North East and Cumbria antimicrobial prescribing guideline for primary care

This guideline aims to provide primary care clinicians with clear advice on the empirical antibiotic treatment of common infections, to promote the judicious use of antibiotics and to minimise the emergence of bacterial resistance.

This guideline has been produced by the NECS Medicines Optimisation Team on behalf of CCGs in the North East and Cumbria. Treatment guidelines contained in this guide have been adapted from the Public Health England (formerly HPA) Management of Infection for Primary Care guidelines.

North East and Cumbria antimicrobial prescribing guideline for primary care

Foreword

This guideline is intended to provide advice on the effective and safe treatment of common infections presenting in primary care in the North East and Cumbria. It is largely based on the Public Health England (formerly HPA) Management of Infection Guidance for Primary Care and NICE Guidance. Clinicians are advised to use professional judgement and involve patients in management decisions.

The guideline should not be used in isolation, it should be supported with patient information about back-up/delayed antibiotics, infection severity and usual duration, clinical staff education, and audits. Materials are available on the RCGP TARGET website.

Further information, evidence and references are available through the Public Health England website and NICE Clinical Knowledge Summaries.

Doses unless stated otherwise are for adults, adjust for age, size and metabolic function. Refer to current BNF and BNF for children for further information.

Background

Antimicrobial stewardship and appropriate use of antibiotics is a global issue, and conserving the use of currently available antibiotics is a vital part of antimicrobial stewardship. The UK five year antimicrobial resistance strategy, published by the Department of Health in September 2013, highlighted the indiscriminate or inappropriate use of antibiotics as a key driver in the spread of antimicrobial resistance. Optimising prescribing practices is a key component of the strategy which highlights the need for sector specific prescribing guidelines to promote responsible use of antibiotics.

MicroGuide app

This guideline is also available to download free of charge as an app for your smartphone/ tablet. To get the app search for MicroGuide in the Apple Store or Google Play on your smart device. Select North of England CCGs from the list of medical organisations and you will be ready to download the guideline. The app will automatically update when the guideline is reviewed.

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<td>Educational resources for healthcare professionals</td>
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<tr>
<td>Changes from the previous guideline</td>
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</table>
10 steps for good antimicrobial prescribing practice

1. Prescribe an antibiotic only when there is likely to be a clear clinical benefit
2. Document clinical indication, duration, dose and route in patient records
3. Do not prescribe an antibiotic for viral sore throat, simple coughs and colds
4. Consider a no, or delayed, antibiotic strategy for acute self-limiting upper respiratory tract infections
5. Limit prescribing over the telephone to exceptional cases
6. Use simple generic antibiotics first whenever possible
7. Avoid broad spectrum antibiotics where a narrow spectrum agent will be effective
8. Avoid widespread use of topical antibiotics (especially those agents also available as systemic preparations)
9. In pregnancy AVOID tetracyclines, aminoglycosides, quinolones and high dose metronidazole. Short term use of trimethoprim (theoretical risk in first trimester in patients with poor diet, as folate antagonist) or nitrofurantoin (at term, theoretical risk of neonatal haemolysis) is unlikely to cause problems to the foetus
10. Where a ‘best guess’ therapy has failed or special circumstances exist, advice can be obtained from your local microbiologist

Microbiology contacts

Main switchboard numbers are listed below. Please ask for the Duty Microbiologist.

City Hospitals Sunderland NHS Foundation Trust
0191 565 6256

County Durham and Darlington NHS Foundation Trust
0191 333 2333

Gateshead Health NHS Foundation Trust
0191 482 0000

Newcastle upon Tyne Hospitals NHS Foundation Trust
0191 233 6161

North Cumbria University Hospitals NHS Trust
01228 523444

North Tees and Hartlepool NHS Foundation Trust
01642 617617

Northumbria Healthcare NHS Foundation Trust
0344 811 8111

South Tees Hospitals NHS Foundation Trust
01642 850850

South Tyneside NHS Foundation Trust
0191 404 1000

University Hospitals of Morecambe Bay NHS Foundation Trust
01229 870870

Risk of sepsis

Sepsis is a medical emergency, it is responsible for 37,000 deaths annually in the UK and severe sepsis has a five-fold higher mortality than STEMI or stroke. A high degree of vigilance is required for early identification of the septic patient. In the primary care setting, where perceived infection is one of the most common reasons for presentation, clinical acumen of the GP is essential in determining which patients to evaluate for sepsis.

As well as the general impression at the time of initial assessment, the presence of abnormal observations should be enough to initiate evaluation for sepsis.

In severe infection it is important to initiate antibiotics as soon as possible.

Further information on sepsis, including GP sepsis screening and action tool can be found on page 23.

Risk of Clostridium difficile infection

Antibiotic exposure is associated with a significantly higher risk of Clostridium difficile infection (CDI) than no antibiotic exposure. Ciprofloxacin, cephalosporins, clindamycin and co-amoxiclav (the 4C antibiotics) and other broad spectrum antimicrobials are associated with an increased risk of CDI.

Antibiotics associated with an increased risk of CDI have been highlighted with the use of red text and @ throughout this guide.

When using antibiotics associated with an increased risk of CDI counsel patients at risk to be alert for signs of CDI and seek medical help if diarrhoea develops.

Further information on CDI can be found on page 24.

Penicillin allergy

Allergy is one of the most common and important adverse effects of penicillin and related drugs.

All cases of penicillin allergy should be recorded in the patient’s notes.

Anaphylaxis is rare, but can be fatal. Any patient describing anaphylaxis following penicillin exposure must not be prescribed any penicillin again.

Further information on penicillin allergy can be found on page 25.
This quick reference guide shows recommended first line drugs, adult doses and treatments for some of the more common infections in primary care. Please refer to the North East and Cumbria antimicrobial prescribing guideline for primary care for full details.

**Upper respiratory tract infections**

**Antibiotics are rarely necessary** as most upper respiratory tract infections are self-limiting. Provide patients with advice about total illness length and advice regarding management of symptoms, particularly analgesics and antipyretics.

**Acute sore throat** – avoid antibiotics, 90% resolve in 7 days without and pain only reduced by 16 hours. Assess severity using FeverPAIN clinical scoring system.
- First line: **Phenoxymethylpenicillin 500mg QDS for 10 days**
- Penicillin allergy: **Clarithromycin 250-500mg BD for 5 days**

**Acute rhinosinusitis** – avoid antibiotics, 80% resolve in 14 days without, and they only offer marginal benefit after 7 days
- First line: **Amoxicillin 500mg TDS for 7 days** or
- Penicillin allergy: **Doxycycline 200mg stat then 100mg OD for 7 days**

**Acute otitis media in children** – avoid antibiotics as 60% are better within 24 hours
- First line: **Amoxicillin** (see BNF for Children (BNF-C) for doses)
- Penicillin allergy: **Erythromycin** (children <12), **Clarithromycin** (children ≥12) for 5 days (see BNF-C for doses)

**Lower respiratory tract infections**

**Acute cough, bronchitis** – antibiotics of little benefit if no co-morbidity. Consider delayed antibiotic with advice. Consider immediate antibiotics if >80 years and one of: hospitalisation in the past year, oral steroids, diabetic, congestive heart failure OR >65 years with two of the above.
- First line: **Amoxicillin 500mg TDS for 5 days**
- Penicillin allergy: **Doxycycline 200mg stat then 100mg OD for 5 days**

**Acute exacerbation of COPD** – treat promptly with antibiotics if purulent sputum and increased shortness of breath and/or increased sputum volume.
- **Doxycycline 200mg stat then 100mg OD for 5 days** or **Amoxicillin 500mg TDS for 5 days**
- Alternative (if resistance risk factors) **Co-amoxiclav 625mg TDS for 5 days**

**Urinary tract infections**

**UTI in men and non-pregnant women** (no fever or flank pain)
- **Nitrofurantoin 100mg BD (modified release) or 50mg QDS (standard release) for 3 days in women/ 7 days in men**
  Or **Trimethoprim 200mg BD for 3 days in women/ 7 days in men**

**Skin infections**

**Cellulitis and wound infection**
- First line: **Flucloxacillin 500mg-1g QDS for 7 days**
- Alternative (penicillin allergy): **Clarithromycin 500mg BD for 7 days**
  *continue treatment for a further 7 days if slow response*

**Impetigo** (also boils, carbuncles, folliculitis, staphylococcal paronychia and staphylococcal whitlow)
- First line: **Flucloxacillin 500mg – 1g QDS for 7 days** (see BNF-C for patients <18 years of age)
- Penicillin allergy: **Clarithromycin 500mg BD for 7 days**
- If liquid formulation required: **Erythromycin** (see BNF-C for doses)

**Bites (human and animal)**
- First line: **Co-amoxiclav 625mg TDS for 7 days**
- Penicillin allergy: **Metronidazole 400mg TDS for 7 days PLUS doxycycline 100mg BD for 7 days**

Valid from June 2016. Review date April 2018.
Upper respiratory tract infections

Most respiratory tract infections are self-limiting, therefore antibiotics are rarely necessary.

Consider a delayed antibiotic prescription strategy. Giving out antibiotics automatically for upper respiratory tract infections increases the number of future consultations for the same symptoms.

The NICE care pathway for respiratory tract infections states that all patients should be offered:

1. Advice about the natural history of the illness and total illness length
2. Advice regarding management of symptoms, particularly analgesics and antipyretics (a patient information leaflet is available through the RCGP TARGET toolkit)

### Natural history and average illness length for common respiratory tract infections:

<table>
<thead>
<tr>
<th>Infection</th>
<th>Average length of symptoms</th>
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<td>Middle-ear infection</td>
<td>4 days</td>
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<tr>
<td>Sore throat</td>
<td>7 days</td>
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<tr>
<td>Common cold</td>
<td>10 days</td>
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<td>Sinusitis</td>
<td>18 days</td>
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<tr>
<td>Cough or bronchitis</td>
<td>21 days</td>
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### When to treat

- **Acute otitis externa (AOE)**
  - It is important to exclude an underlying chronic otitis media before treatment is commenced.
  - Many cases recover after thorough cleansing of the external ear canal by suction or dry mopping. Cure rates are similar at 7 days for topical acetic acid or antibiotic +/- steroid.
  - If cellulitis or disease extending outside ear canal start oral antibiotics and refer to exclude malignant OE.

### Prescribing notes and general advice

- **First line**: Acetic acid 2% ear spray (Ear-calm®) 1 spray TDS for 7 days and analgesia
  - For patients who pay for prescriptions Ear-calm® spray is available to purchase from pharmacies for less than a prescription charge.
- **Alternative**: Neomycin sulfate with corticosteroid drops (Betnesol N®) 3 drops TDS for a minimum of 7 days; maximum 14 days
- **Or**: Neomycin sulfate with dexamethasone spray (Otomize®) 1 spray TDS

### References and further information

- NICE Clinical Knowledge Summaries: Otitis externa
<table>
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<th>When to treat</th>
<th>Prescribing notes and general advice</th>
<th>When treatment is needed</th>
<th>References and further information</th>
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<tr>
<td><strong>Acute otitis media in children (AOM)</strong></td>
<td>Avoid antibiotics as 60% are better within 24 hours without; they only reduce pain at 2 days (NNT = 15) and do not prevent deafness.</td>
<td>Use NSAIDs or paracetamol for pain relief. Inform the parent/carer that the total duration of illness for untreated acute otitis media, before and after seeing a healthcare professional is 4 days. Advise the person to re-consult if the condition worsens or if symptoms are not starting to settle within 3 days of the onset of the illness.</td>
<td>First line: <strong>Amoxicillin</strong> see latest BNF for children for accurate doses. Alternative (penicillin allergy): <strong>Erythromycin</strong>* for children &lt;12 years see latest BNF for children for accurate doses. <strong>Clarithromycin</strong> for children ≥12 years 250 – 500mg BD for 5 days</td>
<td>NICE Clinical Knowledge Summaries: <strong>Otitis media</strong> NICE CG47: Feverish illness in children NICE CG69: Respiratory tract infections</td>
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<tr>
<td></td>
<td>Consider a delayed antibiotic prescription strategy. Public Health England suggest you consider a 2 or 3 day delayed or immediate antibiotics for pain relief if:</td>
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<td></td>
<td>• &lt;2 years with bilateral AOM (NNT = 4)</td>
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<td></td>
<td>• All ages with otorrhoea (NNT = 3)</td>
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<tr>
<td><strong>Acute rhinosinusitis</strong></td>
<td>Avoid antibiotics as 80% resolve in 14 days without, and they only offer marginal benefit after 7 days (NNT = 15). Consider a delayed antibiotic prescription strategy. Consider 7-day delayed or immediate antibiotic when fever &gt;38°C, toothache.</td>
<td>Use adequate analgesia.</td>
<td>First line: <strong>Amoxicillin</strong> 500mg TDS for 7 days Or <strong>Phenoxymethylpenicillin</strong> 500mg QDS for 7 days Alternative (penicillin allergy): <strong>Doxycycline</strong> 200mg stat then 100mg OD for 7 days Persistent symptoms: <strong>Co-amoxiclav 625mg TDS</strong> for 7 days</td>
<td>NICE Clinical Knowledge Summaries: <strong>Sinusitis</strong> NICE CG69: Respiratory tract infections</td>
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<tr>
<td><strong>Acute sore throat</strong></td>
<td>The majority of sore throats are viral; most patients do not benefit from antibiotics. 90% of cases resolve in 7 days without antibiotics, and pain only reduced by 16 hours. Adequate analgesia and fluids will usually be all that is required. Consider a delayed antibiotic prescription strategy. Clinical scoring systems can be used to help decide whether to prescribe an antibiotic. Public Health England recommend using the FeverPAIN score as an alternative to the Centor criteria. Always share self-care advice and safety net. <strong>FeverPAIN score:</strong> each clinical feature scores 1 point:</td>
<td></td>
<td>First line: <strong>Phenoxymethylpenicillin</strong> 500mg QDS for 10 days. Alternative (penicillin allergy): <strong>Clarithromycin</strong> 250 – 500mg BD for 5 days</td>
<td>NICE Clinical Knowledge Summaries: <strong>Acute sore throat</strong> NICE CG 69: Respiratory tract infections – antibiotic prescribing FeverPAIN clinical score</td>
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<td></td>
<td>• Fever in last 24 hours</td>
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<td></td>
<td>• Purulence</td>
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<td></td>
<td>• Attend rapidly under 3 days</td>
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<td></td>
<td>• Inflamed tonsils</td>
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<td>• No cough or coryza</td>
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<td>Score 0-1 = 13-18% streptococci, use NO antibiotic strategy Score 2-3 = 34-40% streptococci, use 3 day back-up antibiotic Score ≥4 = 62-65% streptococci, use immediate antibiotic if severe, or 48 hour short back-up prescription</td>
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<td></td>
<td><strong>The Centor criteria:</strong> the presence of each clinical feature scores 1 point:</td>
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<tr>
<td></td>
<td>• History of fever</td>
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<td></td>
<td>• Absence of cough</td>
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<td></td>
<td>• Tender anterior cervical lymphadenopathy</td>
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<td></td>
<td>• Tonsillar exudate</td>
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<td>Score 0-2 indicates a low chance of <strong>Group A Beta-haemolytic Streptococci (GABHS)</strong> Score 3-4 or history of OM, consider a 2 or 3 day delayed antibiotic prescription strategy or immediate antibiotics</td>
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</table>
Key points from the NICE care pathway for respiratory tract infections

Patient with acute otitis media/ acute sore throat/ acute pharyngitis/ acute tonsillitis/ common cold/ acute rhinosinusitis/ acute cough/ bronchitis

Also consider immediate antibiotic prescribing depending on the severity of the RTI

Patient at risk of developing complications

No antibiotic prescribing

Delayed antibiotic prescribing

No antibiotic prescribing, delayed antibiotic or immediate antibiotic prescribing

Immediate antibiotic prescribing or further investigation and/or management

Offer patients:
- Reassurance that antibiotics are not needed immediately because they will make little difference to symptoms and may have side effects e.g. diarrhoea, vomiting and rash
- A clinical review if the RTI worsens or becomes prolonged

Consider an immediate antibiotic prescribing strategy for the following patients:
- Children younger than 2 years with bilateral acute otitis media
- Children with otorrhoea who have acute otitis media
- Patients in whom three or more Centor criteria are present

The Centor criteria – the presence of each clinical feature scores 1 point:
- History of fever
- Absence of cough
- Tender anterior cervical lymphadenopathy
- Tonsillar exudate

Offer patients:
- Reassurance that antibiotics are not needed immediately because they will make little difference to symptoms and may have side effects e.g. diarrhoea, vomiting and rash
- Advice about using the delayed prescription if symptoms do not settle or get significantly worse
- Advice about reconsulting if symptoms get significantly worse despite using the delayed prescription

Adapted from the NICE pathway for self-limiting respiratory tract infections – antibiotic prescribing overview.
## Lower respiratory tract infections

**Low doses of penicillins are more likely to select out resistance.**  
**Do not** use ciprofloxacin first line. **Reserve all** quinolones for proven resistant organisms.

### When to treat

<table>
<thead>
<tr>
<th>Acute cough, bronchitis</th>
<th>Acute exacerbation of COPD</th>
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</table>
| **Consider 7 days delayed antibiotic with symptomatic advice/ patient information leaflet.**  
Care should be taken to exclude a differential diagnosis of pneumonia. Antibiotics are not indicated in people who are otherwise well. Routine follow up is not necessary, however patients should be advised to seek advice if their condition deteriorates significantly or symptoms persist for longer than 3 weeks.  
Consider immediate antibiotics if >80 years of age and with one of the following:  
- Hospitalization in past year  
- Oral steroids  
- Diabetic  
- Congestive heart failure  
OR >65 years of age and two of the above.  
Consider CRP test if antibiotic being considered  
- CRP <20mg/L consider no antibiotics  
- CRP 20-100mg/L consider delayed antibiotic strategy  
- CRP >100mg/L consider immediate antibiotic prescription | **Treat exacerbations promptly with antibiotics if purulent sputum and increased shortness of breath and/or increased sputum volume**  
Risk factors for antibiotic resistant organisms include co-morbid disease, severe COPD, frequent exacerbations, antibiotics in last 3 months. |

### Prescribing notes and general advice

<table>
<thead>
<tr>
<th>Acute cough, bronchitis</th>
<th>Acute exacerbation of COPD</th>
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<tr>
<td>Use paracetamol or ibuprofen as required, drink plenty of fluids. Symptom resolution can take up to 3 weeks.</td>
<td><strong>! Increased risk of C.diff infection with co-amoxiclav.</strong></td>
</tr>
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</table>

### When treatment is needed

<table>
<thead>
<tr>
<th>Acute cough, bronchitis</th>
<th>Acute exacerbation of COPD</th>
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</thead>
</table>
| **Amoxicillin** 500mg TDS for 5 days.**  
Or **Doxycycline** 200mg stat, then 100mg OD for 5 days | **First line:** **Doxycycline** 200mg stat, then 100mg OD for 5 days  
Or **Amoxicillin** 500mg TDS for 5 days  
**Alternative (if resistance risk factors):** **Co-amoxiclav** 625mg TDS for 5 days |

### References and further information

<table>
<thead>
<tr>
<th>Acute cough, bronchitis</th>
<th>Acute exacerbation of COPD</th>
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</table>
| **NICE Clinical Knowledge Summaries: Chest infections**  
**NICE CG69: Respiratory tract infections** | **NICE Clinical Knowledge Summaries: Chest infections**  
**NICE CG69: Respiratory tract infections** |
<table>
<thead>
<tr>
<th>Community acquired pneumonia (treatment in the community)</th>
<th>When to treat</th>
<th>Prescribing notes and general advice</th>
<th>When treatment is needed</th>
<th>References and further information</th>
</tr>
</thead>
</table>
| **Do not routinely offer microbiological tests to patients with low-severity community acquired pneumonia.**  
The use CRB-65 score to help guide and review:  
- Consider home-based care for patients with a CRB-65 score of 0  
- Consider hospital assessment for all other patients, particularly those with a CRB-65 score of 2 or more  

For patients with moderate or high-severity community acquired pneumonia:  
- Take blood and sputum cultures and  
- Consider pneumococcal and legionella urinary antigen tests  

Do not routinely offer a glucocorticoid to patients with community acquired pneumonia unless they have other conditions for which glucocorticoid treatment is indicated.  | **CRB-65 score for mortality risk assessment in primary care:**  
Each score 1:  
- Confusion (AMT <8)  
- Raised respiratory rate (>30 breaths per minute)  
- Low blood pressure (systolic ≤90mmHg or diastolic ≤60mmHg)  
- Age ≥65 years  

Patients are stratified for risk of death as follows:  
0: low risk (<1% mortality risk)  
1 or 2: intermediate risk (1-10% mortality risk)  
3 or 4: high risk (more than 10% mortality risk)  | **If CRB-65=0**  
First line: **Amoxicillin 500mg TDS for 5 days**  
Alternative (penicillin allergy): **Clarithromycin 500mg BD for 5 days**  
**Or: Doxycycline 200mg stat, then 100mg OD for 5 days**  
*consider extending the course of the antibiotic for longer than 5 days as a possible management strategy for patients with low-severity community acquired pneumonia whose symptoms do not improve as expected after 3 days.*  
Explain to patients/carers they should seek further medical advice if their symptoms do not begin to improve within 3 days of starting the antibiotic, or earlier if their symptoms are worsening.  | **If CRB-65=1 and able to be managed at home**  
First line: **Amoxicillin 500mg TDS for 7-10 days**  
**PLUS**  
Clarithromycin 500mg BD for 7-10 days  
**Or: Doxycycline 200mg stat, then 100mg OD for 7-10 days**  | **NICE Clinical Knowledge Summaries:**  
**Chest infections - adult**  
**BTS Guidelines for the Management of Community Acquired Pneumonia**  
**NICE CG191:**  
**Pneumonia: Diagnosis and management of pneumonia in adults** |
# Urinary tract infections

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| **Acute pyelonephritis** | Whether or not a person with acute pyelonephritis should be admitted to hospital depends on a number of factors including the severity of their symptoms, their general state of health, comorbidities and age.  
If admission is not needed, send MSU for culture and sensitivities and start antibiotics.  
If no response within 24 hours, admit. |  
+ **Increased risk of C.diff infection with ciprofloxacin and co-amoxiclav.**  
Encourage adequate fluid intake. |  
+ **Co-amoxiclav @ 625mg TDS for 7 days**  
Or **Ciprofloxacin @ 500mg BD for 7 days**  
*may not be as effective in patients with renal impairment. |  
NICE Clinical Knowledge Summaries: Pyelonephritis – acute |
| **Recurrent UTI** | To reduce recurrence first advise simple measures including better hydration and cranberry products.  
Guidance from The British Association of Urological Surgeons is in development. In the interim, treatment guidance is available from the Scottish Medicines Consortium and SIGN |  | Scottish Medicines Consortium Guidance SIGN Guideline 88 |
| **UTI in children** | Assess the risk of serious illness in line with NICE CG47 (Feverish illness in children).  
**Infants <3 months**: urgently refer all infants less than 3 months of age if UTI is suspected.  
Treat mildly unwell children aged 3 months and older. Use positive nitrite to guide. Send pre-treatment MSU for all.  
Imaging: only refer if child younger than 6 months of age or recurrent or atypical UTI. |  
Most children are well 24-48 hours after starting treatment. If the infant or child is still unwell after 24-48 hours they should return for reassessment.  
Encourage adequate fluid intake (for example check that the child is passing adequate amounts of urine or is having wet nappies). |  
Lower UTI  
**Trimethoprim** for 3 days*  
Or **Nitrofurantoin** for 3 days*  
Or **Amoxicillin** (if susceptible) for 3 days*  
Or **Cefalexin** for 3 days*  
*see BNF for children for accurate dosing information |  
Upper UTI  
**Co-amoxiclav @** for 7-10 days (see BNF for children for accurate doses) | NICE Clinical Knowledge Summaries: Urinary tract infection – children  
NICE CG54: Urinary tract infections in children |
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| **UTI in men and non-pregnant women (no fever or flank pain)** | Do not treat asymptomatic bacteriuria: it is common but it is not associated with increased morbidity.  
*Women with severe/≥3 symptoms:* treat.  
*Women with mild/<2 symptoms:* use dipstick to guide treatment.  
*Men:* consider prostatitis and send pre-treatment MSU or if symptoms mild/ non-specific use –ve nitrites and leucocytes to exclude UTI.  
*People >65 years:* do not treat asymptomatic bacteriuria; it is common but not associated with increased morbidity. | Do not routinely dipstick to exclude UTI. In elderly patients (>65 years), diagnosis should be based on full clinical assessment, including vital signs. Dipstick tests are only indicated for women <65 years who have minimal signs and symptoms. Please refer to SIGN guidance 88 for guidance on dipstick testing in the community.  
Community multi-resistant extended-spectrum beta-lactamase *E. coli* is increasing: seek advice from microbiologist. Nitrofurantoin, pivmecillinam or fosfomycin are options (please refer to your local formulary for status before prescribing). | **First line:**  
Nitrofurantoin 100mg BD (modified release) or 50mg QDS (standard release) for 3 days in women/ 7 days in men*  
Or Trimethoprim 200mg BD for 3 days in women/ 7 days in men  
**Second line:** Perform culture in all treatment failures. Amoxicillin resistance is common; only use if susceptible.  
*contra-indicated in patients with eGFR<45ml/min  
Short courses of nitrofurantoin may be used with caution in patients with eGFR 30-44ml/min. For further information see MHRA Drug Safety Update September 2014. |
| **UTI in patients with catheters** | For every day a catheter is left in, 5-10% of patients will become colonised with bacteria. Unless catheterisation is short term all patients can be assumed to have bacteria in their urine.  
If signs/ symptoms are consistent with a catheter-associated UTI please discuss with microbiologist regarding appropriate antibiotics. Management should include a change of catheter (if safe to do so) whilst on appropriate antibiotics. | Do not use dipstick testing to diagnose UTI in patients with catheters.  
A catheter specimen of urine sample is necessary in suspected catheter associated UTI but CSU samples should not be sent in the absence of clinical evidence of a UTI. | Therapy is not indicated for asymptomatic patients.  
SIGN guidance: Management of suspected bacterial UTI in adults |
| **UTI in pregnancy** | Symptomatic bacteriuria occurs in 17-20% of pregnancies. Pregnant women with mild to moderate symptomatic UTI should be treated with an antibiotic.  
Send MSU for culture and sensitivity stating clearly which trimester and start empirical antibiotics. | Short term use of nitrofurantoin in pregnancy is unlikely to cause problems to the foetus. The BNF recommends that nitrofurantoin should be avoided at term, because of the risk of neonatal haemolysis.  
Avoid trimethoprim if low folate status or on folate antagonist (e.g. antiepileptics) | **First line:**  
Nitrofurantoin* 100mg BD (modified release) or 50mg QDS (standard release) for 7 days.  
*contra-indicated in patients with eGFR<45ml/min  
Or Amoxicillin (if susceptible) 500mg TDS for 7 days  
**Alternative:** Trimethoprim 200mg BD for 7 days (unlicensed) Also give folic acid 5mg daily if 1st trimester  
Or Cefalexin 500mg BD for 7 days |

**NICE Clinical Knowledge Summaries:**  
Urinary tract infection (lower) – women  
Urinary tract infection (lower) – men  
SIGN guidance: Management of suspected bacterial UTI in adults
# Gastrointestinal tract infections

## When to treat

**Acute diverticulitis**

Information on the management of acute diverticulitis can be found on the [NICE Clinical Knowledge Summaries website](https://www.nice.org.uk).  

**Clostridium difficile infection**

ALL positive cases of *C.diff* infection should be discussed with a microbiologist prior to initiating treatment.

**Non-severe CDI:** treat in primary care.
- Mild CDI: not associated with a raised WCC, typically associated with <3 stools of type 5-7 on the Bristol Stool Chart per day.
- Moderate CDI: associated with a raised WCC (>15x10^9/L), typically associated with 3-5 stools per day.

**Severe CDI:** specialist treatment only. **Admit as an emergency.**
- Severe CDI: associated with WCC >15x10^9/L or an acute rising serum creatinine (i.e. 50% above baseline), or evidence of severe colitis.
- Life-threatening CDI: includes hypotension, partial or complete ileus of toxic megacolon, or CT evidence of severe disease.

## Prescribing notes and general advice

### How to respond to positive lab results:
1. Initiate treatment as indicated (and isolate the patient if in a nursing/ care home)
2. Stop concomitant (non *C.difficile*) antibiotics if safe to do so and any laxatives
3. Review and stop any concomitant PPI use if possible
4. Do not use antimotility drugs e.g. loperamide

### Treat according to local microbiological advice.

*Where metronidazole is recommended:* 400mg TDS for 10-14 days (70% of patients respond to metronidazole in 5 days; 92% in 7 days)

*Where vancomycin is recommended:* Please note vancomycin caps 125mg QDS cannot be administered via PEG.

## When treatment is needed

**Detection and eradication of *H.pylori***

The presence of *H.pylori* should be confirmed before starting eradication therapy. One week triple treatment eradicates *H.pylori* in >90% of cases.

There is no need to continue PPI beyond eradication treatment unless ulcer is complicated by haemorrhage or perforation.

Do not use clarithromycin, metronidazole or quinolone if used in past year for any infection.

**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.

*H.pylori* can be initially detected using a stool antigen test or urea breath test.  
Where re-testing is necessary a breath test should be used.

Testing for *H.pylori* should not be performed within 4 weeks of treatment with any antibiotic or 2 weeks with any PPI.

Always use PPI **twice daily** (refer to local formulary for first line choice).

### First line treatment:

**PPI WITH** amoxicillin 1g BD for 7 days

**PLUS** either clarithromycin* 500mg BD for 7 days OR metronidazole* 400mg BD for 7 days

*choose the treatment regimen with the lowest acquisition cost, and take into account previous exposure to clarithromycin or metronidazole.

### Penicillin allergy:

**PPI WITH** clarithromycin 500mg BD for 7 days

**PLUS** metronidazole 400mg BD for 7 days

For relapses discuss with specialist prior to initiating treatment

### References and further information

- [NICE Clinical Knowledge Summaries: Acute diverticulitis](https://www.nice.org.uk)
- [NICE Clinical Knowledge Summaries: Diarrhoea – antibiotic associated](https://www.nice.org.uk)
- [NICE Clinical Knowledge Summaries: Dyspepsia – proven peptic ulcer](https://www.nice.org.uk)
- [NICE CG184: Dyspepsia and gastro-oesophageal reflux disease](https://www.nice.org.uk)
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<td><strong>Gastroenteritis</strong></td>
<td>Treatment should only be considered on the advice of a microbiologist in severe or invasive infections (severe systemic upset and/or dysentery). <strong>Antibiotic therapy is not usually indicated.</strong> Fluid replacement essential. Do not use antimotility drugs if stools are bloody.</td>
<td></td>
<td>NICE Clinical Knowledge Summaries: Gastroenteritis</td>
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<td><strong>Threadworms</strong></td>
<td>Treatment is recommended if threadworms have been seen or eggs detected. All household contacts should be treated simultaneously.</td>
<td>Advise morning shower/baths and hand hygiene. Wash sleepwear, bed linen, towels, and cuddly toys at normal temperatures and rinse well. Thoroughly vacuum and dust, paying particular attention to the bedrooms, including vacuuming mattresses.</td>
<td>NICE Clinical Knowledge Summaries: Threadworm BNF for Children: 5.5.1 Drugs for threadworms</td>
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<td><strong>Traveller's diarrhoea</strong></td>
<td>For assessment of individual countries see the National Travel Health Network and Centre (NaTHNaC) website (<a href="http://www.nathnacl.org">www.nathnacl.org</a>). If a prescription is considered necessary for people travelling to remote areas, treatment should be via private prescription.</td>
<td></td>
<td>NaTHNaC: Health Professionals – travellers' diarrhoea</td>
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# Genital tract infections

**STI screening:** People with risk factors (<25 years of age, no condom use, recent (<12 months) change of partner, symptomatic partner, high risk sexual practices) should be screened for chlamydia, gonorrhea, HIV, syphilis. Refer to GUM clinic or GP with level 2 or 3 expertise in GUM.

Clinical guidelines from the British Association for Sexual Health and HIV (BASHH) can be found on the [BASHH website](#).

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<td><strong>Acute prostatitis</strong></td>
<td>Start antibiotic treatment immediately, while waiting for MSU culture results.</td>
<td>First line: <strong>Ciprofloxacin</strong> @ 500mg BD for 28 days (Quinolones achieve higher prostate levels.)</td>
<td>NICE Clinical Knowledge Summaries: Prostatitis – acute</td>
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<td>Reassess after 24-28 hours. Review the culture results and ensure that an appropriate antibiotic is being used. Refer to urology urgently if the infection is not responding adequately to treatment.</td>
<td>Second line: <strong>Trimethoprim</strong> 200mg BD for 28 days</td>
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<td><strong>Bacterial vaginosis</strong></td>
<td>Approximately 50% of women with BV are asymptomatic. When symptoms are present, BV is characterized by a fishy-smelling vaginal discharge. Women with asymptomatic bacterial vaginosis (BV) do not usually require treatment. Symptomatic women should be managed as per the treatment choices outlined below. <strong>Pregnant women</strong> should be managed as per treatment choices below, however the 2g stat dose of metronidazole should not be used.</td>
<td>First line: <strong>Metronidazole PO</strong> 400mg BD for 7 days Or <strong>Metronidazole PO</strong> 2g stat* *2g stat dose of metronidazole should not be used in pregnant women <strong>Alternative:</strong> <strong>Metronidazole vaginal gel</strong> 0.75% 5g (1 applicatorful) intravaginally at night for 5 nights Or <strong>Clindamycin cream</strong> 2% 5g (1 applicatorful) intravaginally at night for 7 nights</td>
<td>NICE Clinical Knowledge Summaries: Bacterial vaginosis – summary</td>
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| **Chlamydia trachomatis** | Treatment should be initiated promptly in all people who test positive for chlamydia, or have signs or symptoms strongly suggestive of chlamydia (after testing for other sexually transmitted infections as appropriate). Opportunistically screen all aged 15 – 25 years. If acceptable, refer to a GUM clinic who will arrange treatment, screening for other STIs, detailed information on STIs, and partner notification. | Sexual intercourse should be avoided until both the person diagnosed with chlamydia and any partners have completed the course of treatment. (If single dose azithromycin is given, sexual abstinence for the following 7 days is advised or until any sexual partners have completed their treatment, whichever is the longer.) | **Doxycycline** 100mg BD for 7 days  
Or **Azithromycin** 1g stat (taken 1 hour before or 2 hours after food)  
Pregnancy and breastfeeding: **Azithromycin** (off-label use) 1g stat  
Or **Erythromycin** 500mg QDS for 7 days  
Or **Amoxicillin** 500mg TDS for 7 days | NICE Clinical Knowledge Summaries: Chlamydia  
British Association for Sexual Health & HIV: Chlamydia guideline  
SIGN: Management of genital chlamydia trachomatis infection |
| **Epididymo-orchitis, epididymitis, and orchitis** | Information on the management of epididymo-orchitis, epididymitis, and orchitis can be found on the NICE Clinical Knowledge Summaries website | | NICE Clinical Knowledge Summaries: Scrotal swellings – epididymo-orchitis |
| **Genital herpes** | Refer to Sexual Health Service for confirmation of diagnosis or (if first episode) send viral swab to lab. Consider the need for full STI screening in all cases. Commence treatment within 5 days of the start of the episode. Extend course if new lesions appear during treatment or healing incomplete. Advise abstinence until lesions have cleared. Patient information leaflets are available from the Herpes Viruses Association or the Family Planning Association. | First line: **Aciclovir** 400mg TDS for 5 days  
Or **Aciclovir** 200mg five times a day for 5 days  
Immunocompromised/ HIV patients: **Aciclovir** 400mg five times a day for 7-10 days | NICE Clinical Knowledge Summaries: Herpes simplex – genital |
| **Gonorrhoea** | Antibiotic resistance to gonorrhoea is now very high. Ideally, refer all people with confirmed or suspected gonorrhoea to a genito-urinary medicine (GUM) clinic or other local specialist sexual health service. | | NICE Clinical Knowledge Summaries: Gonorrhoea  
Gonorrhoea and Antimicrobial Resistance CMO Letter Dec 2016 |
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| **Pelvic inflammatory disease** | Refer women and contacts to GUM clinic. Start empirical antibiotics as soon as a presumptive diagnosis of PID is made clinically. Do not wait for swab results. Always culture for gonorrhea and chlamydia. If gonorrhea is likely use ceftriaxone regimen (28% of gonorrhea isolates are now resistant to quinolones) or refer to GUM clinic. | First line: **Metronidazole** 400mg BD for 14 days **PLUS** Ofloxacin 400mg BD for 14 days  
**Or** Metronidazole 400mg BD for 14 days **PLUS** Doxycycline 100mg BD for 14 days  
If high risk of gonorrhoea: ADD Ceftraxone IM 500mg IM stat |
| **Trichomoniasis**           | Treat partners and refer to GUM clinic. Trichomoniasis is a sexually transmitted infection. Advise sexual abstinence until treatment is completed and any partners have also been treated and followed up. | First line: **Metronidazole** tablets 400mg BD for 5-7 days  
**Or** Metronidazole tablets 2g stat  
*manufacturer advises avoid in pregnancy  
**Alternative:** Clotrimazole pessary 100mg pessary at night for 6 nights |
| **Vaginal candidiasis**       | Topical and oral azoles give 75% cure. Pregnancy: Avoid oral azoles – use intravaginal | First line: **Clotrimazole pessary** 500mg stat  
**Or** Clotrimazole vaginal cream 10% stat  
**Or** Fluconazole PO 150mg stat  
**Alternative or pregnancy:** Clotrimazole pessary 100mg at night for 6 nights  
**Or** Miconazole intravaginal cream 2% 5g BD for 7 days |

References and further information

NICE Clinical Knowledge Summaries: Pelvic inflammatory disease

NICE Clinical Knowledge Summaries: Trichomoniasis

NICE Clinical Knowledge Summaries: Candida – female genital
# Eye and skin infections

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<td><strong>Acne</strong></td>
<td>Treatment depends on the type and severity of acne. Patients with severe disease (e.g. nodulocystic acne) should be referred. &lt;br&gt; &lt;br&gt; Treat with oral antibiotics for at least 3 months if clinical improvement continues for a further 3 months. If no improvement try an alternative antibiotic before referral.</td>
<td>Lymecycline – lower risk of photosensitivity (once daily dosage), but 2½ times more expensive than doxycycline. Avoid in pregnancy, breastfeeding and patients younger than 12 years. &lt;br&gt; <strong>AVOID MINOCYCLINE</strong> due to risk of liver damage.</td>
<td><strong>Mild disease (comedonal):</strong> Benzyol peroxide topical 5-10% gel applied 1-2 times daily after washing; start with lower strength preps &lt;br&gt; <strong>Mild disease (inflammatory):</strong> Oxytetracycline 500mg BD for up to 6 months &lt;br&gt; Or Lymecycline 408mg OD for up to 6 months &lt;br&gt; In combination with benzoyl peroxide &lt;br&gt; If tetracyclines contraindicated: Clarithromycin 500mg BD</td>
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<td><strong>Bites (human and animal)</strong></td>
<td>Determine whether the person is at increased risk of the wound becoming infected, either due to the nature of the bite or due to a medical condition (e.g. diabetes, immunosuppressed status). &lt;br&gt; &lt;br&gt; Human bites: prescribe prophylactic antibiotics for all human bite wounds under 72 hours old, even if there is no sign of infection. &lt;br&gt; &lt;br&gt; Animal bites: prescribe prophylactic antibiotics if the wound is less than 48 hours old and the risk of infection is high.</td>
<td>Thorough irrigation is important. Assess whether the wound is infected. The following may be present: redness, swelling, serosanguinous or purulent discharge, pain, localized cellulitis, lymphadenopathy, or fever. &lt;br&gt; Assess risk of tetanus and rabies.</td>
<td>Prophylaxis or treatment of human, cat or dog bite: <strong>Co-amoxiclav</strong> 625mg TDS for 7 days &lt;br&gt; Alternative (penicillin allergy): &lt;br&gt; Human/ cat/ dog bites: Metronidazole 400mg TDS for 7 days &lt;br&gt; <strong>PLUS</strong> Doxycycline PO 100mg BD for 7 days &lt;br&gt; Or human bites only: Metronidazole 400mg TDS for 7 days &lt;br&gt; <strong>PLUS</strong> Clarithromycin 500mg BD for 7 days &lt;br&gt; <strong>AND</strong> review at 24 and 48 hours</td>
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<td><strong>Cellulitis and wound infection</strong></td>
<td><strong>Class I:</strong> patient afebrile and healthy other than cellulitis, use oral flucloxacinil alone &lt;br&gt; <strong>Class II:</strong> febrile and ill, or co-morbidity, admit for IV treatment or use OPAT (if available) &lt;br&gt; <strong>Class III:</strong> toxic appearance: admit. If river or sea water exposure, discuss with specialist.</td>
<td>Advice should be given on: &lt;br&gt; • The use of paracetamol or ibuprofen &lt;br&gt; • Seeking immediate advice if antibiotics are not tolerated, skin signs worsen or systemic symptoms develop or worsen &lt;br&gt; • Adequate fluid intake &lt;br&gt; • Elevating the leg for comfort and to relieve oedema (where applicable)</td>
<td>First line: <strong>Flucloxacillin</strong> 500mg – 1g* QDS for 7 days** &lt;br&gt; <em>1g flucloxacillin dose is unlicensed &lt;br&gt; Alternative (penicillin allergy): <strong>Clarithromycin</strong> 500mg BD for 7 days</em>* &lt;br&gt; If on statins: <strong>Doxycycline</strong> 200mg stat, then 100mg OD for 7 days** &lt;br&gt; If unresolved: <strong>Clindamycin</strong> 300 – 450mg QDS for 7 days** &lt;br&gt; If facial: <strong>Co-amoxiclav</strong> 625mg TDS for 7 days** &lt;br&gt; <strong>If slow response, continue antibiotics for a further 7 days</strong></td>
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<td><strong>Cold sores</strong></td>
<td>Cold sores resolve after 7-10 days without treatment. Topical antivirals applied prodromally reduce duration by approximately 12-24 hours.</td>
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<td>First line (only if severe): <a href="https://www.rcgp.org.uk/resources/patient-information-leaflets/chloramphenicol-0-5-eye-drops">Chloramphenicol 0.5% drops</a> Apply 1 drop every 2 hours for 2 days, then every 4 hours. Continue for 48 hours after healing.</td>
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<td><strong>Conjunctivitis</strong></td>
<td>Most bacterial cases of conjunctivitis are self-limiting. 65% resolve on placebo by day five. If symptoms persist for longer than 2 weeks they should reconsult for investigation of the cause. People should <em>urgently seek medical attention</em> if they develop marked eye pain or photophobia, loss of visual acuity, or marked redness of the eye. Treat with antibiotics if red eye with mucopurulent (not watery) discharge. Starts in one eye but may spread to both.</td>
<td>Remove contact lenses, if worn, until all symptoms and signs of infection have completely resolved and any treatment has been completed for 24 hours. Clean away infected secretions from eyelids and lashes with cotton wool soaked in water. Wash hands regularly, particularly after touching infected secretions, and to avoid sharing pillows and towels to avoid spreading infection.</td>
<td>First line (only if severe): <a href="https://www.rcgp.org.uk/resources/patient-information-leaflets/chloramphenicol-1-eye-ointment">Chloramphenicol 1% eye ointment</a> Apply <em>either</em> at night (if eye drops used during the day) or 3-4 times daily (if eye ointment used alone). Continue for 48 hours after healing.</td>
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<td><strong>Eczema</strong></td>
<td>Using topical antibiotics or adding them to steroids in eczema management encourages resistance and does not improve healing.</td>
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<td>In infected eczema, use antiseptic bath additives (e.g. Oilatum Plus) and treat with systemic antibiotics as for impetigo if clinically indicated.</td>
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<td><strong>Fungal proximal fingernail or toenail infection</strong></td>
<td>Self-care alone may be appropriate for people who are not bothered by the infected nail or who wish to avoid the possible adverse effects of drug treatment. Consider drug treatment if: - Walking is uncomfortable - Abnormal-looking nails are causing significant psychological distress - The person has diabetes, vascular disease, or a connective tissue disorder (because of a higher risk for secondary bacterial infections and cellulitis) - The nail infection is thought to be the source of fungal skin infection - The person is, or is likely to become, severely immunocompromised (for example with haematological malignancy or its treatment) Take nail clippings: start therapy only if infection is confirmed by laboratory. For children seek specialist advice.</td>
<td>Discuss the likely benefits and adverse effects of treatment so the person can make a fully informed choice. - Treatment does not always cure the infection. Cure rates range between approximately 60–80% - Treatment that eradicates the infection sometimes does not restore the nail's appearance to normal - The drugs need to be taken for several months, or longer for resistant nails - Unpleasant adverse effects can occur. These include headache, itching, loss of the sense of taste, gastrointestinal symptoms, rash, and fatigue. Although abnormal liver function tests are not uncommon, liver failure and other serious adverse effects are rare.</td>
<td>First line: <a href="https://www.rcgp.org.uk/resources/patient-information-leaflets/terbinafine-tablets">Terbinafine tablets</a> 250mg OD: - Fingers: 6–12 weeks - Toes: 3–6 months</td>
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<td>* with oral terbinafine use monitor hepatic function before treatment and then every 4–6 weeks during treatment—discontinue if abnormalities in liver function tests. Terbinafine is fungicidal, so treatment time is shorter than with fungistatic imidazoles.</td>
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<td>Alternative: <a href="https://www.rcgp.org.uk/resources/patient-information-leaflets/itraconazole-tablets">Itraconazole tablets</a> 200mg BD for 7 days in each month: - Fingers: 2 courses - Toes: 3 courses</td>
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| **Fungal skin infection**       | If intractable send skin scrapings.                                          | Evidence suggests topical terbinafine and imidazole (clotrimazole, miconazole and econazole) are more likely to cure fungal skin infections than placebo. There is evidence that terbinafine is associated with fewer treatment failures than topical imidazoles. | **Treatment options:**                                                                                                                                                                                                     | NICE CKS: Fungal skin infection – body and groin  
NICE CKS: Fungal skin infection – foot  
NICE CKS: Fungal skin infection – scalp  
NICE CKS: Fungal skin infection – scalp  
NICE CKS: Fungal skin infection – scalp |
|                                | Scalp: discuss with specialist.                                              |                                                                                                     | **Terbinafine topical** Apply twice daily for 1-2 weeks  
**Or Clotrimazole 1% cream** Apply twice to three times daily for at least 4 weeks  
**Or Miconazole 2% cream** Apply twice daily continuing for 1-2 weeks after healing  
**Or Ketoconazole (for adults only)** Apply once to twice daily  
**Or Econazole** Apply twice daily  
OR (athlete’s foot only) **Undecanoate topical (Mycota®)** Apply twice daily continuing for 1-2 weeks after healing | **First line:** *Flucloxacillin* 500mg-1g QDS for 7 days  
For patients <18 years see latest BNF for children for accurate dosing information  
**Alternatives (penicillin allergy):** *Clarithromycin* 500mg BD for 7 days  
Children <12 years of age if liquid formulations are required: *Erythromycin* See latest BNF for children for accurate dosing information  
**For localized lesions:** *Fusidic acid 1% topical* apply TDS for 5 days  
MRSA only: *Mupirocin* TDS for 5 days  
NICE Clinical Knowledge Summaries: Impetigo  
British Association of Dermatologists: Patient Information Leaflets |
| **Impetigo**                     | For extensive, severe or bullous impetigo, use oral antibiotics.             | Hygiene measures are important to aid healing and stop the infection spreading to other sites on the body and to other people. Children and adults should stay away from school or work until the lesions are dry and scabbed over, or, if the lesions are still crusted or weeping, for 48 hours after antibiotic treatment has started. | **First line:** *Flucloxacillin* 500mg-1g QDS for 7 days  
For patients <18 years see latest BNF for children for accurate dosing information  
**Alternatives (penicillin allergy):** *Clarithromycin* 500mg BD for 7 days  
Children <12 years of age if liquid formulations are required: *Erythromycin* See latest BNF for children for accurate dosing information  
**For localized lesions:** *Fusidic acid 1% topical* apply TDS for 5 days  
MRSA only: *Mupirocin* TDS for 5 days  
NICE Clinical Knowledge Summaries: Impetigo  
British Association of Dermatologists: Patient Information Leaflets |
| **Also boils, carbuncles, folliculitis, staphylococcal paronychia and staphylococcal whitlow** | Reserve topical antibiotics for very localized lesions to reduce the risk of resistance.  
Soak and remove excess crust prior to application of topical therapy.  
Reserve mupirocin for MRSA. |                                                                                                     |                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                   |
| **Leg ulcers**                   | Antibiotics should only be prescribed in cases of active clinical infection, not for bacterial colonization, as bacteria will always be present.  
Signs of active infection include cellulitis, increased pain, pyrexia, purulent exudate and odour.  
If the person has an active infection, send pre-treatment swab. Review antibiotics after culture results. |                                                                                                     | **First line:** *Flucloxacillin* 500mg – 1g* QDS for 7 days (if slow response continue for another 7 days)  
*1g flucloxacillin dose is unlicensed  
**Alternative:** *Clarithromycin* 500mg BD for 7 days (if slow response continue for another 7 days)  
NICE Clinical Knowledge Summaries: Leg ulcer – venous | **First line:** *Flucloxacillin* 500mg – 1g* QDS for 7 days (if slow response continue for another 7 days)  
*1g flucloxacillin dose is unlicensed  
**Alternative:** *Clarithromycin* 500mg BD for 7 days (if slow response continue for another 7 days)  
NICE Clinical Knowledge Summaries: Leg ulcer – venous |
<table>
<thead>
<tr>
<th>Condition</th>
<th>When to treat</th>
<th>Prescribing notes and general advice</th>
<th>When treatment is needed</th>
<th>References and further information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mastitis</strong></td>
<td>For information on treatment in primary care and referrals, please refer to NICE Clinical Knowledge Summaries.</td>
<td>Reassure the person that infection with meticillin-resistant <em>Staphylococcus aureus</em> (MRSA) does not present a risk to healthy people in the community.</td>
<td><strong>Doxycycline</strong> 200mg stat, then 100mg BD for 7 days</td>
<td>NICE Clinical Knowledge Summaries: Mastitis and breast abscess</td>
</tr>
<tr>
<td><strong>MRSA</strong></td>
<td>If active infection i.e. MRSA confirmed by lab results, and admission not warranted use sensitivities to guide treatment. If no response seek advice from microbiologist. Do not routinely treat with oral or topical antibiotics unless directed by microbiologist.</td>
<td></td>
<td><strong>First line:</strong> <strong>Ketoconazole topical</strong> 2% shampoo applied to the affected area once daily for 5 days; leave on for 3-5 minutes before rinsing &lt;br&gt; <strong>For resistant/ widespread infection:</strong> <strong>Itraconazole</strong> 200mg OD for 7 days</td>
<td>NICE Clinical Knowledge Summaries: MRSA in primary care</td>
</tr>
<tr>
<td><strong>Pityriasis versicolor</strong></td>
<td>Initial treatment for pityriasis versicolor is with a topical antifungal. Ketoconazole shampoo for 5-7 days is recommended. Topical azole creams may be used, but large quantities may be needed. If pityriasis versicolor is extensive, or if topical treatment is ineffective, an oral antifungal drug (e.g. itraconazole) may be used for adults and children older than 12 years. Changes in skin pigmentation usually fully resolve within 2–3 months of starting antifungal treatment (but may persist for longer periods).</td>
<td></td>
<td><strong>First line:</strong> <strong>Ketoconazole topical</strong> 2% shampoo applied to the affected area once daily for 5 days; leave on for 3-5 minutes before rinsing &lt;br&gt; <strong>For resistant/ widespread infection:</strong> <strong>Itraconazole</strong> 200mg OD for 7 days</td>
<td>NICE Clinical Knowledge Summaries: Pityriasis versicolor</td>
</tr>
<tr>
<td><strong>Scabies</strong></td>
<td>Treat whole body including scalp, face, neck, ears, under nails. Reapply to hands if washed within 8 hours of application. Simultaneously (within 24 hours) treat all household contacts, close contacts and sexual contacts (even in the absence of symptoms). Treat scabies that has become infected with an antibiotic.</td>
<td>Encourage the family not to delay treatment. Consider symptomatic treatment for itching (crotamiton). Advise the person that itching may take several weeks to resolve. Consider an oral sedating antihistamine (e.g. chlorphenamine) at night if the itch is interfering with sleep.</td>
<td><strong>First line:</strong> <strong>Permethrin</strong> 5% dermal cream Repeat application after 7 days &lt;br&gt; <strong>Alternative:</strong> <strong>Malathion</strong> 0.5% aqueous liquid Repeat application after 7 days</td>
<td>NICE Clinical Knowledge Summaries: Scabies</td>
</tr>
<tr>
<td>When to treat</td>
<td>Prescribing notes and general advice</td>
<td>When treatment is needed</td>
<td>References and further information</td>
<td></td>
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<tr>
<td>---------------</td>
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</tr>
</tbody>
</table>
| **Tick bites** | Prophylaxis not indicated if the bite occurred more than 72 hours ago, or if the patient is continually exposed to ticks.  
For treatment of localized erythema migrans see below.  
Treatment of later stages of Lyme disease – discuss with microbiologist. | Treatment of localized erythema migrans: **Doxycycline 100mg BD for 14 days**  
**Or Amoxicillin 500mg TDS for 14 days**  
Alternative treatment of localized erythema migrans (penicillin allergy): **Clarithromycin 500mg BD for 14 days** for adults and children >12 years  
**Erythromycin** for children <12 years. See BNF for children for dosing information. | NICE Clinical Knowledge Summaries: Insect bites and stings |
| **Varicella zoster (chickenpox) and Herpes zoster (shingles)** | Pregnant/ immunocompromised/ neonate: seek urgent specialist advice.  
Chickenpox: if adult or severe pain/ secondary household case/ on steroids AND can start within 24 hours of rash, consider aciclovir.  
Shingles: treat if >50 years of age and within 72 hours of rash (PHN rare if <50 years); or if active ophthalmic or Ramsey Hunt or eczema. | If treatment indicated: **Aciclovir tablets 800mg five times a day for 7 days**  
Alternative if compliance is a problem: **Valaciclovir 1g TDS**  
**Or Famciclovir 500mg TDS or 750mg BD**  
*please refer to your local formulary for status | NICE Clinical Knowledge Summaries: Chickenpox  
NICE Clinical Knowledge Summaries: Shingles |
# Other infections

## When to treat

<table>
<thead>
<tr>
<th>Dental infections – emergency treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dental infections are always best treated by a dentist.</strong></td>
</tr>
<tr>
<td>GPs should not routinely be involved in dental treatment and, if possible,</td>
</tr>
<tr>
<td>advice should be sought from the patient’s dentist.</td>
</tr>
<tr>
<td>Antibiotics are recommended if there are signs of severe infection,</td>
</tr>
<tr>
<td>systemic symptoms or high risk of complications.</td>
</tr>
<tr>
<td>Severe odontogenic infections; defined as cellulitis plus signs of sepsis,</td>
</tr>
<tr>
<td>difficulty in swallowing, impending airway obstruction, Ludwig’s angina.</td>
</tr>
<tr>
<td>Refer urgently for admission to protect airway, achieve surgical drainage and</td>
</tr>
<tr>
<td>IV antibiotics.</td>
</tr>
<tr>
<td>The empirical use of cephalosporins, co-amoxiclav, clarithromycin and</td>
</tr>
<tr>
<td>clindamycin do not offer any advantage for most dental patients and should</td>
</tr>
<tr>
<td>only be used if no response to first line drugs when referral is the preferred</td>
</tr>
<tr>
<td>option.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suspected meningitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer all patients to hospital immediately.</td>
</tr>
<tr>
<td>Administer benzylpenicillin prior to admission, unless hypersensitive i.e.</td>
</tr>
<tr>
<td>history of difficulty breathing, collapse, loss of consciousness, or rash.</td>
</tr>
</tbody>
</table>

## Prescribing notes and general advice

<table>
<thead>
<tr>
<th><strong>Prevention of secondary cases:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Only prescribe following advice from the Public Health England Health</td>
</tr>
<tr>
<td>Protection Team.</td>
</tr>
<tr>
<td><strong>North East:</strong> telephone 0300 303 8596 (option 1)</td>
</tr>
<tr>
<td><strong>Cumbria:</strong> telephone 01228 606060</td>
</tr>
</tbody>
</table>

## When treatment is needed

| **If pus drain by incision, tooth extraction or via root canal. Send pus for** |
| **microbiology.**                                                            |
| **If spreading infection (lymph node involvement or systemic signs i.e. fever**|
| and malaise) consider concomitant metronidazole.                             |

**First line:** Amoxicillin 500mg TDS for up to 5 days (review at 3 days) (+/− metronidazole 400mg TDS if spreading infection)

Or Phenoxymethylpenicillin 500mg – 1g QDS for up to 5 days (review at 3 days) (+/− metronidazole if spreading infection)

In severe infection: Clindamycin @ 300mg QDS for 5 days

Or (penicillin allergy): Clarithromycin 500mg BD for up to 5 days (review at 3 days) (+/− metronidazole 400mg TDS if spreading infection)

## References and further information

- NICE Clinical Knowledge Summaries: Dental abscess
- NICE Clinical Knowledge Summaries: Meningitis

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**Valid from June 2016. Review date April 2018.**
Sepsis

Sepsis is a medical emergency. It is responsible for 37,000 deaths annually in the UK and sepsis has a fivefold higher mortality than STEMI or stroke. It is essential that sepsis is recognised early for the patient to reach hospital soon enough to avoid serious complication or death.

A high degree of vigilance is required for early identification of the septic patient. As well as the general impression at the time of initial assessment, the presence of abnormal observations should be enough to initiate evaluation for sepsis.

NICE guidance (the recognition, diagnosis and management of severe sepsis) is in development and is anticipated to be published in 2016. Please refer to the NICE website for further information.

The UK Sepsis Trust have produced a toolkit for primary care which aims to make GPs and other primary care clinicians familiar with sepsis. It advises on specific safety netting in patients presenting with signs and symptoms of infection, ensuring that appropriate further assessment is undertaken and time-critical care is delivered rapidly when necessary.

**General Practice Sepsis Screening and Action Tool**

This tool, produced by the UK Sepsis Trust, should be applied to all patients who are not pregnant who have a suspected infection or their clinical observations are outside of normal limits.

**Patient groups to consider screening:**

- With clinical evidence of systemic infection (such as recent history of fever)
- In whom you are considering antibiotic prescription or stewardship discussion
- You suspect to have ‘flu’
- You suspect to have gastroenteritis
- Who are obviously unwell without clear cause
- Who are elderly or immunosuppressed and present with signs of infection
- Who have deteriorated on antibiotic therapy

---

1. **Might this be more than a self-limiting infection?**
   - Symptoms of infection (e.g., recent history of fever)
   - Acute deterioration
   - Unexplained illness, especially in immunosuppressed or elderly people

2. **Perform a full set of observations. Are any 2 of the following present?**
   - Temperature > 38.5°C or < 36°C
   - Respiratory rate > 20 per minute
   - Heart rate > 90 per minute
   - Acute confusion, disorientation, reduced conscious level
   - Consist blood glucose > 7.7 relevant in non-diabetics

3. **Is any red flag present?**
   - Systolic B.P. < 90 mmHg
   - Heart rate > 130 per minute
   - Respiratory rate > 25 per minute
   - Oxygen saturations < 91% (N.B. 90% in patients with known COPD)
   - Responds only to voice or pain/Unresponsive
   - Petechial rash

**Sepsis unlikely.**
Continue usual care.

**Sepsis may be present**
Evaluate whether acute referral/admission required, especially if:
- already on antibiotics
- partially treated
- no clear source of infection
If treating in the community, consider:
- planned second assessment
- brief written handover
documenting observations
- specific safety net advice

**Red Flag Sepsis**
This is a time critical condition, immediate action is required.

Dial 999
Arrange blue light transfer
Write a brief clear handover including observations and antibiotic allergies where present.

Administer oxygen and other appropriate immediate care as available

---

1. **UK Sepsis Trust General Practice Screening and Action Tool**
**Clostridium difficile infection**

_Clostridium difficile_ (C.diff) can be present in the gut without causing illness. It is estimated to be present in the lower bowel of around 5% of the population.

The natural intestinal flora normally prevent overgrowth of _C.diff_, however when antimicrobial therapy is given to patients it can upset this and allow _C.diff_ to multiply.

The toxins produced by _C.diff_ damage the lining of the GI tract and cause symptoms ranging from mild diarrhoea to severe pseudomembranous colitis and toxic megacolon.

Which patients are most at risk of _Clostridium difficile infection_?

Patients are more at risk of _C.diff_ infection if they are:

<table>
<thead>
<tr>
<th>High risk patient</th>
<th>High risk environment</th>
<th>High risk antibiotics (the 4Cs)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Older patients &gt;65 years</td>
<td>Contact with <em>C.diff</em> patients</td>
<td>Clindamycin</td>
</tr>
<tr>
<td>Long term conditions requiring frequent antibiotics</td>
<td>Recent hospital admission</td>
<td>Ciprofloxacin and other quinolones</td>
</tr>
<tr>
<td>Recent antibiotic exposure within previous 2 months</td>
<td>Institutionalised</td>
<td>Cephalosporins</td>
</tr>
<tr>
<td>Contact with <em>C.diff</em> patients</td>
<td>Recent hospital admission</td>
<td>Co-amoxiclav</td>
</tr>
</tbody>
</table>

**Antibiotics and Clostridium difficile infection**

Antibiotic exposure is associated with a significantly higher risk of _C.diff_ infection than no antibiotics.

Risk of infection is greatest with:

1. Clindamycin
2. Quinolones
3. Cephalosporins
4. Penicillins
5. Macrolides
6. Sulphonamides or trimethoprim

**PPIs and the risk of Clostridium difficile infection**

Research shows that:

- Proton pump inhibitors (PPIs) are associated with near doubling of the likelihood of _C.diff_ infection\(^2\)
- Co-administration of PPIs and antibiotic increases the risk of _C.diff_ infection beyond that conferred by either treatment alone\(^3\)
- _C.diff_ infection risk is increased after even short duration of PPI use\(^4\)

**Commencing antibiotic therapy for Clostridium difficile infection**

Antibiotic therapy for _C.diff_ infection should be commenced as soon as possible, within 48 hours of prescribing.

If pharmacies are unable to supply, the prescription should be returned to the patient to try an alternative pharmacy. The patient’s GP should be informed of any delay in supply and initiation of antibiotic therapy.

Ensure ALL cases of _Clostridium difficile_ infection are Read coded as a major medical problem to inform future patient management.

---

Penicillin allergy

Adapted from NICE guidelines CG183 (Drug allergy: diagnosis and management)

About 10% of the general population claim to have a penicillin allergy; this has often been because of a skin rash that occurred during a course of penicillin in childhood. Fewer than 10% of people who think they are allergic to penicillin are truly allergic. Therefore, penicillin allergy can potentially be excluded in 9% of the population. Studies have shown that people with a label of penicillin allergy are more likely to be treated with broad-spectrum, non-penicillin antibiotics, such as quinolones, vancomycin and third-generation cephalosporins. However, use of these antibiotics in people with an unsubstantiated label of penicillin allergy may lead to antibiotic resistance and, in some cases, sub-optimal therapy.

Administering drugs to patients who have a reported allergy can be fatal, but inadvertent prescription or administration of such drugs is common. Data from the UK General Practice Research Database indicate that the incidence of contraindicated antibiotics being re-prescribed to patients with suspected penicillin allergy is as high as 48.5%, suggesting that even electronic systems with reminders do not eliminate the risk of inappropriate prescribing.

The British Society for Allergy and Clinical Immunology (BSACI) recommends giving patients written details about their allergy, including information on drugs they should avoid.

Documenting and sharing information with other healthcare professionals

When recording drug allergy status, ensure all the following has been documented as a minimum:

- The drug name
- The signs, symptoms and severity of the reaction (see NICE guideline)
- The date when the reaction occurred

Ensure that information about drug allergy status is updated and included in all GP referral letters and hospital discharge letters.

Non-specialist management and referral to specialist services

NICE recommend referring people with a suspected allergy to beta-lactam antibiotics to a specialist drug allergy service if they:

- Need treatment for a disease or condition that can only be treated by a beta-lactam antibiotic or
- Are likely to need beta-lactam antibiotics frequently in the future (for example, people with recurrent bacterial infections or immune deficiency).

Antibiotic choices in penicillin allergy

<table>
<thead>
<tr>
<th>Contra-indicated in penicillin allergy</th>
<th>Caution in penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td>Avoid if serious type 1 penicillin allergy (e.g. anaphylaxis/angioedema)</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>Use with caution if non-severe allergy (e.g. minor rash only)</td>
</tr>
<tr>
<td>Co-amoxiclav</td>
<td>- Cefaclor</td>
</tr>
<tr>
<td>Flucloxacinil</td>
<td>- Cefalexin</td>
</tr>
<tr>
<td>Penicillin V</td>
<td>- Cefotaxime</td>
</tr>
<tr>
<td>Pivmecillinam</td>
<td>- Ceftriaxone</td>
</tr>
<tr>
<td></td>
<td>N.B. risk of allergic reaction is greater in β-lactams most similar to penicillins in underlying structure.</td>
</tr>
</tbody>
</table>

5 NICE guidelines [CG183] Drug allergy: diagnosis and management (September 2014)
Extended-Spectrum Beta-Lactamases (ESBLs)

ESBL-producing strains are bacteria that produce an enzyme called extended-spectrum beta lactamase, which makes them more resistant to cephalosporins e.g. cefuroxime, cefotaxime and ceftazidime, and makes the infections harder to treat. In many instances, only two oral antibiotics and a very limited group of intravenous antibiotics remain effective.

Community multi-drug resistant ESBL producing organisms are responsible for urinary tract infections which in many instances may only respond orally to nitrofurantoin or fosfomycin.

Fosfomycin for treatment of ESBLs

Fosfomycin is a broad spectrum antibiotic, licensed in the UK for the treatment of lower UTIs due to ESBL (extended-spectrum beta-lactamase) producing bacteria.

Fosfomycin should only be prescribed on the advice of a microbiologist.

Please note: Fosfomycin is not currently available on formulary in every CCG. Please refer to your local formulary for information on the status of fosfomycin in your CCG.

<table>
<thead>
<tr>
<th>Indications for use</th>
<th>Fosfomycin is indicated for use in lower UTIs due to ESBL producing bacteria. Fosfomycin is not indicated for the treatment of ESBL pyelonephritis or peri-nephric abscess. Fosfomycin should only be considered for symptomatic patients where there are no other oral options suitable for the patient.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licensing</td>
<td>The use of fosfomycin is licensed in the UK; however it is not available commercially in the UK and must be imported from abroad, making the product unlicensed.</td>
</tr>
<tr>
<td>Use of fosfomycin abroad</td>
<td>Fosfomycin is currently licensed and available commercially in most western European countries (Monuril® and the USA (Monuro®).</td>
</tr>
<tr>
<td>Dosing</td>
<td>If fosfomycin is used, a single 3g dose is recommended in women. In men, a second 3g dose should be taken after 3 days.</td>
</tr>
</tbody>
</table>

Prescribing fosfomycin in primary care

Different arrangements are currently in place in different CCGs for the prescribing of fosfomycin.

In some CCGs all prescribing of fosfomycin will take place in secondary care, however in other CCGs, prescribing may take place in primary care.

Please refer to your local formulary for information on the status of fosfomycin in your CCG.
Resources to use in consultations with patients

Patient information leaflets
Evidence shows that the use of leaflets or booklets outlining the natural history of respiratory tract infections (and information about when to reconsult) can result in reduced antibiotic prescribing. Reductions in antibiotic prescribing have been shown to result in reductions in future demand for antibiotics.

Leaflets should be used as a tool for clinicians to interact with patients during the consultation, rather than as a ‘parting gift’ and can be used as part of a delayed prescription strategy.

The ‘Treating Your Infection’ leaflet is a useful tool for clinicians to use within consultations for patients who do not require an antibiotic prescription for their infection. It includes information on illness duration, self-care advice and advice on when to reconsult.

The leaflet is available to download from the TARGET Antibiotics Toolkit and is also available in a number of other languages. Alternative versions of the leaflet for use in out of hours clinics and community pharmacies are also available.

The ‘When Should I Worry’ booklet provides information for parents about the management of respiratory tract infections such as coughs, colds, sore throats and ear ache in children.

It is designed to be shared in consultations and can be downloaded from the When Should I Worry website. Printed booklets are available to order from the Royal College of GPs.

An eLearning programme for clinicians to support effective use of the booklet is also available on the When Should I Worry website.

This Get Well Soon Without Antibiotics leaflet, produced by the Department of Health, explains the need to get the right treatment for common illnesses such as coughs and colds without encouraging antibiotic resistance.

It is available to download from the Department of Health website. The leaflet is also available to download in a number of other languages.

Shared decision making tools
Shared decision making tools can be useful in visualising and explaining treatment effects and possible side effects to patients.

Cates plots (‘smiley face’ plots) compare the risks of an event in 100 or 1000 patients who receive treatment with the same number of patients who are not treated.

Plots are available online for acute otitis media in children, highlighting pain at 2-7 days in acute otitis media, and diarrhoea, vomiting or rashes in acute otitis media.

Go to http://www.nntonline.net/visualrx/examples/ to see more.

6 Cates plots (‘smiley face’ plots) compare the risks of an event in 100 or 1000 patients who receive treatment with the same number of patients who are not treated.

Valid from June 2016. Review date April 2018.
Resources for display in practices

Posters and information on display in prominent positions in GP practices can raise public awareness of the issues surrounding the use of antibiotics and can make a difference to the patients’ expectations about when to expect antibiotics by influencing their social norms.

Posters for clinical and waiting areas
The Department of Health have produced a number of posters to display in healthcare settings to promote the appropriate use of antibiotics for patients presenting with a cold.

Posters can be downloaded from the TARGET Antibiotics Toolkit website.

Videos for patient waiting areas
The Department of Health have produced a number of videos for display on screens in patient waiting areas. They can be accessed from the TARGET Antibiotics Toolkit website.

European Antibiotics Awareness Day
European Antibiotics Awareness Day is held on 18th November each year. It is a Europe wide annual event that raises awareness on how to use antibiotics in a responsible way that will help keep them effective for the future.

Antibiotic Guardian campaign
Antibiotic Guardian supports the UK Antimicrobial Resistance Strategy, European Antibiotic Awareness Day and World Antibiotic Awareness Week and hosts a number of resources for healthcare professionals and the public.

Everyone in the UK, the public and medical community are asked to become an Antibiotic Guardian by choosing a pledge to use antibiotics more appropriately and help save these vital medicines from becoming obsolete. Make your own pledge here.
Antibiotic audit resources

Practice level prescribing audits

Practices are encouraged to audit antibiotic use on a regular basis, especially use of high risk antibiotics, namely cephalosporins, quinolones and co-amoxiclav (the ‘3Cs’). This may support revalidation.

The antibiotics selected to investigate should be informed by prescribing reports and prescribing data. If this shows the practice is using significant amounts of a particular high risk antibiotic, an audit of that antibiotic will establish when and how it is being prescribed which should then be compared to guidance. Results of the audit should be shared within the wider practice and provide a basis for discussion amongst prescribers.

TARGET Antibiotics Toolkit audits

The TARGET Antibiotics Toolkit provides a number of templates for accurate and easy auditing of antibiotic prescribing, including Read codes, current guidance and action plans.

The following audit templates are available to download from the TARGET website:

- Sore throat audit
- Urinary tract infection audit
- Otitis media audit
- Acute cough audit

Scottish Antimicrobial Prescribing Group audits

The Scottish Antimicrobial Prescribing Group have produced a comprehensive audit tool for the audit of primary care management of commonly encountered infections. The audit tool aims to provide prescribers with qualitative information on their prescribing of antibiotics.

Antimicrobial stewardship self-assessment checklist

A short questionnaire for use by GP practices and CCGs to assess antibiotic prescribing is available on the TARGET Antibiotics Toolkit.

The questionnaire provides practices with strategies to optimise prescribing of antibiotics and allows comparison to other practices locally and nationally. The questionnaire may be helpful for practices preparing for CQC inspections.
## Educational resources for healthcare professionals

### NECS Antimicrobial Stewardship eLearning
Developed to support clinicians in the North East and Cumbria understand why optimising antibiotic prescribing is important, and highlighting strategies to help prescribers promote effective antimicrobial stewardship.

### Health Education England/ e-LFH Reducing Antimicrobial Resistance eLearning package
As part of the 5 year antimicrobial resistance strategy, Health Education England have developed eLearning for all healthcare professionals. The updated Health & Social Care Act Code of Practice for Infection Prevention and Control now contains Antimicrobial Stewardship and recommends providers should ensure all prescribers receive induction and training in prudent antimicrobial use and are familiar with the antimicrobial resistance and stewardship competencies.

### Future Learn Antimicrobial Stewardship: Managing Antibiotic Resistance
Delivered by the University of Dundee in partnership with the British Society for Antimicrobial Chemotherapy, this free online course is designed to help clinicians understand what antimicrobial stewardship is and how you can apply it everyday. Although the focus is for prescribing in the hospital setting, the skill set can be applied and adapted to other healthcare settings. The intention of the course is to stimulate and encourage further inquiry and learning in this important area.

### TARGET Antibiotic Resistance in Primary Care online course
This course will assist you in identifying the need for optimised antibiotic prescribing, as well as equipping you with tools for improving your antibiotic prescribing. Evidence showing the link between prescribing and resistance rates in GP patients is explored and useful resources to use in your surgery are included.

### Skin Infections online course
Skin infections are commonly seen in general practice. With ever increasing rates of antibiotic resistance, it is important for GPs to feel confident about making a diagnosis and to understand when antibiotic treatment is indicated. This course describes common presentations of bacterial, viral and fungal skin infections and outlines their management.

### MARTI Managing Acute Respiratory Tract Infections
The MARTI series of training modules enables you to improve the care you provide to patients presenting with acute ear pain, acute sore throat, sinusitis and acute cough. The module equals two hours toward your CPD, and can import into the RCGP Revalidation portfolio. This online course has been developed through a partnership between the RCGP and Public Health England's Primary Care Unit. It was led by Dr Cliodna McNulty and funded by an educational grant from the British Society for Antimicrobial Chemotherapy.

### Urinary Tract Infections
This course explains the importance and appropriateness of diagnostics and offers advice on how to assess and treat patients with a range of urinary symptoms. It encourages reflection on how to minimise antibiotic resistance and offers 'real-life' cases. The module equals 1.5 hours toward your CPD, and can be imported into the RCGP Revalidation portfolio. This course has been developed in partnership with Public Health England's Primary Care Unit. It was funded by an educational grant from Public Health England.

### STAR Stemming the Tide of Antimicrobial Resistance
STAR is a theory based ‘blended learning’ programme to promote appropriate antibiotic prescribing. The STAR programme was led by Professor Chris Butler and developed by a team at Cardiff University.
Changes from the previous guideline

This guideline is an update of the North East and Cumbria antibiotic prescribing guideline for primary care version 1.2, published in November 2014.

Changes from version 1.2 are outlined in the table below:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acute otitis externa</strong></td>
<td>Advice updated in line with PHE guidance advising prescribers to refer to exclude malignant OE if cellulitis or disease extending outside ear canal. Predsol-N removed as treatment option following discontinuation by manufacturer</td>
</tr>
<tr>
<td><strong>Acute sore throat</strong></td>
<td>Latest PHE guidance suggests the use of the FeverPAIN clinical scoring system to help decide whether to prescribe an antibiotic, as an alternative to the Centor criteria. FeverPAIN score: each clinical feature scores 1 point:</td>
</tr>
<tr>
<td></td>
<td>• Fever in last 24 hours</td>
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<tr>
<td></td>
<td>• Purulence</td>
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<tr>
<td></td>
<td>• Attend rapidly under 3 days</td>
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<tr>
<td></td>
<td>• Inflamed tonsils</td>
</tr>
<tr>
<td></td>
<td>• No cough or coryza</td>
</tr>
<tr>
<td></td>
<td>Score 0-1 = 13-18% streptococci, use NO antibiotic strategy</td>
</tr>
<tr>
<td></td>
<td>Score 2-3 = 34-40% streptococci, use 3 day back-up antibiotic</td>
</tr>
<tr>
<td></td>
<td>Score &gt;4 = 62-65% streptococci, use immediate antibiotic if severe, or 48 hour short back-up prescription</td>
</tr>
<tr>
<td><strong>Acute cough, bronchitis</strong></td>
<td>Information on CRP testing included in line with PHE and NICE guidance</td>
</tr>
<tr>
<td></td>
<td>Consider CRP test if antibiotic being considered</td>
</tr>
<tr>
<td></td>
<td>• CRP &lt;20mg/L consider no antibiotics</td>
</tr>
<tr>
<td></td>
<td>• CRP 20-100mg/L consider delayed antibiotic strategy</td>
</tr>
<tr>
<td></td>
<td>• CRP &gt;100mg/L consider immediate antibiotic prescription</td>
</tr>
<tr>
<td><strong>Recurrent UTI</strong></td>
<td>Comprehensive guidance on recurrent UTI is in development by The British Association of Urological Surgeons. In the interim, prescribers are advised to refer to guidance from the Scottish Medicines Consortium and SIGN.</td>
</tr>
<tr>
<td></td>
<td>To reduce recurrence first advise simple measures including better hydration and cranberry products.</td>
</tr>
<tr>
<td><strong>UTI in men and non-pregnant women</strong></td>
<td>Additional information added advising prescribers to not routinely dipstick to exclude UTI. Do not routinely dipstick to exclude UTI. In elderly patients (&gt;65 years), diagnosis should be based on full clinical assessment, including vital signs. Dipstick tests are only indicated for women &lt;65 years who have minimal signs and symptoms. Please refer to SIGN guidance 88 for guidance on dipstick testing in the community.</td>
</tr>
<tr>
<td><strong>Acute diverticulitis</strong></td>
<td>Link added signposting to information on management of acute diverticulitis</td>
</tr>
<tr>
<td><strong>Detection and eradication of H.pylori</strong></td>
<td>De-NolTab® (tripotassium dicitratobismuthate) removed as a treatment option following its discontinuation by the manufacturer.</td>
</tr>
<tr>
<td><strong>Threadworms</strong></td>
<td>Information added regarding use of mebendazole in pregnancy. Manufacturer recommends avoiding mebendazole in pregnancy. During pregnancy, physical removal of eggs combined with hygiene methods is the preferred treatment.</td>
</tr>
<tr>
<td>Condition</td>
<td>Changes</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Gonorrhoea</strong></td>
<td>New section in line with PHE guidance.</td>
</tr>
<tr>
<td></td>
<td>Antibiotic resistance is now very high.</td>
</tr>
<tr>
<td></td>
<td>Ideally refer all people with confirmed or suspected gonorrhoea to a GUM clinic or other specialist sexual health service.</td>
</tr>
<tr>
<td><strong>Pelvic inflammatory disease</strong></td>
<td>Ciprofloxacin removed as treatment option in line with PHE guidance.</td>
</tr>
<tr>
<td></td>
<td>First line: metronidazole 400mg BD for 14 days PLUS ofloxacin 400mg BD for 14 days</td>
</tr>
<tr>
<td></td>
<td>Or: metronidazole 400mg BD for 14 days PLUS doxycycline 100mg BD for 14 days</td>
</tr>
<tr>
<td></td>
<td>If high risk of gonorrhoea add ceftriaxone IM 500mg stat</td>
</tr>
<tr>
<td><strong>Cellulitis and wound infection</strong></td>
<td>Treatment classifications revised in line with PHE guidance.</td>
</tr>
<tr>
<td></td>
<td>- Class I: patient afebrile and healthy other than cellulitis, use oral flucloxacillin alone</td>
</tr>
<tr>
<td></td>
<td>- Class II: febrile and ill, or co-morbidity, admit for IV treatment or use OPAT (if available)</td>
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<tr>
<td></td>
<td>- Class III: toxic appearance: admit. If river or sea water exposure, discuss with specialist.</td>
</tr>
<tr>
<td></td>
<td>Treatment options added for patients on statins and facial cellulitis in line with PHE guidance</td>
</tr>
<tr>
<td></td>
<td>- If on statins: doxycycline 200mg stat, then 100mg OD for 7 days</td>
</tr>
<tr>
<td></td>
<td>- If facial: co-amoxiclav 625mg TDS for 7 days</td>
</tr>
<tr>
<td><strong>Fungal proximal fingernail or toenail infection</strong></td>
<td>Amorolfine removed as a treatment option due to being included in the PrescQIPP DROP list (drugs to review for optimised prescribing). Systemic treatments are more effective, if antifungal treatment is indicated. Amorolfine nail lacquer is available OTC for mild cases.</td>
</tr>
<tr>
<td><strong>Fungal skin infection</strong></td>
<td>Additional information on effectiveness of antifungals added.</td>
</tr>
<tr>
<td></td>
<td>Clotrimazole, ketoconazole and econazole added as potential treatment options in line with PHE guidance.</td>
</tr>
<tr>
<td><strong>Varicella zoster (chickenpox) and Herpes zoster (shingles)</strong></td>
<td>First line treatment recommendation changed – aciclovir tablets (not dispersible) now recommended first line following product price changes.</td>
</tr>
<tr>
<td><strong>Dental infections – emergency treatment</strong></td>
<td>Dose of metronidazole updated in line with PHE guidance.</td>
</tr>
<tr>
<td></td>
<td>Add metronidazole 400mg TDS if spreading infection</td>
</tr>
</tbody>
</table>
Acknowledgements

This guideline has been produced by the NECS Medicines Optimisation Team on behalf of CCGs in the North East and Cumbria. Many thanks to the organisations and individuals involved in the production and consultation of this guideline.

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NHS Northumberland Clinical Commissioning Group
NHS South Tees Clinical Commissioning Group
NHS South Tyneside Clinical Commissioning Group
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North East Microbiologists Group
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South Tyneside NHS Foundation Trust
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