</td>
<td>500 mg TDS for 3 days</td>
<td>Metronidazole</td>
<td>400 mg TDS for 3 days</td>
<td>Refer to dentist for irrigation &amp; debridement. If persistent swelling or systemic symptoms use metronidazole. Use in combination with antiseptic mouthwash (chlorhexidine or hydrogen peroxide) if pain limits oral hygiene.</td>
</tr>
<tr>
<td><strong>Dental abscess</strong></td>
<td>The empirical use of cephalosporins, co-amoxiclav, clarithromycin, and clindamycin do not offer any advantage for most dental patients and should only be used if no response to first line drugs when referral is the preferred option</td>
<td>Amoxicillin or Penicillin V</td>
<td>True penicillin allergy: Clarithromycin</td>
<td>500mg BD For up to 5 days review at day 3</td>
<td>Regular analgesia should be first option until a dentist can be seen for urgent drainage, as repeated courses of antibiotics for abscess are not appropriate. Repeated antibiotics alone, without drainage are ineffective in preventing spread of</td>
</tr>
</tbody>
</table>
### Infection

<table>
<thead>
<tr>
<th>Infection</th>
<th>First Choice</th>
<th>BNF Dosage / Length of Treatment</th>
<th>Second Choice</th>
<th>BNF Dosage / Length of Treatment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe / spreading infection</td>
<td>Metronidazole</td>
<td>400mg TDS For 5 days</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

infection. Antibiotics are recommended if there are signs of severe infection, systemic symptoms or high risk of complications. Severe odontogenic infections; defined as cellulitis plus signs of sepsis, difficulty in swallowing, impending airway obstruction, Ludwigs angina. Refer urgently for admission to protect airway, achieve surgical drainage and IV antibiotics

### 18.5 Microbiology Support

For North Essex, microbiology advice can be sought from the microbiology team at Colchester General Hospital on 01206 747374. Dr Gillian Urwin is the Lead Microbiologist. Out of hours the on-call microbiologist can be contacted via 01206 747474.

For South Essex, please contact Southend Hospital Microbiology Department / on-call microbiologist via 01702 435555 (switchboard).

### 18.6 References

2.  BNF and BNF for Children Online  
3.  [NICE Quality Standard 90 Urinary tract infections in adults](http://www.nice.org.uk/guidance/gs90Urinary tract infections in adults | Guidance and guidelines | NICE)
9. CG27 Medical Emergencies

Doses are for patients with normal renal and hepatic function unless otherwise indicated.
18. MHRA. Fluoroquinolone antibiotics: ciprofloxacin, levofloxacin, moxifloxacin, ofloxacin. New restrictions and precautions due to very rare reports of disabling and potentially long-lasting or irreversible side effects. Published 21 March 2019.

Appendix 1 – NICE Treatment Algorithm – Acute Sore Throat

Sore throat (acute): antimicrobial prescribing

When no antibiotic given, advise:
- antibiotic is not needed
- cooling medical help if symptoms worsen rapidly or significantly, do not start to improve after 1 week or the person becomes very unwell

With a back-up antibiotic prescription, advise:
- antibiotic is not needed immediately
- use prescription if no improvement in 3 to 5 days, or symptoms worsen
- cooling medical help if symptoms worsen rapidly or significantly or the person becomes very unwell

With an immediate antibiotic prescription, advise:
- cooling medical help if symptoms worsen rapidly or significantly or the person becomes very unwell

Reassess at any time if symptoms worsen rapidly or significantly, taking account of:
- other possible diagnoses
- any symptoms or signs suggesting a more serious illness or condition
- previous antibiotic use, which may lead to resistance organism

If the person:
- is systemically very unwell, or has symptoms and signs of a more serious illness or condition, or has high risk of complications

Offer an immediate antibiotic prescription

Refer to hospital if:
- severe systemic infection, or severe complications

Evidence on antibiotics
- Antibiotics make little difference to how long symptoms last or the number of people whose symptoms improve
- Withholding antibiotics is unlikely to lead to complications
- Possible adverse effects include diarrhoea and nausea

FeverPAIN score
- Fever, Purrulence, Attend within 2 days or less, Severe Inflamed Tonsils, No cough or cold
- 1 point for each

Centor score
- Tonsillar exudate, Tender anterior cervical lymphadenopathy or symptoms: History of fever (>39°C), No cough
- 1 point for each

First published: January 2018

Approved by Medicines Management Group April 2019
Doses are for patients with normal renal and hepatic function unless otherwise indicated
Appendix 2 – NICE Treatment Algorithm - Sinusitis

Sinusitis (acute): antimicrobial prescribing

Symptoms for 10 days or less?
- Yes
  - Do not offer an antibiotic
  - When no antibiotic given, advise:
    - Antibiotic is not needed
    - Sinusitis usually lasts 2-3 weeks
    - Manage symptoms with self-care
    - When to seek help

Symptoms with no improvement for more than 10 days?
- Yes
  - Consider no antibiotic or back-up antibiotic prescription, depending on likelihood of bacterial cause
  - Consider prescribing a high dose nasal corticosteroid for 14 days for adults and children aged 12 and above

When giving a back-up antibiotic prescription, advise:
- Manage symptoms with self-care
- Antimicrobial is not needed immediately
- Use prescription if symptoms worsen rapidly or significantly, or do not improve in 7 days
- Return if symptoms significantly worsen despite taking the antibiotic or if the antibiotic is stopped

Offer immediate antibiotic or
Investigate and manage in line with NICE guidance on respiratory tract infections (self-limiting)

Refer to hospital if complication present:
- Severe systemic infection
- Intracranial or periostial complications
- Intracranial complications

Evidence on antibiotics
- Antibiotics make little difference to how long symptoms last or the number of people whose symptoms improve
- Possible adverse effects include diarrhoea and nausea

Bacterial cause may be more likely if several of the following are present:
- Symptoms for more than 10 days
- Circumcinated or purulent nasal discharge
- Severe localized unilateral pain (particularly pain over teeth and jaw)
- Fever
- Marked deterioration after an initial milder phase

Self-care
- Consider paracetamol or ibuprofen for pain or fever (or under 5s, see the NICE guideline on fever in under 5s: assessment and initial management)
- Little evidence that nasal saline or nasal decongestants help, but people may want to try them
- No evidence for oral decongestants, antihistamines, mucolytics, steam inhalation, or warm face packs

First published: October 2017. See the full recommendations and why we made them www.nice.org.uk

Approved by Medicines Management Group April 2019
Doses are for patients with normal renal and hepatic function unless otherwise indicated
Appendix 3 – NICE Treatment Algorithm – Acute otitis media

Otitis media (acute): antimicrobial prescribing

When no antibiotic given, advise:
- antibiotic is not needed
- seeking medical help if symptoms worsen rapidly or significantly, do not start to improve after 3 days or the child or young person becomes very unwell

With a back-up antibiotic prescription, advise:
- antibiotic is not needed immediately
- use prescription if no improvement in 3 days or symptoms worsen
- seeking medical help if symptoms worsen rapidly or significantly, or the child or young person becomes very unwell

With an immediate antibiotic prescription, advise:
- seeking medical help if symptoms worsen rapidly or significantly, or the child or young person becomes very unwell

Reasses at any time if symptoms worsen rapidly or significantly, taking account of:
- other possible diagnoses
- any symptoms or signs suggesting a more serious illness or condition
- previous antibiotic use, which may lead to resistant organisms

If the child or young person is systemically very unwell, or has symptoms and signs of a more serious illness or condition, or has high risk of complications:

Offer an immediate antibiotic prescription

Refer to hospital if:
- severe systemic infection, or
- complications like mastoiditis

Self-care
- Offer regular doses of paracetamol or ibuprofen to manage pain, with the right dose for age or weight at the right time and maximum doses for severe pain
- Evidence suggests that decongestants or antihistamines do not help symptoms

Evidence on antibiotics
- Antibiotics make little difference to the number of children whose symptoms improve
- Antibiotics make little difference to the number of children with recurrent infections, short-term hearing loss or perforated ear drum
- Complications (such as mastoiditis) are rare with or without antibiotics
- Possible adverse effects include diarrhoea and nausea

Groups who may be more likely to benefit from antibiotics
- Children and young people with acute otitis media and otorrhoea (discharge following ear drum perforation)
- Children under 2 years with acute otitis media in both ears

March 2018

Approved by Medicines Management Group April 2019
Doses are for patients with normal renal and hepatic function unless otherwise indicated
Appendix 4 – NICE NG113 Treatment Algorithm – UTI (catheter)

UTI (catheter): antimicrobial prescribing

- **Consider removing or, if not possible, changing the catheter** if it has been in place for more than 7 days. But do not delay antibiotic treatment.
- **Send a urine sample** for culture and susceptibility testing.
- **Offer an antibiotic**.
- **Advise managing symptoms with self-care**.
- **Advise**:
  - possible adverse effects of antibiotics include diarrhea and nausea.
  - seeking medical help if symptoms worsen at any time or do not start to improve within 48 hours, or the person becomes systemically very unwell.

When results of urine culture are available:

- **Review choice of antibiotic**.
- **Change antibiotic according to susceptibility results** if bacteria are resistant, using narrow spectrum antibiotics when possible.

Reassess at any time if symptoms worsen or do not start to improve within 48 hours, taking account of:

- other possible diagnoses
- any symptoms and signs suggesting a more serious illness or condition, such as sepsis
- previous antibiotic use, which may have led to resistant bacteria

Refer to hospital if the person has any symptoms or signs of a more serious illness or condition (for example, sepsis)

- Do not routinely offer antibiotic prophylaxis to people with a short-term or long-term catheter.
- Advise seeking medical help if symptoms of acute UTI develop.

H

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

Background

- Catheter-associated UTI is a symptomatic bladder or kidney infection in a person with a catheter.
- Bacteria are more likely to be present in urine the longer a catheter is in place (after 1 week most people have bacteria).
- Antibiotic treatment is not routinely needed for asymptomatic bacteriuria in people with a catheter.

Self-care

- Advise paracetamol for pain.
- Advise drinking enough fluids to avoid dehydration.

Antibiotics

- When prescribing antibiotics, take account of severity of symptoms, risk of complications, previous urine culture and susceptibility results, previous antibiotic use, which may have led to resistant bacteria, and local antimicrobial resistance data.
- Give oral antibiotics first-line if people can take oral medicines, and the severity of their condition does not require intravenous antibiotics.
- Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics where possible.

NICE National Institute for Health and Care Excellence

November 2018
### UTI (catheter): antimicrobial prescribing

#### Choice of antibiotic: non-pregnant women and men aged 16 years and over

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First choice oral antibiotic if no upper UTI symptoms</strong></td>
<td></td>
</tr>
<tr>
<td>Nitrofurantoin – if GFR ≥ 45 ml/minute³</td>
<td>100 mg modified-release twice a day for 7 days</td>
</tr>
<tr>
<td>Trimethoprim – if low risk of resistance³</td>
<td>200 mg twice a day for 7 days</td>
</tr>
<tr>
<td>Amoxicillin (only if culture results available and susceptible)</td>
<td>500 mg three times a day for 7 days</td>
</tr>
<tr>
<td>**Second choice oral antibiotic if no upper UTI symptoms (first choice not suitable)**²</td>
<td></td>
</tr>
<tr>
<td>Pivmecillinam (a penicillin)²</td>
<td>400 mg initial dose then 200 mg three times a day for a total of 7 days</td>
</tr>
<tr>
<td><strong>First choice oral antibiotic if upper UTI symptoms</strong>²</td>
<td></td>
</tr>
<tr>
<td>Cefalexin</td>
<td>500 mg twice or three times a day (up to 1 to 1.5 g three or four times a day for severe infections) for 7 to 10 days</td>
</tr>
<tr>
<td>Co-amoxiclav (only if culture results available and susceptible)</td>
<td>500/125 mg three times a day for 7 to 10 days</td>
</tr>
<tr>
<td>Trimethoprim (only if culture results available and susceptible)</td>
<td>200 mg twice a day for 14 days</td>
</tr>
<tr>
<td>Ciprofloxacin (consider safety issues)⁴</td>
<td>500 mg twice a day for 7 days</td>
</tr>
</tbody>
</table>

#### Choice of antibiotic: non-pregnant women and men aged 16 years and over (continued)

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Second choice intravenous antibiotic: consult local microbiologist</strong></td>
<td></td>
</tr>
<tr>
<td>See Table for use and dosing in specific populations, for example, hepatic and renal impairment, breastfeeding and for administering intravenous antibiotics.</td>
<td></td>
</tr>
<tr>
<td>Check any previous culture and susceptibility results, and previous antibiotic prescribing and choose antibiotics accordingly.</td>
<td></td>
</tr>
<tr>
<td>May be used with caution if GFR 30–44 ml/minute to treat uncomplicated lower UTI caused by suspected or proven multidrug resistant bacteria and only if potential benefit outweighs risk (BNF, August 2018).</td>
<td></td>
</tr>
<tr>
<td>Nitrofurantoin and pivmecillinam are only licensed for uncomplicated lower UTIs, and are not suitable for people with upper UTI symptoms of a blocked catheter.</td>
<td></td>
</tr>
<tr>
<td>Low risk of resistance is likely if not used in the past 3 months; previous urine culture suggests susceptibility (but this was not used); and in younger people in areas where data suggests low resistance. Higher risk of resistance is likely with recent use and in older people in care homes.</td>
<td></td>
</tr>
<tr>
<td>The European Medicines Agency’s Pharmacovigilance Risk Assessment Committee has recommended restricting the use of fluoroquinolone antibiotics following a review of disabling and potentially long-lasting side effects mainly affecting muscles, tendons, bones and the nervous system (press release October 2018), but they are an option in catheter-associated UTI with upper UTI symptoms, which is a severe infection.</td>
<td></td>
</tr>
<tr>
<td>Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics.</td>
<td></td>
</tr>
<tr>
<td>Therapeutic drug monitoring and assessment of renal function is required (BNF, August 2018).</td>
<td></td>
</tr>
</tbody>
</table>

#### Choice of antibiotic: pregnant women aged 12 years and over

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First choice oral antibiotic</strong>²</td>
<td></td>
</tr>
<tr>
<td>Cefalexin</td>
<td>500 mg twice or three times a day (up to 1 to 1.5 g three or four times a day for severe infections) for 7 to 10 days</td>
</tr>
</tbody>
</table>

#### Choice of antibiotic: pregnant women aged 12 years and over (continued)

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First choice intravenous antibiotic: if vomiting, unable to take oral antibiotics or severely unwell</strong>²</td>
<td></td>
</tr>
<tr>
<td>Antibiotics may be combined if susceptibility or sepsis a concern²⁵</td>
<td></td>
</tr>
<tr>
<td>Co-amoxiclav (only if culture results available and susceptible)</td>
<td>1.2 g three times a day</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>750 mg to 1.5 g three or four times a day</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>1 to 2 g once a day</td>
</tr>
<tr>
<td>Ciprofloxacin (consider safety issues)²⁶</td>
<td>400 mg twice or three times a day</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>Initially 5 to 7 mg/kg once a day, subsequent doses adjusted according to serum-gentamicin concentration⁶</td>
</tr>
<tr>
<td>Amikacin</td>
<td>Initially 15 mg/kg once a day (maximum per dose 1.5 g once a day), subsequent doses adjusted according to serum-amikacin concentration (maximum 15 g per course)⁶</td>
</tr>
</tbody>
</table>

When exercising their judgment, professionals and practitioners are expected to take the guidelines 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 overrule the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardians.

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Approved by Medicines Management Group April 2019

Doses are for patients with normal renal and hepatic function unless otherwise indicated.
## UTI (catheter): antimicrobial prescribing

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

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Children under 3 months</strong> - Refer to paediatric specialist and treat with intravenous antibiotics in line with the NICE guideline on fever in under 5s</td>
<td></td>
</tr>
<tr>
<td><strong>Children aged 3 months and over</strong> - First choice oral antibiotics</td>
<td></td>
</tr>
<tr>
<td>Trimethoprim - if low risk of resistance</td>
<td>3 to 5 months, 4 mg/kg (maximum 200 mg per dose) or 25 mg twice a day for 7 to 10 days; 6 months to 5 years, 4 mg/kg (maximum 200 mg per dose) or 50 mg twice a day for 7 to 10 days; 6 to 11 years, 4 mg/kg (maximum 200 mg per dose) or 100 mg twice a day for 7 to 10 days; 12 to 15 years, 200 mg twice a day for 7 to 10 days</td>
</tr>
<tr>
<td>Amoxicillin (only if culture results available and susceptible)</td>
<td>3 to 11 months, 125 mg three times a day for 7 to 10 days; 1 to 4 years, 250 mg three times a day for 7 to 10 days</td>
</tr>
<tr>
<td>5 to 15 years, 500 mg three times a day for 7 to 10 days</td>
<td></td>
</tr>
<tr>
<td>Cefalexin</td>
<td>3 to 11 months, 12.5 mg/kg or 125 mg twice a day for 7 to 10 days (25 mg/kg two to four times a day [maximum 1 g per dose four times a day] for severe infections)</td>
</tr>
<tr>
<td>1 to 4 years, 12.5 mg/kg twice a day or 125 mg three times a day for 7 to 10 days (25 mg/kg two to four times a day [maximum 1 g per dose four times a day] for severe infections)</td>
<td></td>
</tr>
<tr>
<td>5 to 11 years, 12.5 mg/kg twice a day or 250 mg three times a day for 7 to 10 days (25 mg/kg two to four times a day [maximum 1 g per dose four times a day] for severe infections)</td>
<td></td>
</tr>
<tr>
<td>12 to 15 years, 500 mg twice or three times a day (up to 1.5 g three or four times a day for severe infections) for 7 to 10 days</td>
<td></td>
</tr>
<tr>
<td>Co-amoxiclav (only if culture results available and susceptible)</td>
<td>3 to 11 months, 0.25 ml/kg of 125/31 suspension three times a day for 7 to 10 days (dose doubled in severe infection)</td>
</tr>
<tr>
<td>1 to 5 years, 0.25 ml/kg of 125/31 suspension or 5 ml of 125/31 suspension three times a day for 7 to 10 days (dose doubled in severe infection)</td>
<td></td>
</tr>
<tr>
<td>6 to 11 years, 0.15 ml/kg of 250/62 suspension or 5 ml of 250/62 suspension three times a day for 7 to 10 days (dose doubled in severe infection)</td>
<td></td>
</tr>
<tr>
<td>12 to 15 years, 250/125 mg or 500/125 mg three times a day for 7 to 10 days</td>
<td></td>
</tr>
<tr>
<td><strong>Children aged 3 months and over</strong> - First choice intravenous antibiotic (if vomiting unable to take oral antibiotics or severely unwell). Antibiotics may be combined if susceptibility or sepsis a concern*</td>
<td></td>
</tr>
<tr>
<td>Co-amoxiclav (only in combination unless culture results confirm susceptibility)</td>
<td>3 months to 15 years, 30 mg/kg three times a day (maximum 1.2 g three times a day)</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>3 months to 15 years, 20 mg/kg three times a day (maximum 750 mg per dose). (50 to 60 mg/kg three or four times a day [maximum 1.5 g per dose] for severe infections)</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>3 months to 11 years (up to 50 kg), 50 to 80 mg/kg once a day (maximum 4 g per day); 9 to 11 years (50 kg and above), 1 to 2 g once a day</td>
</tr>
<tr>
<td>12 to 15 years, 1 to 2 g once a day</td>
<td></td>
</tr>
<tr>
<td>Gentamicin</td>
<td>Initially 7 mg/kg once a day, subsequent doses adjusted according to serum-gentamicin concentration</td>
</tr>
<tr>
<td>Amikacin</td>
<td>Initially 15 mg/kg once a day, subsequent doses adjusted according to serum-amikacin concentration</td>
</tr>
<tr>
<td><strong>Children aged 3 months and over</strong> - Second choice intravenous antibiotic: Consult local microbiologist</td>
<td></td>
</tr>
</tbody>
</table>

---

1. **See NICE for children (BNF)** for use and dosing in specific populations, for example, hepatic impairment and renal impairment, and for administering intravenous antibiotics. For prescribing in pregnancy, refer to the table on choice of antibiotic for pregnant women aged 12 and over.
2. Age bands apply to average size and, in practice, age bands will be used with other factors such as the severity of the condition and the child's size.
3. Check any previous urine culture and susceptibility results, and antibiotic prescribing and choose antibiotics accordingly. If a child or young person is receiving prophylactic antibiotics, treatment should be with a different antibiotic not a higher dose of the same antibiotic.
4. **Low risk of resistance is likely if not used in the past 3 months, previous urine culture suggests susceptibility (but this was not used), and in areas where data suggests low resistance. Higher risk of resistance is likely with recent use. Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics where possible for a total antibiotic course of 10 days.**
5. **Therapeutic drug monitoring and assessment of renal function is required (BNF, August 2018).**
Appendix 5 – NICE NG109 Treatment Algorithm – UTI (lower)

UTI (lower): antimicrobial prescribing

Non-pregnant woman

Consider a back-up antibiotic prescription or immediate antibiotic, noting that the evidence for back-up antibiotics was from women not needing immediate treatment

If urine sent for culture and susceptibility, and antibiotic given:
• review antibiotic choice when results available, and
• change antibiotic for pregnant women if bacteria resistant
• change antibiotic for children and young people, men and non-pregnant women if bacteria resistant and symptoms not improving
Use a narrow spectrum antibiotic when possible

Lower urinary tract infection (UTI)

Give advice about managing symptoms with self care

Pregnant woman, or Man, or Child or young person under 16 years

Send midstream urine for culture and susceptibility for pregnant women and men
Send urine for culture and susceptibility or dipstick in line with the NICE guideline on urinary tract infection for under 16
Offer immediate antibiotic
Assess and manage fever in under 5s in line with the NICE guideline on fever in under 5s

With all antibiotic prescriptions, advise:
• possible adverse effects of antibiotics include diarrhoea and nausea
• seeking medical help if symptoms worsen at any time, do not improve within 48 hours of taking the antibiotic, or the person becomes very unwell
With a back-up antibiotic prescription, also advise:
• antibiotic is not needed immediately
• use prescription if no improvement in 48 hours or symptoms worsen at any time

Reassess at any time if symptoms worsen rapidly or significantly or do not improve in 48 hours of taking antibiotics, sending a urine sample for culture and susceptibility if not already done. Take account of:
• other possible diagnoses
• any symptoms or signs suggesting a more serious illness or condition
• previous antibiotic use, which may have led to resistance

Refer to hospital if a person aged 16 or over has any symptoms or signs suggesting a more serious illness or condition (for example, sepsis)
Refer children and young people to hospital in line with the NICE guideline on urinary tract infection in under 16s

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

Background
• Lower UTI (cystitis) is a bladder infection usually caused by bacteria travelling up to the urethra from the gastrointestinal tract

Self-care
• Advise paracetamol for pain or, if preferred and suitable, ibuprofen
• Advise drinking enough fluids to avoid dehydration
• No evidence found for cranberry products or urine alkalinising agents to treat lower UTI

Antibiotics
• When considering antibiotics, take account of severity of symptoms, risk of complications, previous urine culture and susceptibility results, previous antibiotic use which may have led to resistant bacteria and local antimicrobial resistance data

Asymptomatic bacteriuria
• Asymptomatic bacteriuria is significant levels of bacteria in urine with no UTI symptoms
• Screened for and treated in pregnant women because risk factor for pyelonephritis and premature delivery
• Not screened for or treated in non-pregnant women, men, children or young people

October 2018

Approved by Medicines Management Group April 2019
Doses are for patients with normal renal and hepatic function unless otherwise indicated
# UTI (lower): antimicrobial prescribing

## Choice of antibiotic: non-pregnant women aged 16 years and over

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrofurantoin</td>
<td>100 mg modified-release twice a day for 3 days</td>
</tr>
<tr>
<td>Trimeprorphin (if low risk of resistance)</td>
<td>200 mg twice a day for 3 days</td>
</tr>
<tr>
<td>Second choice (no improvement in lower UTI symptoms on first choice taken for at least 48 hours, or when first choice not suitable)</td>
<td>100 mg modified-release twice a day for 3 days</td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>400 mg initial dose, then 200 mg three times a day for a total of 3 days</td>
</tr>
<tr>
<td>Penicillin (a penicillin)</td>
<td>3 g single dose sachet</td>
</tr>
</tbody>
</table>

1. See BNF for use and dosing in specific populations, for example, hepatic impairment, renal impairment and breastfeeding.
2. Doses given are by mouth using immediate-release medicines, unless otherwise stated.
3. Check any previous urine culture and susceptibility results and antibiotic prescribing and choose antibiotics accordingly.
4. May be used with caution if eGFR 30–44 ml/minute to treat uncomplicated lower UTI caused by suspected or proven multidrug resistant bacteria and only if potential benefit outweighs risk (BNF, August 2018).
5. A lower risk of resistance may be more likely if not used in the past 3 months, previous urine culture suggests susceptibility (but this was not used), and in younger people in areas where local epidemiology data suggest resistance is low. A higher risk of resistance may be more likely with recent use and in older people in residential facilities.
6. If there are symptoms of pyelonephritis or the person has a complicated UTI (associated with a structural or functional abnormality, or underlying disease, which increases the risk of a more serious outcome or treatment failure), see the recommendations on choice of antibiotic in the NICE antimicrobial prescribing guideline on ‘acute pyelonephritis’.

**Abbreviations:** eGFR, estimated glomerular filtration rate.

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

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrofurantoin</td>
<td>3 to 5 months, 4 mg/kg (maximum 200 mg per dose) or 25 mg twice a day for 3 days, 6 months to 5 years, 4 mg/kg (maximum 200 mg per dose) or 50 mg twice a day for 3 days, 6 to 11 years, 4 mg/kg (maximum 200 mg per dose) or 100 mg twice a day for 3 days; 12 to 15 years, 200 mg twice a day for 3 days</td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>3 months to 11 years, 750 micrograms/kg four times a day for 3 days</td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>12 to 15 years, 50 mg four times a day or 100 mg modified-release twice a day for 3 days</td>
</tr>
<tr>
<td>Nitrofurantoin (if eGFR &gt;45 ml/minute) and not first choice</td>
<td>3 months to 11 years, 750 micrograms/kg four times a day for 3 days</td>
</tr>
<tr>
<td>Amoxicillin (if culture results available and susceptible)</td>
<td>1 to 11 months, 125 mg three times a day for 3 days; 1 to 4 years, 250 mg three times a day for 3 days; 12 to 15 years, 500 mg twice a day for 3 days</td>
</tr>
<tr>
<td>Cefalexin</td>
<td>3 to 11 months, 12.5 mg/kg or 125 mg twice a day for 3 days; 1 to 4 years, 12.5 mg/kg twice a day or 125 mg three times a day for 3 days; 5 to 11 years, 12.5 mg/kg twice a day or 250 mg three times a day for 3 days; 12 to 15 years, 500 mg twice a day for 3 days</td>
</tr>
</tbody>
</table>

1. See BNF for children (BNFC) for use and dosing in specific populations.
2. Age bands apply to children of average size; in practice the prescriber will use these with other factors. Doses given are by mouth using immediate release medicines, unless otherwise stated.
3. Check previous urine culture and susceptibility results and antibiotic prescribing. If receiving prophylactic antibiotics, treatment should be with a different antibiotic.
4. 2 or more antibiotics are appropriate, choose the antibiotic with the lowest acquisition cost. Some children may also be able to take a tablet or part-tablet, rather than a liquid formulation if the dose is appropriate.
5. A lower risk of resistance may be more likely if not used in the past 3 months, previous urine culture suggests susceptibility (but this was not used), and in younger people in areas where data suggest resistance is low. Risk of resistance may be higher with recent use and in older people in care homes.
6. If there are symptoms of pyelonephritis or the person has a complicated UTI, see the recommendations in the NICE antimicrobial prescribing guideline on ‘acute pyelonephritis’.

**Abbreviations:** eGFR, estimated glomerular filtration rate.
## UTI (lower): antimicrobial prescribing

### Choice of antibiotic: pregnant women aged 12 years and over

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td>First choice for treating lower UTI</td>
<td></td>
</tr>
</tbody>
</table>
Nitrofurantoin (avoid at term)  
- if eGFR ≥ 45 ml/minute  
- 100 mg modified-release twice a day for 7 days |
| Second choice for treating lower UTI (no improvement in lower UTI symptoms on first choice taken for at least 48 hours or when first choice not suitable) |  
Amoxicillin (only if culture results available and susceptible)  
- 500 mg three times a day for 7 days |
| Cefalexin |  
- 500 mg twice a day for 7 days |
| Alternative second choices |  
Consult local microbiologist, choose antibiotics based on culture and susceptibility results |

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

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td>First choice</td>
<td></td>
</tr>
</tbody>
</table>
Trimethoprim  
- 200 mg twice a day for 7 days |
| Second choice (no improvement in UTI symptoms on first choice taken for at least 48 hours or when first choice not suitable) |  
Nitrofurantoin  
- if eGFR ≥ 45 ml/minute  
- 100 mg modified-release twice a day for 7 days |

Consider alternative diagnoses and follow recommendations in the NICE antimicrobial prescribing guidelines on acute pyelonephritis or acute prostatitis, basing antibiotic choice on recent culture and susceptibility results.

See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment and renal impairment.

Doses given are by mouth using immediate release medicines, unless otherwise stated.

Check any previous urine culture and susceptibility results and antibiotic prescribing and choose antibiotics accordingly.

Nitrofurantoin is not recommended for men with suspected prostate involvement because it is unlikely to reach therapeutic levels in the prostate.

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.

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Approved by Medicines Management Group April 2019

Doses are for patients with normal renal and hepatic function unless otherwise indicated.
Appendix 6 – NICE NG110 Treatment Algorithm – Prostatitis

Prostatitis (acute): antimicrobial prescribing

NICE (National Institute for Health and Care Excellence)

Advises:
- Usual course of acute prostatitis is several weeks
- Possible adverse effects of antibiotics include diarrhoea and nausea
- Seeking medical help if symptoms worsen at any time, or do not start to improve within 48 hours of taking the antibiotic, or the person becomes systemically very unwell

When results of urine culture available:
- Review the choice of antibiotic, and
- Change antibiotic according to susceptibility results if bacteria are resistant, using a narrow spectrum antibiotic when possible

Reassess at any time if symptoms worsen, taking account of:
- Other possible diagnoses
- Any symptoms or signs suggesting a more serious illness or condition, such as acute urinary retention, prostatic abscess or sepsis
- Previous antibiotic use, which may have led to resistant bacteria

Refer to hospital if:
- There are any symptoms or signs of a more serious illness or condition (for example, sepsis, acute urinary retention or prostatic abscess), or
- Symptoms are not improving 48 hours after starting the antibiotic

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

Background
- Acute prostatitis:
- Is a bacterial infection needing antibiotics
- Can occur spontaneously or after medical procedures
- Can last several weeks
- Can lead to acute urinary retention and prostatic abscess

Self-care
- Advise paracetamol (with or without a low-dose weak opioid, such as codeine) for pain, or ibuprofen if preferred and suitable
- Advise drinking enough fluids to avoid dehydration

Antibiotics
- When prescribing antibiotics, take account of severity of symptoms, risk of complications or treatment failure, previous urine culture and susceptibility results, previous antibiotic use which may have led to resistant bacteria, and local antimicrobial resistance data
- Give oral antibiotics first-line if people can take oral medicines, and the severity of their condition does not require intravenous antibiotics
- Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics where possible

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Doses are for patients with normal renal and hepatic function unless otherwise indicated
### Choice of antibiotic: adults aged 18 years and over

<table>
<thead>
<tr>
<th>Antibiotic 1</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciprofloxacin</td>
<td>500 mg twice a day for 14 days then review</td>
</tr>
<tr>
<td>Ofloxacin</td>
<td>200 mg twice a day for 14 days then review</td>
</tr>
</tbody>
</table>

Alternative first choice oral antibiotic for adults unable to take a fluoroquinolone (guided by susceptibilities when available):

- Trimethoprim: 200 mg twice a day for 14 days then review

Second choice oral antibiotic (after discussion with a specialist):

- Levofoxacin: 500 mg once a day for 14 days then review
- Co-trimoxazole: 960 mg twice a day for 14 days then review

First choice intravenous antibiotics (if unable to take oral antibiotics or severely unwell: guided by susceptibilities when available). Antibiotics may be combined if sepsis is a concern:

- Ciprofloxacin: 400 mg twice or three times a day
- Levofoxacin: 500 mg once a day
- Cefuroxime: 1.5 g three or four times a day
- Ceftriaxone: 2 g once a day
- Gentamicin: Initially 5 to 7 mg/kg once a day, subsequent doses adjusted according to serum gentamicin concentration
- Amikacin: Initially 15 mg/kg once a day (maximum per dose 1.5 g once a day), subsequent doses adjusted according to serum amikacin concentration (maximum 15 g per course)

Second choice intravenous antibiotic - consult local microbiologist

---

1 See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment and renal impairment, and administering intravenous antibiotics.
2 Check previous urine culture and susceptibility results and antibiotic prescribing and choose antibiotics accordingly.
3 The European Medicines Agency’s Pharmacovigilance Risk Assessment Committee has recommended restricting the use of fluoroquinolone antibiotics following a review of disabling and potentially long-lasting side effects mainly involving muscles, tendons, bones and the nervous system (press release October 2018), but they are appropriate in acute prostatitis which is a severe infection.
4 Review treatment after 14 days and either stop or continue for a further 14 days if needed (based on history, symptoms, clinical examination, urine and blood tests).
5 Only consider when there is bacteriological evidence of sensitivity and good reasons to prefer this combination to a single antibiotic (BNF, August 2018).
6 Review intravenous antibiotics by 48 hours and consider switching to oral antibiotics where possible for a total of 14 days, then review.
7 Therapeutic drug monitoring and assessment of renal function is required (BNF, August 2018).

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 guardians.

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Appendix 7 – NICE NG111 Treatment Algorithm – Acute pyelonephritis

Pyelonephritis (acute): antimicrobial prescribing

Advises:
- Possible adverse effects of antibiotics include diarrhoea and nausea
- Nausea with vomiting is also a possible indication of worsening pyelonephritis
- Seeking medical help if symptoms worsen at any time or do not start to improve within 48 hours of taking the antibiotic, or the person becomes systemically very unwell

When results of urine culture available:
- Review the choice of antibiotic, and
- Change antibiotic according to susceptibility results if bacteria are resistant, using a narrow spectrum antibiotic when possible

Resess at any time if symptoms worsen or do not start to improve within 48 hours of taking the antibiotic, taking account of:
- Other possible diagnoses
- Any symptoms or signs suggesting a more serious illness or condition, such as sepsis
- Previous antibiotic use, which may have led to resistant bacteria

Refer to hospital if the person has any symptoms or signs of a more serious illness or condition (for example, sepsis)
Refer children and young people to hospital in line with the NICE guideline on urinary tract infections under 16s
Consider referring or seeking specialist advice for people aged 16 years and over if they:
- Are significantly dehydrated or unable to take oral fluids and medicines
- Are pregnant
- Have a higher risk of complications

NICE uses 'offer' when there is more certainty of benefit and 'consider' when evidence of benefit is less clear.
## Pyelonephritis (acute): antimicrobial prescribing

### Choice of antibiotic: non-pregnant women and men aged 16 years and over

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td>First choice oral antibiotic</td>
<td></td>
</tr>
<tr>
<td>Cefalexin</td>
<td>500 mg twice or three times a day (up to 1.5 g three or four times a day for severe infections) for 7 to 10 days</td>
</tr>
<tr>
<td>Co-amoxiclav (only if culture results available and susceptible)</td>
<td>500/125 mg three times a day for 7 to 10 days</td>
</tr>
<tr>
<td>Trimethoprim (only if culture results available and susceptible)</td>
<td>200 mg twice a day for 14 days</td>
</tr>
<tr>
<td>Ciprofloxacin (consider safety issues)</td>
<td>500 mg twice a day for 7 days</td>
</tr>
<tr>
<td>First choice intravenous antibiotics (if vomiting, unable to take oral antibiotics, or severely unwell)</td>
<td>Antibiotics may be combined if susceptibility or sepsis is a concern</td>
</tr>
<tr>
<td>Co-amoxiclav (only in combination or if culture results available and susceptible)</td>
<td>1.2 g three times a day</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>750 mg to 1.5 g three or four times a day</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>1 to 2 g once a day</td>
</tr>
<tr>
<td>Ciprofloxacin (consider safety issues)</td>
<td>400 mg twice or three times a day</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>Initially 5 mg/kg to 7 mg/kg once a day, subsequent doses adjusted according to serum gentamicin concentration</td>
</tr>
<tr>
<td>Amikacin</td>
<td>Initially 15 mg/kg once a day (maximum per dose 1.5 g once a day), subsequent doses adjusted according to serum amikacin concentration (maximum 15 g per course)</td>
</tr>
</tbody>
</table>

### Choice of antibiotic: pregnant women aged 12 years and over

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td>First choice oral antibiotic</td>
<td></td>
</tr>
<tr>
<td>Cefalexin</td>
<td>500 mg twice or three times a day (up to 1.5 g three or four times a day for severe infections) for 7 to 10 days</td>
</tr>
<tr>
<td>First choice intravenous antibiotic (if vomiting, unable to take oral antibiotics, or severely unwell)</td>
<td>Cefuroxime</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>750 mg to 1.5 g three or four times a day</td>
</tr>
<tr>
<td>Second choice antibiotics or combining antibiotics if susceptibility or sepsis is a concern</td>
<td>Consult local microbiologist</td>
</tr>
</tbody>
</table>

---

1. See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment and renal impairment, and administering intravenous antibiotics.
2. Check any previous urine culture and susceptibility results and antibiotic prescribing and choose antibiotics accordingly.
3. Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics.
4. Therapeutic drug monitoring and assessment of renal function is required (BNF, August 2018).

---

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.

Approved by Medicines Management Group April 2019

Doses are for patients with normal renal and hepatic function unless otherwise indicated
## Pyelonephritis (acute): antimicrobial prescribing

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

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Children aged 3 months and over - First choice oral antibiotic</strong></td>
<td></td>
</tr>
<tr>
<td>Cefalexin</td>
<td>3 to 11 months, 12.5 mg/kg or 125 mg twice a day for 7 to 10 days (25 mg/kg two to four times a day for severe infections)</td>
</tr>
<tr>
<td>Co-amoxiclav (only if culture results available and susceptible)</td>
<td>3 to 11 months, 0.25 ml/kg of 125/31 suspension three times a day for 7 to 10 days (dose doubled in severe infection)</td>
</tr>
<tr>
<td><strong>Children aged 3 months and over - First choice intravenous antibiotics (if vomiting, unable to take oral antibiotics or severely unwell). Antibiotics may be combined if susceptibility or sepsis a concern</strong></td>
<td></td>
</tr>
<tr>
<td>Co-amoxiclav (only in combination or if culture results available and susceptible)</td>
<td>3 months to 15 years, 30 mg/kg three times a day (maximum 1.2 g three times a day)</td>
</tr>
<tr>
<td>Cefturoxime</td>
<td>3 months to 15 years, 20 mg/kg three times a day (maximum 750 mg per dose), increased to 50 to 60 mg/kg three or four times a day (maximum 1.5 g per dose) for severe infections</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>3 months to 11 years (up to 50 kg), 50 to 80 mg/kg once a day (maximum 4 g per day); 9 to 11 years (50 kg and above), 1 to 2 g once a day; 12 to 15 years, 1 to 2 g once a day</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>Initially 7 mg/kg once a day, subsequent doses adjusted according to serum gentamicin concentration</td>
</tr>
<tr>
<td>Amikacin</td>
<td>Initially 15 mg/kg once a day, subsequent doses adjusted according to serum amikacin concentration</td>
</tr>
</tbody>
</table>

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1. See BNF for children (BNFC) for appropriate use and dosing in specific populations, for example hepatic and renal impairment, and administering intravenous antibiotics. If a young woman is pregnant, refer to the prescribing table on choice of antibiotic for pregnant women aged 12 years and over.
2. 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 being treated and the child’s size in relation to the average size of children of the same age.
3. Check any previous urine culture and susceptibility results and antibiotic prescribing and choose antibiotics accordingly.
4. Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics where possible for a total of 10 days.
5. If intravenous treatment is not possible, consider intramuscular treatment, if suitable.
6. Therapeutic drug monitoring and assessment of renal function is required (BNFC, August 2018).

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Appendix 8 – NICE NG114 Treatment Algorithm – Chronic obstructive pulmonary disease (acute exacerbation)

COPD (acute exacerbation): antimicrobial prescribing

When no antibiotics given, advise:
- antibiotic is not currently needed
- seeking medical help without delay if symptoms worsen rapidly or significantly, do not improve in an agreed time, or the person is systemically very unwell

If sputum sample sent for testing, when results available:
- review antibiotic choice
- only change antibiotic if bacteria resistant and symptoms not improving

When an antibiotic is given, advise:
- possible adverse effects of antibiotics, particularly diarrhoea
- symptoms may not be fully resolved by completion of antibiotic course
- seeking medical help if symptoms worsen rapidly or significantly, or do not improve within 2 to 3 days (or other agreed time), or the person becomes systemically very unwell

Reassess at any time if symptoms worsen rapidly or significantly, taking account of:
- other possible diagnoses, such as pneumonia
- symptoms or signs of something more serious, such as cardiorespiratory failure or sepsis
- previous antibiotic use, which may have led to resistant bacteria
- send sputum sample for testing if symptoms have not improved after antibiotics

Background
- An acute exacerbation of COPD is a sustained worsening of symptoms from a person’s stable state
- A range of factors (including viral infections and smoking) can trigger an exacerbation
- Many exacerbations (including some severe exacerbations) are not caused by bacterial infections so will not respond to antibiotics

Prescribing considerations
- When considering antibiotics, take into account:
  - the severity of symptoms, particularly sputum colour changes and increases in volume or thickness beyond the person’s normal day-to-day variation
  - whether they may need to go into hospital for treatment (see the NICE guideline on COPD)
  - previous exacerbation and hospital admission history, and the risk of developing complications
  - previous sputum culture and susceptibility results
  - the risk of antimicrobial resistance with repeated courses of antibiotics

Give oral antibiotics first line if possible
December 2018

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

Some people at risk of exacerbations may have antibiotics to keep at home as part of their exacerbation action plan (see the NICE guideline on COPD in over 65s)

Consider an antibiotic, but only after taking into account prescribing considerations

Doses are for patients with normal renal and hepatic function unless otherwise indicated.

Approved by Medicines Management Group April 2019
## COPD (acute exacerbation): antimicrobial prescribing

### Choice of antibiotic for treating an acute exacerbation: adults aged 18 years and over

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First choice oral antibiotics (empirical treatment or guided by most recent sputum culture and susceptibilities)</strong></td>
<td></td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>500 mg three times a day for 5 days (see BNF for dosage in severe infections)</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>200 mg on first day, then 100 mg once a day for 5 day course in total (see BNF for dosage in severe infections)</td>
</tr>
<tr>
<td>Clarithromycin</td>
<td>500 mg twice a day for 5 days (see BNF for dosage in severe infections)</td>
</tr>
</tbody>
</table>

**Second choice oral antibiotics (no improvement in symptoms on first choice taken for at least 2 to 3 days; guided by susceptibilities when available):**

- Use alternative first choice (from a different class): As above
- **Alternative choice oral antibiotics (if person at higher risk of treatment failure; guided by susceptibilities when available):**
  - Co-amoxiclav: 500/125 mg three times a day for 5 days
  - Levofloxacina: 500 mg once a day for 5 days
  - Co-trimoxazoleb: 960 mg twice a day for 5 days

**First choice intravenous antibiotics (if unable to take oral antibiotics or severely unwell; guided by susceptibilities when available):**

- Amoxicillin: 500 mg three times a day (see BNF for dosage in severe infections)
- Co-amoxiclav: 1.2 g three times a day
- Clarithromycin: 500 mg twice a day
- Co-trimoxazolec: 960 mg twice a day (see BNF for dosage in severe infections)
- Piperacillin with tazobactam: 4.5 g three times a day (see BNF for dosage in severe infections)

**Second choice intravenous antibiotics:**

Consult local microbiologist (guided by susceptibilities) a,b,c,d,e,f,g

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1. See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, and for administering intravenous antibiotics.
2. Where a person is receiving antibiotic prophylaxis, treatment should be with an antibiotic from a different class.
3. People who may be at higher risk of treatment failure include people who have had repeated courses of antibiotics, a previous or current sputum culture with resistant bacteria, or people at higher risk of developing complications.
4. The European Medicines Agency’s Pharmacovigilance Risk Assessment Committee has recommended restricting the use of fluoroquinolone antibiotics following a review of disabling and potentially long-lasting side effects mainly involving muscles, tendons, bones and the nervous system. This includes a recommendation not to use them for mild or moderately severe infections unless other antibiotics cannot be used (press release October 2018).
5. Co-trimoxazole should only be considered for use in acute exacerbations of COPD when there is bacteriological evidence of sensitivity and good reason to prefer this combination to a single antibiotic (BNF, October 2018).
6. Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics where possible.

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.

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Appendix 9 – NICE NG120 Treatment Algorithm – Cough (acute): antimicrobial prescribing

Cough (acute): antimicrobial prescribing

Upper respiratory tract infection and not systemically very unwell or at higher risk of complications

Do not offer an antibiotic

Advise on:
- the usual course of acute cough (up to 3 or 4 weeks)
- managing symptoms with self-care
- when to seek medical help, for example if symptoms worsen rapidly or significantly, do not improve after 3 or 4 weeks, or the person becomes systemically very unwell

If antibiotics are not prescribed, advise why not

With an antibiotic, advise on possible adverse effects including diarrhoea

With a back-up prescription, advise on using if symptoms worsen rapidly or significantly at any time

Do not routinely offer an antibiotic

Consider:
- an immediate antibiotic or
- a back-up antibiotic prescription

Refer to hospital, or seek specialist advice on further investigation and management, if the person has any symptoms or signs suggesting a more serious illness or condition (for example, sepsis, a pulmonary embolism or lung cancer)

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

Appendix 9 – NICE NG120 Treatment Algorithm – Cough (acute): antimicrobial prescribing

Doses are for patients with normal renal and hepatic function unless otherwise indicated.
### Cough (acute): antimicrobial prescribing

#### Choice of antibiotic: adults aged 18 years and over

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First choice</strong></td>
<td></td>
</tr>
<tr>
<td>Doxycycline</td>
<td>200 mg on first day, then 100 mg once a day for 4 days (5-day course in total)</td>
</tr>
<tr>
<td><strong>Alternative first choices</strong></td>
<td></td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>500 mg three times a day for 5 days</td>
</tr>
<tr>
<td>Clarithromycin</td>
<td>250 mg to 500 mg twice a day for 5 days</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>250 mg to 500 mg four times a day or 500 mg to 1000 mg twice a day for 5 days</td>
</tr>
</tbody>
</table>

1. See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breast-feeding
2. Doses given are by mouth using immediate-release medicines, unless otherwise stated
3. Doxycycline should not be given to pregnant women, and the possibility of pregnancy should be considered in women of childbearing age (BNF, December 2018)
4. Amoxicillin or erythromycin are preferred in women who are pregnant

#### Choice of antibiotic: children and young people under 18 years

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage and course length</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First choice</strong></td>
<td></td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>1 to 11 months: 125 mg three times a day for 5 days 1 to 4 years: 250 mg three times a day for 5 days 5 to 17 years: 500 mg three times a day for 5 days</td>
</tr>
<tr>
<td><strong>Alternative first choices</strong></td>
<td></td>
</tr>
<tr>
<td>Clarithromycin</td>
<td>1 month to 11 years: Under 8 kg, 7.5 mg/kg twice a day for 5 days 8 to 11 kg, 62.5 mg twice a day for 5 days 12 to 19 kg, 125 mg twice a day for 5 days 20 to 29 kg, 167.5 mg twice a day for 5 days 30 to 40 kg, 250 mg twice a day for 5 days 40 kg or more: 500 mg twice a day for 5 days 12 to 17 years: 250 mg to 500 mg twice a day for 5 days</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>1 month to 1 year: 125 mg four times a day or 250 mg twice a day for 5 days 2 to 7 years: 250 mg four times a day or 500 mg twice a day for 5 days 8 to 17 years: 250 mg to 500 mg four times a day or 500 mg to 1000 mg twice a day for 5 days</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>12 to 17 years: 200 mg on first day, then 100 mg once a day for 4 days (5-day course in total)</td>
</tr>
</tbody>
</table>

1. See BNF for children for appropriate use and dosing in specific populations, for example, hepatic impairment and renal impairment
2. 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
3. Amoxicillin or erythromycin are preferred in young women who are pregnant
4. Doxycycline should not be given to young women who are pregnant; and the possibility of pregnancy should be considered in young women of childbearing age (BNF for children, December 2018)