Guidelines for Treatment of Infections in Primary Care in Hull and East Riding

This document is based on the Health Protection Agency advice which can be found at http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1279888711402 (HPA Published August 2010)

The guidelines have been subject to consultation within primary care, public health and clinicians within the Acute Trust and have been approved by the Advisory Committee on Antimicrobial Therapy (ACAT).

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A summary table of main guidance can also be found at Hull and East Riding Prescribing Committee Web Page.

APPROVAL PROCESS

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| Approved by:     | Antimicrobial Control and Advisory Team, HEY, March 2011 |
|                  | Medicines Management Interface Group, March 2011 |
| Ratified by:     | Hull and East Riding Prescribing Committee, March 2011 |
| Review Date:     | March 2013 |

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Aims of Guidelines

- To provide a simple, evidence-based approach to the empirical treatment of common infections
- To promote the safe, effective and economic use of antibiotics
- Minimise the risk of toxicity/adverse effects e.g. *Clostridium difficile* associated diarrhoea (CDAD)
- Delay the emergence and reduce the prevalence of bacterial resistance in the community

Principles of Treatment

- This guidance is based on the best available evidence but its application must be modified by professional judgement.
- Prescribe an antibiotic only when there is likely to be a clear clinical benefit (and where benefits outweigh risks).
- Do not prescribe an antibiotic for viral sore throat, simple coughs and colds.
- Consider a no, or delayed, antibiotic strategy for acute self-limiting upper respiratory tract infections.
- Limit prescribing over the telephone to exceptional cases.
- Use simple generic antibiotics first whenever possible. Avoid broad spectrum antibiotics (e.g. quinolones, cephalosporins, clindamycin, co-amoxiclav) when narrow spectrum agents remain effective, as use of broad spectrum agents increase the risk of *Clostridium difficile*, MRSA and resistant UTIs.
- Cephalosporins and quinolones should **NOT** routinely be used as first line antimicrobials except where indicated in this guidance.
- Macrolide antibiotics should be only be prescribed in preference to penicillins where the patient is **truly hypersensitive** (penicillin allergy is presence of rash or anaphylaxis following treatment with a penicillin).
- The recommended macrolide for general use is clarithromycin (except in pregnancy and breast feeding) due to improved tolerability, absorption and compliance compared to erythromycin.
- Avoid **widespread** use of topical antibiotics (especially those agents also available as systemic preparations) e.g. fusidic acid (Fucibet®, Fucidin®, - ophthalmic use ok).
- In pregnancy **AVOID** tetracyclines, aminoglycosides, quinolones, and **high dose** (> 400mg) metronidazole. Short term use of trimethoprim after the first trimester (unless low folate status or on other folate antagonists e.g. antiepileptics) is unlikely to cause harm to the foetus.
- In children **AVOID** tetracyclines and quinolones.
- Give antibiotics for the **SHORTEST** time possible. In most uncomplicated and non-serious/non-severe infections 5 days treatment is usually sufficient.
- When first-line antibiotic sensitivities are provided, further sensitivity results are usually available for special situations. Consultant medical microbiologists can be contacted for specialist advice by Registered Medical Practitioners on 01482 674991 during laboratory hours or out of hours (for urgent advice) via HEY switchboard 01482 875875.

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General information on prescribing recommendations

The information contained within this document is for guidance to assist in the prescribing of anti-microbials. The doses specified are recommended for use in those with normal pharmacokinetic handling of the drug. Dose adjustments may be necessary in children or those of advanced age or with co-morbidities that could affect the pharmacokinetics of the drug (e.g. liver or renal impairment, pregnancy). Certain drug interactions may also have an impact on anti-microbial drug dosing.

Before prescribing, the information contained within these guidelines should be read in conjunction with the most recent British National Formulary (www.bnf.org or www.bnf.org) or the electronic medicines compendium (www.emc.medicines.org.uk) for contraindications, cautions, use in pregnancy/breast feeding and other disease states (e.g. renal or hepatic impairment) and drug interactions.

Unless otherwise stated the doses are for ADULT patients.

Main risk factors for *Clostridium difficile* associated diarrhoea (CDAD)

Risk factors for CDAD are given below. The more of these risk factors a patient has, the higher the risk is likely to be.

- Age >65 years (especially >75 years)*
- Previous CDAD*
- Recent exposure to cephalosporins*, quinolones* or clindamycin*. Other broad-spectrum antibiotics such as co-amoxiclav (Augmentin®) have been less strongly associated with CDAD, but may also be risk factors especially if prolonged/multiple courses.
- Recent prolonged*/multiple* or IV antibiotic exposure (especially if antibiotics above)
- Nursing/residential home resident
- NG or PEG tube in-situ
- Prolonged hospital stay anticipated
- Recent hospital stay
- Extensive co-morbidity
- Gastrointestinal surgery
- Severe underlying/inter-current illness
- Low albumin/poor nutritional status
- H₂ antagonist or proton pump inhibitor therapy (*Ask, does the patient really need this? Consider stopping* )
- Immunosuppression

* These are probably the most important, particularly in combination

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Additional guidance on sampling

Catheter Urine Specimens

By 14 days post-catheterisation, almost all urine samples from catheterised patients will yield bacterial growth. There is no evidence that giving antibiotics to asymptomatic catheterised patients will produce any clinical benefit whilst they are asymptomatic, and antibiotics do not cure catheter blockage, by-passing of catheters, peri-urethral discharge, and are not an appropriate solution to malodorous urine.

Repetitious use of antibiotics produces selection of highly-resistant strains of bacteria and culminates in colonisation with yeasts. Subsequent manipulation of the catheter may result in bacteraemia blood stream infection with these resistant bacteria and fungi. It is therefore inappropriate to test for the current bacteria present in the urinary system where the patient has no symptoms, except when manipulation of the urinary tract is planned, such as a replacement of the catheter or a urological procedure. In those cases it is appropriate to send a pre-procedure sample, allowing sufficient time (72 hours) for the sample to arrive and for sensitivity tests to be performed. Catheter specimens of urine with signed request forms not carrying clinical details indicating the presence of symptoms or anticipated manipulation of the urinary tract should not be processed.

Wound Swabs, Ulcers of the Skin, Pressure sores, Surface Abrasions and Drain sites

Breaches in the skin result in fluid exudate in a considerable proportion of wounds. The fluid is highly nutritious for bacteria and the growth of a number of organisms to a high level is to be expected. Swabs of such wounds will therefore yield growth. The use of antibiotics in such circumstances will be futile in improving the patient’s condition where no clinical evidence of infection is present.

Specimens from wound swabs should therefore state that redness, swelling, pain, pus or systemic infection is evident (CRP is a useful test to demonstrate systemic infection) and should state the intended antibiotics which should be started after the swab has been obtained. A swab is always a poor substitute for obtaining pus and if pus is available, this should be placed in a sterile container and sent instead of a swab. The same considerations apply to ulcers of the skin, pressure sores, surface abrasions and drain sites.

Specimens from wounds, ulcers of the skin, pressure sores, surface abrasions and drain sites with signed request forms not carrying relevant indications for testing, as stated above, should not be processed.

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**UPPER RESPIRATORY TRACT INFECTIONS**

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<th>ILLNESS</th>
<th>COMMENTS</th>
<th>DRUG</th>
<th>DOSE</th>
<th>DURATION OF Tx</th>
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<tbody>
<tr>
<td>Influenza</td>
<td>Latest guidance on vaccination and treatment of influenza can be found at HPA website (<a href="http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Influenza/">http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Influenza/</a>)</td>
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<td></td>
<td>Annual vaccination is essential for all those at risk of influenza.</td>
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<td>At risk: ≥65yrs, chronic respiratory tract disease (including COPD and asthma), chronic heart disease (not hypertension, unless there are cardiac complications), immunocompromised, diabetes mellitus, chronic renal disease, and chronic liver disease, chronic neurological disease (including stroke, TIA, MS), patients residing in long stare care facilities, principal carers for older/disabled people.</td>
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<td></td>
<td>For otherwise healthy adults, treatment with antivirals is not recommended.</td>
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<tr>
<td></td>
<td>Treatment with antivirals</td>
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<td></td>
<td>Treat 'at risk' patients, only when influenza is circulating in the community, within 48 hours of onset of symptoms. (see below for information on post exposure prophylaxis)</td>
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</tbody>
</table>
| Dosage of oseltamivir | • ‘At risk’ adults and adolescents (13 years & over): 75mg twice a day for 5 days  
• ‘At risk’ children (1 – 12 years):  
  • Body weight over 40 kg: 75mg twice a day for 5 days  
  • Body weight 23-40kg: 60mg twice a day for 5 days  
  • Body weight 15-23 kg: 45mg twice a day for 5 days  
  • Body weight under 15kg: 30mg twice a day for 5 days  
• ‘At risk’ infants (under 1 year) – licensed only during pandemic influenza outbreak, excluding premature infants  
  • 3 months to 1 year: 3mg/kg twice daily for 5 days  
  • 1 month to 3 months: 2.5mg/kg twice daily for 5 days  
  • Under 1 month: 2mg/kg twice daily for 5 days |           |                       |                |
| Dosage of zanamivir | 'At risk' children & adults (aged 5 years & over): 2 blisters (10mg) inhaled twice a day, via a diskhaler® device for 5 days.                                                                               |           |                       |                |
| Post exposure prophylaxis | Recommended in ‘at risk’ patients who have not been immunised with vaccine matching circulating virus (or have been immunised within last 2 weeks) AND have been in close contact with someone with influenza like symptoms AND can start treatment within 48 hours of exposure.                          |           |                       |                |
| Dosage of oseltamivir | • ‘At risk’ adults and adolescents (13 years & over): 75mg once a day for 10 days  
• ‘At risk’ children (1 – 12 years):  
  • Body weight over 40 kg: 75mg once a day for 10 days  
  • Body weight 23-40kg: 60mg once a day for 10 days  
  • Body weight 15-23 kg: 45mg once a day for 10 days  
  • Body weight under 15kg: 30mg once a day for 10 days  
• ‘At risk’ infants (under 1 year) – licensed only during pandemic influenza outbreak, excluding premature infants  
  • 3 months to 1 year: 3mg/kg once daily for 10 days  
  • 1 month to 3 months: 2.5mg/kg once daily for 10 days  
  • Under 1 month: 2mg/kg once daily for 10 days |           |                       |                |
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<th>Treatment Recommendation</th>
<th>First Line (where indicated)</th>
<th>Second Line / Penicillin Allergic (where indicated)</th>
</tr>
</thead>
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<td><strong>Acute sore throat</strong></td>
<td>Avoid antibiotics as 90% resolve in 7 days without, and pain only reduced by 16 hours&lt;sup&gt;A+&lt;/sup&gt;. If Centor score 3 or 4: (Lymphadenopathy; No cough; Fever; Tonsillar Exudate)&lt;sup&gt;B+&lt;/sup&gt; consider 2 or 3-day delayed or immediate antibiotic&lt;sup&gt;A+&lt;/sup&gt;.</td>
<td>First line (where indicated)</td>
<td>Second line / penicillin allergic (where indicated)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Phenoxyethylpenicillin&lt;sup&gt;B+&lt;/sup&gt;</td>
<td>clarithromycin</td>
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<td></td>
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<td>500 mg QDS</td>
<td>250-500 mg BD</td>
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<td></td>
<td></td>
<td>10 days&lt;sup&gt;A+&lt;/sup&gt;</td>
<td>5 days&lt;sup&gt;A+&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
| **Acute otitis media**          | Optimise analgesia<sup>B+</sup>. Avoid antibiotics as 60% are better in 24 hours without: they only reduce pain at 2 days and do not prevent deafness<sup>A+</sup>. Consider 2 or 3-day delayed or immediate antibiotics for pain relief if:  
|                                 | • < 2yrs with bilateral AOM<sup>A+</sup>  
|                                 | • all ages with otorrhoea<sup>A+</sup>                                                      | First line (where indicated) | Second line / penicillin allergic (where indicated) |
|                                 |                                                                                           | amoxicillin<sup>A+</sup>       | clarithromycin                                     |
|                                 |                                                                                           | Adult: 500mg TDS               | ADULT & CHILD over 12 years:                        |
|                                 |                                                                                           | Child: 400mg/kg daily in 3 divided doses. (Max 500mg TDS) | doxycycline                                       |
|                                 |                                                                                           | 5 days<sup>A+</sup>            | 200 mg stat/100 mg OD                              |
|                                 |                                                                                           | 5 days<sup>A+</sup>            | 5 days<sup>A+</sup>                                |
| **Otitis externa**              | Use analgesia and topical preparations first line<sup>A+</sup>. Consider oral antibiotics if spreading cellulitis, extending outside of ear canal or systemically unwell (see treatment guidelines for cellulitis). | First line                     |                                                     |
|                                 |                                                                                           | Hydrocortisone acetate 1% +   |                                                     |
|                                 |                                                                                           | gentamicin 0.3% ear drops.     |                                                     |
|                                 |                                                                                           | 2-4 drops, 3 – 4 times daily, and at night |                                                     |
|                                 |                                                                                           | 7-14 days<sup>A+</sup>        |                                                     |
| **Rhinosinusitis**              | Avoid antibiotics as 80% resolve in 14 days without, and they only offer marginal benefit after 7 days<sup>A+</sup>. Only use for persistent symptoms and purulent discharge lasting at least 7 days or if severe symptoms, or high risk of serious complications (e.g. immunocompromised, cystic fibrosis)<sup>B+</sup>. Use adequate analgesia<sup>B+</sup>. Caution patients on excessive or prolonged use of topical decongestants. | First line (where indicated) | Second line / penicillin allergic (where indicated) |
|                                 |                                                                                           | amoxicillin<sup>A+</sup>       | clarithromycin                                     |
|                                 |                                                                                           | Adult: 500mg TDS               | ADULT & CHILD over 12 years:                        |
|                                 |                                                                                           | Child: see BNF for children    | doxycycline                                       |
|                                 |                                                                                           | 5 days                        | 200 mg stat/100 mg OD                              |
|                                 |                                                                                           | 5 days                        | 5 days                                            |

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**LOWER RESPIRATORY TRACT INFECTIONS**

**Note:** Avoid tetracyclines & quinolones in pregnancy. Low doses of penicillins are more likely to select out resistance. Do NOT use (ciprofloxacin and ofloxacin) first line due to poor activity against pneumococci. However, they do have use in PROVEN pseudomonal infections. Reserve ALL quinolones for proven resistant infections.

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<tr>
<th>ILLNESS</th>
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<th>DRUG</th>
<th>DOSE</th>
<th>DURATION OF Tx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute cough, Bronchitis</td>
<td><strong>Antibiotic little benefit if no co-morbidity</strong>&lt;sup&gt;AA&lt;/sup&gt; Patient leaflets can reduce antibiotic use.&lt;sup&gt;AA&lt;/sup&gt;</td>
<td><strong>First line</strong> (where indicated) amoxicillin</td>
<td>Adult: 500mg TDS Child: see BNF for children</td>
<td>5 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Second line /penicillin allergic</strong> (where indicated) CHILD: clarithromycin</td>
<td>ADULT &amp; CHILD over 12 years: doxycycline</td>
<td>5 days</td>
</tr>
<tr>
<td></td>
<td><strong>Consider whether antibiotics are needed.</strong> 30% is viral, 30-50% is bacterial (rest undetermined). BTS COPD guidelines – only prescribe if two out of three are present&lt;sup&gt;BB&lt;/sup&gt;:</td>
<td><strong>First line:</strong> amoxicillin</td>
<td>500 mg TDS</td>
<td>5 days</td>
</tr>
<tr>
<td></td>
<td>• Dyospnea • Increased sputum • Purulent sputum</td>
<td><strong>Second line/ penicillin allergic</strong> doxycycline</td>
<td>200mg stat /100mg OD</td>
<td>5 days</td>
</tr>
<tr>
<td></td>
<td>Consider a sputum sample in non-responders</td>
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<td></td>
<td><strong>Manage using clinical judgement and CRB-65 score with review:</strong></td>
<td><strong>First line:</strong> amoxicillin&lt;sup&gt;A+&lt;/sup&gt;</td>
<td>500 mg TDS</td>
<td>7 days</td>
</tr>
<tr>
<td></td>
<td>CRB scoring: each scores 1: Confusion (AMT&lt;8);Respiratory rate&gt;30/min;BP systolic&lt;90 or diastolic&lt;=60;Age &gt;65 years. Score 0 suitable for home treatment; 1-2 consider hospital referral; 3-4 urgent hospital admission.</td>
<td><strong>Second line / allergic to penicillin</strong> clarithromycin&lt;sup&gt;A-&lt;/sup&gt; OR doxycycline</td>
<td>500 mg BD</td>
<td>7 days</td>
</tr>
<tr>
<td></td>
<td>For guidance for assessment in children see BTS Guidelines</td>
<td></td>
<td>200mg stat / 100mg OD</td>
<td>7 days</td>
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<tr>
<td></td>
<td>Give immediate IM benzylpenicillin or amoxicillin 1G po if delayed admission/life threatening.</td>
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</tbody>
</table>

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### MENINGITIS

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<tr>
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<th>DOSE</th>
<th>DURATION OF Tx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspected meningococcal disease</td>
<td><strong>Transfer all patients to hospital immediately.</strong>&lt;br&gt;<strong>IF time before admission</strong> administer benzylpenicillin (or cefotaxime) prior to admission, unless hypersensitive i.e. history of breathing difficulties, collapse, loss of consciousness or urticaria or rash within 1 hour of administration of beta lactam&lt;br&gt;Ideally IV but IM if a vein cannot be found.</td>
<td><strong>First line:</strong> benzylpenicillin IV or IM</td>
<td>Adults and children 10 years and over: 1200 mg&lt;br&gt;Children 1 - 9 year: 600 mg&lt;br&gt;Children &lt;1 year: 300 mg</td>
<td>STAT</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>If allergic to penicillin (and available):</strong> cefotaxime IV or IM</td>
<td>Adult and children 12 years and over: 1g&lt;br&gt;Children &lt;12 yrs: 50mg/kg (max 1g)</td>
<td>STAT</td>
</tr>
<tr>
<td>Prevention of secondary case of meningitis</td>
<td>Only prescribe following advice from Public Health Doctor&lt;br&gt;9 am – 5 pm: Contact on-call doctor via TENYAS switchboard</td>
<td></td>
<td>01482 638636&lt;br&gt;01904 666030</td>
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</tr>
</tbody>
</table>

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## URINARY TRACT INFECTIONS

**Note:** Amoxicillin resistance is common therefore only use if culture confirms susceptibility. In the elderly (>65 years), asymptomatic bacteriuria occurs in 25% of women and 10% of men and is not associated with increased morbidity. It is useful only to exclude UTI not to make a diagnosis. In the presence of a catheter, antibiotics will not eradicate bacteriuria and will select out more resistant organisms making subsequent treatment more difficult; only treat if systemically unwell or evidence of pyelonephritis.

<table>
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<th>DRUG</th>
<th>DOSE</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Uncomplicated UTI (no fever or flank pain) NOT PREGNANT HPA ORG SIGN</td>
<td>+ve nitrites and leucocytes on morning urine increases likelihood of UTI in patients with symptoms of cystitis. Asymptomatic bacteriuria in the elderly (both male and female) is common and antibiotics should not be used.</td>
<td>First line</td>
<td>trimethoprim&lt;sup&gt;B&lt;/sup&gt;</td>
<td>200 mg BD</td>
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<td></td>
<td>If antibiotic in previous 6 months, sensitivity test first.</td>
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<td></td>
<td>Men: send pre-treatment MSU&lt;sup&gt;C&lt;/sup&gt;</td>
<td>Second line</td>
<td>nitrofurantoin&lt;sup&gt;B&lt;/sup&gt; caps (avoid if renal impairment)</td>
<td>50-100 mg QDS Or Modified release (MR) 100mg BD&lt;sup&gt;C&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Refer male patients with &gt; 1 UTI Macrocystalline nitrofurantoin (i.e. capsules or m/r capsules) preferred due to reduced side effects.</td>
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<tr>
<td>Multiresistant E.coli with Extended Spectrum Beta-Lactamases (ESBLs) are increasing so perform culture in all treatment failures.</td>
<td>Depending on sensitivity of organism isolated:</td>
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<td></td>
<td>nitrofurantoin&lt;sup&gt;A&lt;/sup&gt; caps (avoid if renal impairment) OR</td>
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<td></td>
<td>fosfomycin&lt;sup&gt;A&lt;/sup&gt; (Named patient drug)</td>
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<td>Patient MUST be referred to secondary care (via microbiology or infectious diseases) to obtain a supply</td>
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<tr>
<td>UTI and asymptomatic bacteriuria in pregnancy HPA ORG</td>
<td>Send MSU for sensitivities and start empirical antibiotics&lt;sup&gt;A&lt;/sup&gt;</td>
<td>First Line</td>
<td>cefalexin</td>
<td>500mg BD</td>
</tr>
<tr>
<td></td>
<td>Avoid trimethoprim in 1&lt;sup&gt;st&lt;/sup&gt; trimester and in those with low folate status or on folate antagonists.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nitrofurantoin – short term use is unlikely to cause harm to foetus but still recommend avoiding at term (due to foetal haemolysis)</td>
<td>Second line</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; /2&lt;sup&gt;nd&lt;/sup&gt; trimester: nitrofurantoin caps</td>
<td>50mg QDS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; /3&lt;sup&gt;rd&lt;/sup&gt; trimester: trimethoprim</td>
<td>200mg BD</td>
</tr>
</tbody>
</table>

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HERPC Guidelines for the Treatment of Infections in Primary Care. Date Approved:23/3/11 Review Date:March 2013
| Children HPA ORG NICECG54 | Child<3 months with suspected UTI: admit\(^1\)C  
Child≥3 months: use positive nitrite to start antibiotics\(^1\)A\(^*\)  
Send pre-treatment MSU for all  
Referral for imaging: only refer if child < 6 months or atypical UTI\(^1\)C  
Refer for recurrent UTI – 2 or more episodes of UTI including one episode of pyelonephritis OR 3 or more episodes of UTI | **First line**  
Trimethoprim\(^A\) OR Nitrofurantoin\(^A\)  
See BNF for dosage  
3 days\(^A\)\(^*\) |  
| **Second line**  
Cephalexin\(^C\)  
See BNF for dosage  
3 days\(^A\)\(^*\) |  
| **Acute pyelonephritis**  
Co-amoxiclav\(^A\)  
(see specialist advice if penicillin allergic)  
See BNF for dosage  
7-10 days\(^A\)\(^*\) |  
| Acute pyelonephritis in ADULTS | If admission to hospital not needed send MSU for culture & sensitivities and start antibiotics\(^C\).  
If no response within 48 hours\(^C\) – Admit to hospital. | **First line**  
Co-amoxiclav\(^C\)  
625mg TDS  
7-14 days\(^C\) |  
| **Second line/penicillin allergic**  
ciprofloxacin\(^A\)\(^*\)  
500 mg BD  
7 days\(^A\)\(^*\) |  
| Recurrent UTI in women  
>= 3 UTIs/year | Educate patient on hygiene, lifestyle, diet measures likely to reduce risk of recurrence (http://cks.nhs.uk/urinary_tract_infection_lower_women)  
Consider referral to secondary care.  
Long-term antibiotics are last resort because of risk of resistant organisms emerging.  
Treatment with cyclical antibiotics are not recommended. | **First line**  
Trimethoprim  
100mg ON  
Long term\(^A\)\(^*\) |  
| **Second line**  
Nitrofurantoin caps  
50-100mg ON  
Long term\(^A\)\(^*\) |  
| Acute prostatitis BASHH | Refer all suspected cases of acute prostatitis to secondary care  
Send MSU for culture and start antibiotics immediately\(^C\).  
Anti-microbial therapy may need adjusted according to microbiology | **First line**  
Trimethoprim\(^C\)  
200mg BD  
28 days\(^C\) |  
| **Second line/ culture negative cases**  
Ciprofloxacin\(^C\)  
500mg BD  
28 days\(^C\) |  
| Epididymo-orchitis BASHH | Refer all suspected cases to Urology or GUM (if STI suspected) | **Gonococcal:**  
Ceftriaxone IM (or Cefixime oral)\(^C\) AND Doxycycline  
250mg IM (or 400mg PO) AND 100mg BD  
STAT  
14 days |  
| **Chlamydial:**  
Doxycycline  
100mg BD  
14 days |  
| **Gram negative:**  
As per sensitivities or if culture negative:  
Ciprofloxacin  
500mg BD  
14 days (or longer) |  

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HERPC Guidelines for the Treatment of Infections in Primary Care.  
Date Approved:23/3/11  
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### GENITO-URINARY TRACT INFECTIONS – National Guidance BASHH – always check for updated guidelines

**Note:** People with risk factors should be screened for Chlamydia, gonorrhoea, HIV, syphilis. Refer individual and partners to GUM service. Risk factors: <25y, no condom, recent (<12mth)/frequency change of partner, symptomatic partner Refer patients with STIs, including trichomoniais, to GUM clinic for contact tracing. If laboratory testing for test of cure in Chlamydia infection is required then it should be performed at least 3 weeks after the initiation of therapy to avoid false positive results.

<table>
<thead>
<tr>
<th>ILLNESS</th>
<th>COMMENTS</th>
<th>DRUG</th>
<th>DOSE</th>
<th>DURATION OF Tx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal candidiasis</td>
<td>All topical and oral azoles give 75% cure.</td>
<td>First line Clotrimazole pessary</td>
<td>500mg STAT or 200mg nocte for 3 nights</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Second line Fluconazole (oral)</td>
<td>150mg STAT</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pregnancy (if symptomatic) Clotrimazole pessary</td>
<td>100mg ON 6 nights</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Or Miconazole 2% cream</td>
<td>5g Intravaginally BD 7 days</td>
</tr>
<tr>
<td></td>
<td>Effects of Clotrimazole on latex condoms is unknown</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>If extensive, severe or unresponsive to first line treatment consider oral therapy. Add clotrimazole 1% or 2% cream, BD to TDS for symptomatic relief.</td>
<td></td>
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<tr>
<td></td>
<td>In pregnancy avoid fluconazole</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Topical treatment gives similar cure rates but is more expensive. Clindamycin may damage latex condoms and diaphragms. Metronidazole vaginal gel is not recommended during menstruation.</td>
<td>First Line metronidazole</td>
<td>400 mg BD 7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Second Line metronidazole 0.75% vag gel OR clindamycin 2% cream</td>
<td>5 g applicatorful ON 5 nights 7 nights</td>
<td></td>
</tr>
<tr>
<td>Bacterial vaginosis</td>
<td>Uncomplicated Chlamydia trachomatis in men and women</td>
<td>Refer patient to GUM for partner notification and follow up.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Opportunistically screen all aged 15-25 years.</td>
<td>First line azithromycin or Doxycycline</td>
<td>1 g STAT 1 hr before or 2 hrs after food 1 hr before or 2 hrs after food</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Second line Doxycycline</td>
<td>100mg BD 7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pregnancy First line Azithromycin (unlicensed)</td>
<td>1 g STAT 1 hr before or 2 hrs after food</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Second line Erythromycin</td>
<td>500mg BD 14 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trichomoniasis</td>
<td>Refer patients and contacts to GUM.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Treat partners simultaneously Avoid 2g stat dose of metronidazole in pregnancy or breast feeding If oral treatment declined, offer clotrimazole (unlicensed) for SYMPTOMATIC relief and treat postnatally.</td>
<td>metronidazole or clotrimazole</td>
<td>400 mg BD or 2 g in single dose 7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100 mg pessary ON 6 days</td>
<td></td>
</tr>
</tbody>
</table>

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| Pelvic Inflammatory Disease (PID) | Test for Chlamydia & *N. gonorrhoea*  
Refer patients and contacts to GUM clinic  
These regimens are not for use in pregnancy. Please discuss these cases with secondary care.  
28% of gonorrhoea isolates now resistant to quinolones<sup>8</sup> so only use ofloxacin based regimens if gonococcal PID unlikely. | **First line**  
Ceftriaxone IM AND metronidazole AND doxycycline<sup>8</sup>  
**Second line**  
Ofloxacin<sup>8</sup> AND metronidazole |  
250mg IM AND  
400 mg BD AND  
100 mg BD  
400mg BD AND  
400mg BD | **STAT**  
14 days  
14 days |  
Genital herpes | Refer patients and contacts to GUM clinic  
Higher doses may be required in severe infection or immunocompromised  
Longer courses required if new lesions appear during treatment period or if healing is incomplete | **First line**  
Aciclovir  
**Aciclovir** |  
200mg FIVE times daily  
OR  
400mg TDS |  
5 days  
5 days |  
Genital warts | Refer patients and contacts to GUM clinic  
Treatment depends on site, character and area involved.  
Cryotherapy is first line treatment for some cases (e.g. keratinised warts)  
Avoid podophyllotoxin in pregnancy / breast feeding  
Imiquimod may damage latex condoms and diaphragms.  
**Treatments include:**  
Podophyllotoxin solution or cream  
Imiquimod cream | **BD for three days**  
(then 4 day break)  
Three times a week, at night | **Repeat weekly until lesions resolve.**  
(max of 4 weeks)  
Until lesions resolve (max 16 weeks) |  

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## GASTRO-INTESTINAL TRACT INFECTIONS

<table>
<thead>
<tr>
<th>ILLNESS</th>
<th>COMMENTS</th>
<th>DRUG</th>
<th>DOSE</th>
<th>DURATION OF Tx</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eradication of Helicobacter pylori</strong></td>
<td>Eradication is beneficial in DU, GU⁵ and low grade maltoma⁶, but not in GORD ⁷. In NUD only 8% of patients benefit ⁸.</td>
<td><strong>First line</strong>⁹⁺ lansoprazole AND amoxicillin AND clarithromycin,</td>
<td>30 mg BD 1 g BD 500 mg BD</td>
<td>7 days⁺⁺⁺</td>
</tr>
<tr>
<td>NICE HPA ORG</td>
<td>Triple treatment attain &gt;85% eradication. As resistance is increasing, avoid clarithromycin or metronidazole if used in past year.</td>
<td><strong>Penicillin allergic</strong>⁺⁺⁺ lansoprazole AND clarithromycin AND metronidazole</td>
<td>30 mg BD 500 mg BD 400 mg BD</td>
<td>7 days⁺⁺⁺</td>
</tr>
<tr>
<td></td>
<td>DU / GU: retest for H. pylori if symptomatic. NUD: do not retest, treat as functional dyspepsia.</td>
<td><strong>Treatment failure</strong>⁺⁺⁺ lansoprazole plus bismuth salt (De-noltab®) AND two unused antibiotics: Amoxicillin Metronidazole Tetracycline</td>
<td>30 mg BD 120 mg QDS 1 g BD 400 mg TDS 500 mg QDS</td>
<td>14 days (for relapse and MALToma) ⁹</td>
</tr>
<tr>
<td>Clostridium difficile</td>
<td>Stop unnecessary antibiotics and/or PPIs ⁹⁺. 70% respond to metronidazole in 5 days, 92% in 14 days. Admit if severe: T&gt;38.5°C; WCC&gt;15, rising creatinine or signs/symptoms of severe colitis ⁹⁺. Antimotility agents should NOT be prescribed in acute episodes.</td>
<td><strong>1st/2nd episode or non-severe</strong> metronidazole (oral)⁺⁺⁺</td>
<td>400 mg TDS</td>
<td>10-14 days⁹⁺⁺⁺</td>
</tr>
<tr>
<td>DH &amp; HPA</td>
<td></td>
<td><strong>3rd or subsequent episode or severe</strong> vancomycin (oral)⁺⁺⁺</td>
<td>125 mg QDS</td>
<td>10-14 days⁹⁺⁺⁺</td>
</tr>
<tr>
<td></td>
<td>Gastroenteritis</td>
<td>Refer previously healthy children with acute painful or bloody diarrhoea to exclude E coli 0157 infection ⁹⁺. <strong>Antibiotic therapy is not indicated unless systemically unwell</strong> ⁹⁺. Initiate treatment, on advice of microbiologist, if the patient is systemically unwell (e.g. clarithromycin 250mg – 500 mg BD for 5-7 days, if campylobacter suspected and treated early) ⁹⁺. Please notify suspected cases of food poisoning to, and seek advice on exclusion of patients, from Public Health Doctor 01482 672171 (9am-5pm) Send stool samples in these cases.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traveller’s Diarrhoea</td>
<td>Limit prescription of antibacterial to be carried abroad and taken if illness develops. (Ciprofloxacin 500mg twice daily for 3 days or 500mg stat dose, as a private prescription)⁹⁺ Restrict to people travelling to remote areas and for people in whom an episode of infective diarrhoea could be dangerous⁹⁺. Consider referral of suspected infectious diarrhoea following travel to Department of Infection and Tropical Medicine, Hull and East Yorkshire Hospitals NHS Trust.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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HERPC Guidelines for the Treatment of Infections in Primary Care. Date Approved: 23/3/11 Review Date: March 2013
## SKIN / SOFT TISSUE INFECTIONS


<table>
<thead>
<tr>
<th>ILLNESS</th>
<th>COMMENTS</th>
<th>DRUG</th>
<th>DOSE</th>
<th>DURATION OF Tx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impetigo</td>
<td>As resistance is increasing topical antibacterials should be reserved for very localised skin infections&lt;sup&gt;a&lt;/sup&gt;. For extensive, severe or bullous impetigo, use oral antibiotics&lt;sup&gt;c&lt;/sup&gt;.</td>
<td><strong>For lesions suitable for topical use:</strong> hydrogen peroxide cream 1% (<em>Crystacide&lt;sup&gt;b&lt;/sup&gt;</em>).</td>
<td>Topically TDS</td>
<td>5 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>First line</strong> fluocoxacin&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Oral 500 mg QDS</td>
<td>7 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Second line/penicillin allergic</strong> clarithromycin&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Oral 250-500mg BD</td>
<td>7 days</td>
</tr>
<tr>
<td>Cellulitis</td>
<td>If patient afebrile and healthy, other than cellulitis, flucoxacin may be used as single drug treatment&lt;sup&gt;c&lt;/sup&gt;. If febrile and ill, admit for IV treatment&lt;sup&gt;c&lt;/sup&gt;</td>
<td><strong>First line</strong> fluocoxacin&lt;sup&gt;c&lt;/sup&gt;</td>
<td>500 mg QDS</td>
<td>7 days. If slow response a further 7 days may be required&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Second line/penicillin allergic:</strong> clarithromycin&lt;sup&gt;c&lt;/sup&gt;</td>
<td>500mg BD</td>
<td>As advised by specialist team</td>
</tr>
<tr>
<td>Diabetic foot</td>
<td><strong>Urgent referral required</strong> Admit if general systemic illness, spreading cellulitis, critical ischaemia, penetrating foot injury. Contact consultant / SpR in Endocrinology via switchboard for advice. If admission not required, start antibiotics and refer urgently to diabetic foot service (tel 01482 675345 or fax 01482 675370) See also HERPC guideline</td>
<td><strong>First line</strong> fluocoxacin&lt;sup&gt;c&lt;/sup&gt;</td>
<td>500 mg QDS</td>
<td>7 days. If slow response a further 7 days may be required&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Second line/penicillin allergic:</strong> clindamycin&lt;sup&gt;c&lt;/sup&gt;</td>
<td>300mg qds</td>
<td>As advised by specialist team</td>
</tr>
<tr>
<td>MRSA Skin colonisation</td>
<td>Give treatment for skin decolonisation when advised by specialist team <em>Naseptin</em> should be used (for 10 days) instead of mupirocin nasal ointment if the isolate is known to be mupirocin resistant. 48 hours after course complete patient should be re-swabbed. If patient not decolonised – seek specialist advice</td>
<td>mupirocin 2% nasal ointment And triclosan 1% foam (<em>Skinsan&lt;sup&gt;b&lt;/sup&gt;</em>).</td>
<td>Apply to nostrils TDS Wash DAILY (incl 2 hair washes)</td>
<td>5 days</td>
</tr>
<tr>
<td>HPA MRSA quick reference guide.</td>
<td></td>
<td></td>
<td></td>
<td>5 days</td>
</tr>
<tr>
<td>MRSA active infection</td>
<td>MRSA confirmed with lab results Seek specialist advice For further information see <a href="http://www.hpa.org.uk">www.hpa.org.uk</a></td>
<td>doxycycline&lt;sup&gt;B+&lt;/sup&gt; (&gt;12yrs only) (Ensure isolate is doxycycline sensitive) Other treatment options– discuss with specialist</td>
<td>100mg BD</td>
<td>7 days</td>
</tr>
</tbody>
</table>

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### PVL producing- *Staphylococcus aureus*

Panton-Valentine Leukocidin (PVL) is a toxin produced by 2% of *S. aureus*. Can rarely cause severe invasive infections in healthy people. Send swabs if recurrent boils/ abscesses. Risk factors: Close contact in communities or sport; poor hygiene.**HPA ORG**

### Leg ulcers

Routine swabs are not recommended. Antibiotics are only indicated if cellulitis is present**, and do not improve healing. Cultures / swabs are only indicated if diabetic or there is evidence of clinical infection, e.g. inflammation or redness / cellulitis, increased pain, purulent exudates, rapid deterioration of ulcer or pyrexia. Sampling requires cleaning then vigorous curettage and aspiration.

If active infection, treat as cellulitis (as above). Refer for specialist opinion if severe infection**.

### Eczeema

Using antibiotics, or adding them to steroids in eczema does not improve healing unless there are visible signs of infection. Where treatment indicated treat as per Impetigo**.

### Bites

#### Animal bite

Thorough irrigation is important**. Assess tetanus and rabies risk**. Antibiotic prophylaxis advised for – puncture wounds, bite involving hand, face, foot, tendon or ligament. It is also recommended for at risk patients e.g. diabetics, elderly, asplenic, immunosuppressed.

Antibiotic prophylaxis advised; add metronidazole if severe. Assess HIV/hepatitis B & C risk

#### Human bite

**HPA ORG**

Routine swabs are not recommended. Antibiotics are only indicated if cellulitis is present**, and do not improve healing. Cultures / swabs are only indicated if diabetic or there is evidence of clinical infection, e.g. inflammation or redness / cellulitis, increased pain, purulent exudates, rapid deterioration of ulcer or pyrexia. Sampling requires cleaning then vigorous curettage and aspiration.

If active infection, treat as cellulitis (as above). Refer for specialist opinion if severe infection**.

### Scabies

Treat whole body including scalp, face, neck, ears, under nails. Treat all household and sexual contacts within 24 hours**.

**HPA ORG**

Permethrin 5% cream or malathion 0.5% aqueous solution.2 applications one week apart.

### Fungal infection of the proximal fingernail or toenail (Adults)

#### For children seek advice

Take nail clippings: Start therapy only if infection is confirmed by laboratory**.

Idiosyncratic liver reactions occur rarely with oral antifungals. If patient develops signs of liver dysfunction treatment should be stopped immediately**.

**HPA ORG**

Pulsed itraconazole monthly is recommended for infections with yeasts and non-dermatophyte moulds.**

#### If nail matrix involvement - terbinafine**

Use with caution in hepatic or renal impairment

**HPA ORG**

<table>
<thead>
<tr>
<th>Nail type</th>
<th>Treatment</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fingers: 6–12 weeks</td>
<td>250 mg OD</td>
<td>Fingers: 2 Cycles</td>
</tr>
<tr>
<td>Toes: 3 – 6 months</td>
<td>1-2x/weekly</td>
<td>Toes: 12 months</td>
</tr>
</tbody>
</table>

If no nail matrix involvement

Amorolfine 5% paint**

**HPA ORG**

<table>
<thead>
<tr>
<th>Nail type</th>
<th>Treatment</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fingers: 6 months</td>
<td>1-2x/weekly</td>
<td>Fingers: 6 months</td>
</tr>
<tr>
<td>Toes: 12 months</td>
<td>200 mg BD</td>
<td></td>
</tr>
</tbody>
</table>

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Fungal infection of the skin

Terbinafine is fungicidal. Imidazole is fungistatic. Treatment times shorter with terbinafine.

If candida possible, use imidazole.
If intractable, use skin scrapings and if infection confirmed, use oral therapy (as above). Scalp infections – discuss with specialist.

Patients should be given advice regarding general hygiene measures in order to improve healing and reduce the risk of spread of infection to others.

Topical terbinafine
OR
Topical Clotrimazole 1% cream

BD
Apply 2-3 times / day

1-2 weeks
4 – 6 weeks (i.e. 1-2 weeks after healing)

VIRAL INFECTIONS

<table>
<thead>
<tr>
<th>ILLNESS</th>
<th>COMMENTS</th>
<th>DRUG</th>
<th>DOSE</th>
<th>DURATION OF Tx</th>
</tr>
</thead>
</table>
| Herpes zoster / Chicken pox & Varicella zoster/shingles | If pregnant / immunocompromised / neonate seek urgent advice from virology dept 01482 626762 (Out of hours contact on call consultant microbiologist: 01482 875875)
Chicken pox: treat ONLY IF > 14 years or severe pain, dense/oral rash, secondary household case, on steroids or smoker and IF can start within 24 hours of rash
Shingles: treat ONLY IF over 50 years and within 72 hours of rash; or if active ophthalmic or Ramsey Hunt or eczema. | If indicated: aciclovir | 800 mg five times a day
Child – see BNF | 7 days

Cold sores resolve after 7-10 days without treatment. Topical antivirals (such as aciclovir 5% cream 5 times a day for 5 days) applied prodromally reduce duration by 12-24 hours.

PARASITIC INFECTIONS

| Threadworm | Treat all household contacts at the same time. Advise morning shower / baths, pants at night and hand hygiene for 2 weeks.
PLUS wash sleepwear, bed linen, dust and vacuum on day 1. First trimester of pregnancy – hygiene only
Second and third trimester of pregnancy – use piperazine | First line (> 6 months) (unlicensed under 2 years)
mebendazole
Second line/ plus infants aged 3 to 6 mths
Piperazine with Senna (Pripsen®)
Infants < 3months | First line (> 6 months) (unlicensed under 2 years)
100mg
Second line/ plus infants aged 3 to 6 months
3-12 months 2.5ml
1-6yrs 5ml
> 6 yrs One sachet
Infants < 3months

STAT and repeat after 2 weeks
STAT and repeat after 2 weeks

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### ORAL INFECTIONS

During working hours i.e. Monday to Friday 8.30 am to 6.00pm (inclusive) patients should be referred to their regular general dental practitioner. Patients who do not have a regular NHS Dentist and have expectations of NHS dental treatment should contact their local NHS dental practices, details can be found by contacting NHS direct (0845 46 47) or the PCT PALS team.

An urgent care dental triage service is available, tel 0845 0568298, out of hours (6pm - 9pm) every evening plus bank holidays and Saturdays and Sundays from 9.00am to 12 noon. Appointments will be made to access care on Saturdays, Sundays and bank holidays, if appropriate.

<table>
<thead>
<tr>
<th>ILLNESS</th>
<th>COMMENTS</th>
<th>DRUG</th>
<th>DOSE</th>
<th>DURATION OF Tx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Candida</td>
<td>Typically presents as white plaques on mucosal surfaces. They can be wiped off to reveal a raw erythematous base that may bleed. There are many possible causes of white lesions. However should be distinguished from leukoplakia, a pre-malignant condition where that plaque cannot be wiped off. It is important to treat any pre-disposing factors: • Diabetes mellitus • Corticosteroids (inhaled/oral) • Oral antibiotics should be reviewed • Medication that causes a dry mouth • Denture hygiene should be optimised</td>
<td>Miconazole oral gel Consider change of use to nystatin if patients taking a statin or warfarin</td>
<td>5ml qds (retain gel in mouth near lesions) Dental prosthesis should be removed at night and brushed with gel.</td>
<td>Continue for 48hrs after lesions have healed. Review with a dental practitioner</td>
</tr>
<tr>
<td>Dental Abscess</td>
<td>All patients with a facial swelling should be seen by a dental practitioner within 24hrs. It is accepted that access to a dental practitioner is not always possible. In such cases treatment should consist of analgesia +/- antibiotics. There is a lack of trials looking specifically at antibiotics in the treatment of dental abscess. However expert opinion suggests amoxicillin AND metronidazole. This is a potentially dangerous and life-threatening condition. Patients should understand that treatment for the infection only tempers the condition and a dentist needs to treat the cause to prevent recurrence.</td>
<td>1st line Amoxicillin AND Metronidazole Penicillin allergic Clarithromycin AND Metronidazole</td>
<td>250mg – 500mg TDS 200mg – 400mg TDS 250mg – 500mg BD 200 – 400mg TDS</td>
<td>Until reviewed by dental practitioner Until reviewed by dental practitioner</td>
</tr>
</tbody>
</table>

### MISCELLANEOUS

Prophylaxis of infection in asplenic and hyposplenic patients

Guidance can be found at the following websites


**Note:** *Doses are oral and for adults unless otherwise stated. Please refer to BNF for further information.*

A+ = systematic review, A− = rigorous RCT, B+ = RCT or cohort study, B− = case-control study

C = formal combination of expert opinion.

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References

The primary reference sources for these guidelines were:


Further references used are listed below by clinical topic.

The HPA guidance was initially developed in 1999 by practitioners in South Devon, as part of the S&W Devon Joint Formulary Initiative, and Cheltenham & Tewkesbury Prescribing Group and modified by the PHLS South West Antibiotic Guidelines Project Team, PHLS Primary Care Co-ordinators and members of the Clinical Prescribing Sub-group of the Standing Medical Advisory Committee on Antibiotic Resistance. It was further modified following comments from Internet users.

The guidance has been updated regularly as significant research papers, systematic reviews and guidance have been published. The Health Protection Agency works closely with the authors of the Clinical Knowledge Summaries.

Grading of guidance recommendations

The strength of each recommendation is qualified by a letter in parenthesis.

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

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A+ = systematic review, A- = rigorous RCT, B+ = RCT or cohort study, B- = case-control study
C = formal combination of expert opinion.
A no antibiotic prescribing strategy or a delayed antibiotic prescribing strategy should be negotiated for patients with the following conditions: acute otitis media, acute sore throat, common cold, acute rhinosinusitis, acute cough/acute bronchitis. Depending on patient preference and clinical assessment of severity, patients in the following specific subgroups can also be considered for immediate antibiotics in addition to the reasonable options of a no antibiotic strategy or a delayed prescribing strategy:

- bilateral acute otitis media in children under two years,
- acute otitis media in children with otorrhoea.
- acute sore throat/acute tonsillitis when three or four of the Centor criteria are present.

For all antibiotic prescribing strategies, patients should be given advice about the usual natural history of the illness, including the average total length of the illness (before and after seeing the doctor):

- acute otitis media: 4 days;
- acute sore throat/acute pharyngitis/acute tonsillitis: 1 week;
- common cold: 1½ weeks;
- acute rhinosinusitis: 2½ weeks;
- acute cough/acute bronchitis: 3 weeks.

Advice should also be given about managing symptoms, including fever (particularly analgesics and antipyretics).

When the delayed antibiotic prescribing strategy is adopted, patients should be offered the following:

- reassurance that antibiotics are not needed immediately because they are likely to make little difference to symptoms and may have side effects
- advice about using the delayed prescription if symptoms are not starting to settle in accordance with the expected course of the illness or if a significant worsening of symptoms occurs
- advice about re-consulting if there is a significant worsening of symptoms despite using the delayed prescription.
- A delayed prescription with instructions can either be given to the patient or left at an agreed location to be collected at a later date.

**Influenza**

National Institute for Health and Clinical Excellence. Amantadine, oseltamivir and zanamivir for the treatment of influenza (review of NICE technology appraisal guidance 58)
http://www.nice.org.uk/nicemedia/pdf/TA168quickrefguide.pdf Accessed 05.08.10

http://www.hpa.org.uk/webw/HPAweb&HPAwebPrinterFriendly/HPAweb_C/1201861721077?p=120186170287 Accessed 05.08.10


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C = formal combination of expert opinion.
Sore Throat


Altamimi S, Khali A, Khalaiai KA, Milner R, Pusic MV, Al Othman MA. Short versus standard duration antibiotic therapy for acute streptococcal pharyngitis in children. Cochrane Database of systematic reviews 2009, Issue 1. Art No.: CD004872. DOI: 10/1002/14651858.CD004872.pub2. RATIONALE: This recent meta-analysis shows short-course (including 5 days Clarithromycin) broad-spectrum antibiotics are as efficacious as 10-day-penicillin for sore throat symptom treatment and GABHS eradication. 10-day-phenoxymethylpenicillin remains the treatment of choice. Evidence suggests the use of broader spectrum antibiotics will drive the emergence of bacterial resistance; increase the risk of developing Clostridium difficile Associated Disease; and are associated with more adverse drug reactions. 5-days-clarithromycin should be reserved for those with true penicillin allergy.

Centor RM, Whitherspoon JM, Dalton HP, Brody CE, Link K. The diagnosis of strep throat in adults in the emergency room. Med Decision Making 1981;1:239-46. RATIONALE: Centor Criteria: History of fever; absence of cough; tender anterior cervical lymphadenopathy and tonsillar exudates. A low Centor score (0-2) has a high negative predictive value (80%) and indicates low chance of Group A Beta Haemolytic Streptococci (GABHS). A Centor score of 3-or-4 suggests the chance of GABHS is 40%. If a patient is unwell with a Centor score of 3-or-4 then the chance of developing Quinsy is 1:60.

Howie JGR, Foggo BA. Antibiotics, sore throats and rheumatic fever. BJGP 1985;35:223-224. RATIONALE: This Scottish retrospective study confirms the low incidence of Rheumatic Fever in the UK, (0.6 per 100,000 children per year). It would take 12 working GP life times to see one case of Rheumatic Fever. The risk of developing Rheumatic Fever was not reduced in this study by treating sore throats with antibiotics. This supports the recommendation that in the UK antibiotics should not be used to prevent non-supportive complications of acute sore throat.

HPA comment: Expert opinion is that phenoxymethylpenicillin should be dosed QDS for severe infections in order to optimise the therapeutic drug concentrations.

Kagan, B. Ampicillin Rash. Western Journal of Medicine 1977;126(4):333-335 RATIONALE: Amoxicillin should be avoided in the treatment of acute sore throat due to the high risk of developing a rash, when the Epstein Barr virus is present.

Lan AJ, Colford JM, Colford JMJ. The impact of dosing frequency on the efficacy of 10 day penicillin or amoxicillin therapy for streptococcal tonsillitharyngitis: A meta-analysis. Pediatr 2000;105(2):E19. RATIONALE: This meta-analysis provides the evidence that BD dosing with phenoxymethylpenicillin is as effective as QDS in treating GABHS.

Schartz RH, Wientzen RL Jr, Predreira F, Feroli EJ, Mella GW, Guandolo VL. Penicillin V for group A streptococcal pharyngotonsillitis. A randomized trial of seven vs ten days’ therapy. JAMA 1981 Oct 16;246(16):1790-5 RATIONALE: The best evidence for a 10 day course of penicillin comes from the early trials using the parenteral form. This RCT demonstrates that a 10 day course of oral phenoxymethylpenicillin is better than 7 days for resolution of symptoms and eradication of GABHS.

Spinks A, Glasziou PP, Del Mar C. Antibiotics for sore throat. Cochrane Database of systematic reviews 2006, Issue 4.Art. No CD000023.DOI:10.1002/14651858.CD000023.pub3. (Review content up to date 24 November 2008). RATIONALE: This meta-analysis includes 27 RCT’s and 2,835 cases of sore throat. Without antibiotics 40% of sore throats resolve in 3 days and 90% in 7 days. Antibiotics do confer a marginal benefit: To resolve one sore throat at 3 days the NNT is 6 and at 7 days the NNT is 21. However, absolute benefits are modest, especially as the Number Needed to Harm for antibiotic use in respiratory infections is about 15.

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HERPC Guidelines for the Treatment of Infections in Primary Care. Date Approved:23/3/11 Review Date:March 2013
Taylor JL, Howie JGR. Antibiotics, sore throat and acute nephritis. BJGP 1983;33:783-86. RATIONALE: This study shows that Glomerulonephritis is a rare condition, (2.1 per 100,000 children per year) and that treating acute sore throat with antibiotics doesn’t prevent it occurring.

Acute Otitis Media

NICE 69: National Institute for Health and Clinical Excellence. Prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care. 2008. (Clinical guideline 69) RATIONALE: Acute Otitis Media: NICE 69 includes 3 trials that use a delayed-antibiotic strategy for treating AOM. Two USA studies used a 2-day-delayed antibiotic and the UK primary care study used a 3-day-delayed antibiotic.

Bertin L, Pons G, d’Athis P, Duhamel JF, Mauelonde C, Lasfargues G, Guillot M, Marsac A, Debregeas B, Olive G. A randomized, doubleblind, multicentre controlled trial of ibuprofen versus acetaminophen and placebo for symptoms of acute otitis media in children. Fundam Clin Pharmacol 1996;10(4):387-92 RATIONALE: This small RCT is probably the best trial evidence we have specifically for analgesia use in AOM. Both Paracetamol and Ibuprofen showed a non-significant trend towards effective analgesia compared with placebo. Note that all children were also treated with an antibiotic.

Kozyrskyj AL, Hildes Ripstein GF, Longstaffe SE, et al. Short-course antibiotics for acute otitis media. Cochrane Database Syst Rev 2000;(2):CD001095. RATIONALE: This review found that 5 days of antibiotic treatment was as effective as 10 days in otherwise healthy children with uncomplicated AOM.

Little P, Gould C, Williamson I, Moore M, Warner G, Dunleavey J. Pragmatic randomised controlled trial of two prescribing strategies for childhood acute otitis media. BMJ 2001;322:336-42 RATIONALE: This RCT makes two important observations: that parents tend to underestimate the amount of analgesia they’ve administered and that when recommending a no-antibiotic strategy it is all the more important to optimise analgesia.

Rovers MM, Glasziou P, Appelman CL, Burke P, McCormick DP, Danoiseaux RA, Little P, Le Saux N, Hoes AW. Predictors of pain and/or fever at 3 to 7 days for children with acute otitis media not treated initially with antibiotics: a meta-analysis of individual patient data. Pediatrics 2007;119(3):579-85 RATIONALE: The risk of prolonged illness was 2 times higher for children <2years with bilateral AOM than for children with unilateral AOM. For this sub-group parents should be advised that symptoms may persist for up to 7 days, and they should optimise analgesia use.

Rovers MM, Glasziou P, Appelman CL, Burke P, McCormick DP, Danoiseaux RA, Gaboury I, Little P, Hoes AW. Antibiotics for acute otitis media: a meta-analysis with individual patient data. Lancet 2006;368:1429-1435 RATIONALE: Note this is sub-analysis of data. In children <2 years old with bilateral AOM, 30% on antibiotics and 55% of controls had pain and/or fever at 3 to 7 days (RD -25%; 95% CI: -36, -14) and the NNT was 4 in children with otorrhoea, 24% on antibiotics and 60% of controls had pain and/or fever at 3 to 7 days (RD -36%; 95% CI: -53, -19) and the NNT was 3.

Sanders S, Glasziou PP, Del Mar C, Rovers MM. Antibiotics for acute otitis media in children. Cochrane Database of Systematic Reviews2004, Issue 1. Art. No.:CD000219.DOI:10.1002/14651858.CD000219.pub2. (Content up to date 08.11.08) RATIONALE: Most (66%) of children are better in 24 hours and antibiotics have no effect. 80% of children are better in 2-7 days and antibiotics have a small effect (symptoms reduced by 16 hours), (RR 0.72; 95% CI 0.62 to 0.83). Antibiotics did not reduce tympanometry (deafness), perforation or recurrence. Vomiting, diarrhoea or rash was more common in children taking antibiotics (RR 1.37; 95% CI 1.09 to 1.76) with a Number Needed to Harm of 16.


Note: Doses are oral and for adults unless otherwise stated. Please refer to BNF for further information. A+ = systematic review, A- = rigorous RCT, B+ = RCT or cohort study, B- = case-control study, C = formal combination of expert opinion.
Acute Otitis Externa

Abelardo E, Pope L, Rajkumar K, Greenwood R, Nunez DA. A double-blind randomised clinical trial of the treatment of otitis externa using topical steroid alone versus topical steroid-antibiotic therapy. *European Archives of Oto-rhino-laryngology*; 2009;266(1):41-5 RATIONALE: A hospital outpatient RCT showing superiority of topical steroid-antibiotic therapy. The Cochrane Review 2010 also stated that 'the evidence for steroid-only drops is very limited and as yet not robust enough to allow us to reach a conclusion or provide recommendations.'

Kaushik V, Malik T, Saeed SR. Interventions for acute otitis externa. *Cochrane Database of Systematic Reviews* 2010, Issue1. Art. No.:CD004740. DOI: 10.1002/14651858.CD004740.pub2. RATIONALE: The best evidence we have to date. Includes 19 low quality RCT’s only two of which are from primary care, and therefore probably included more severe or chronic cases. One big downside for primary care is that over half of the trials involved ear cleaning. The meta-analysis demonstrates topical treatments alone are adequate for treating most cases of AOE. Acetic acid was as effective and comparable to antibiotic/steroid for the first 7 days, but inferior after this point. It is important to instruct patients to use drops for at least one week, and to continue for up to 14 days if symptoms persist.

Rosenfeld RM, Brown L, Cannon R, Dolor RJ, Ganiats TG, Hanningly M, Kokemueller P, Marcy M, Roland PS, Shiffman RN, Stinnett SS, Witsell DL, Singer M, Wasserman JM. Clinical Practice Guideline: Acute Otitis Externa. *Otolaryngology – Head and Neck Surgery* 2006;134(Suppl 4):S4-S23 RATIONALE: Up to 40% of patients with AOE receive oral antibiotics unnecessarily. The oral antibiotics in the trials were often inactive against *P aeruginosa* (incidence 36%) and *S aureus* (incidence 21%). Topical antibiotics such as neomycin have a broader spectrum of activity. When using topical antibiotics in this situation bacterial resistance is far less of a concern as the high concentration of the drug in the ear canal will generally eradicate all susceptible organisms, plus those with marginal resistance. **Malignant Otitis Externa is an aggressive infection that affects the immunocompromised and elderly that requires prompt admission.** Facial Nerve paralysis may be an early sign. GPs should refer severe cases, characterised by unremitting pain, cranial nerve deficits, perforated tympanic membrane or history of previous ear surgery.

Acute Rhinosinusitis

NICE 69: National Institute for Health and Clinical Excellence. Prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care. 2008. (Clinical guideline 69). Although there are no specific studies looking at delayed antibiotics for acute rhinosinusitis, NICE 69 recommends the same approach as for the other self limiting respiratory tract infections. The 7-day delay is recommended as systematic review shows no benefit of antibiotics in rhinosinusitis within the first 7 days.

Ahovuo-Saloranta A, Borisenko OV, Kovanen N, Varonene H, Rautakorpi UM, Williams Jr JW, Makela M. Antibiotics for acute maxillary sinusitis. *Cochrane Database of Systematic Reviews* 2008, Issue 2.Art. No.: CD000243. DOI:10.1002/14651858.CD000243.pub2. (Last assessed as up-to-date 28 May 2007) RATIONALE: This is a big clinical review (57 studies), that contained 6 placebo controlled trials. 5 of these were in primary care and involved 631 patients. There was a slight statistical difference in favour of antibiotics compared with placebo (RR 0.66; 95%CI 0.65 to 0.84). Note cure/improvement rate was high in placebo group (80%) compared with the treatment group (90%). Antibiotics have a small treatment effect in patients with uncomplicated acute rhinosinusitis, in a primary care setting, for more than seven days.

Ah-See KW, Evans AS. Sinusitis and its management. *BMJ* 2007;334:358-61 RATIONALE: Adequate analgesia is becoming recognised as the first-line management for acute rhinosinusitis. Robust evidence for this is limited, as it is for analgesia use in general. This is partly due to the widespread accepted efficacy and tolerability of analgesics, that such research isn’t deemed necessary. We have to make do with the consensus expert opinion.

De Ferranti SD, Lonnidis JPA, Lau J, Anniger WV, Barza M. Are amoxicillin and folate inhibitors as effective as other antibiotics for acute sinusitis? *BMJ*1998;317:632-7 RATIONALE: On current evidence, no one class of antibacterial is more likely than another to cure patients with sinusitis.

Falagas ME, Karageorgopoulos DE, Grammatikos AP, Mathaiou DK. Effectiveness and safety of short vs. long duration of antibiotic therapy for acute bacterial sinusitis: a meta-analysis of randomised trials. *British Journal of...

**Note:** Doses are oral and for adults unless otherwise stated. Please refer to BNF for further information. A+ = systematic review, A- = rigorous RCT, B+ = RCT or cohort study, B- = case-control study C = formal combination of expert opinion.
RATIONALE: there was no difference in the comparison of short-course (3-7 days) with long-course treatment (6-10 days). The pragmatic interpretation of this meta-analysis is that a 7 day course is optimal.

Hansen JG, Hojbjerg T, Rosborg J. Symptoms and signs in culture proven acute maxillary sinusitis in general practice population. APMIS 2009;117(10):724-9 RATIONALE: We don't yet have robust diagnostic criteria for those patients with acute rhinosinusitis that would most benefit from antibiotics. This primary care prospective cohort study of 174 patients shows: Fever >38 degrees; maxillary toothache and raised ESR were associated with S. pneumoniae and H. influenzae positive rhinosinusitis.

Young J, De Sutter A, Merenstein D, van Essen GA, Kaiser L, Varonen H, Williamson I, Bucher HC. Antibiotics for adults with clinically diagnosed acute rhinosinusitis: a meta-analysis of individual patient data. Lancet. 2008;371:908-914 RATIONALE: This meta-analysis included 2,547 pts from 9 Placebo-controlled trials. This primary care meta-analysis showed that 15 people would have to be given antibiotics before an additional patient was cured. The Odds Ratio of treatment effect for antibiotics relative to placebo was 1.37 (95% CI 1.13 to 1.66). A further sub-group analysis showed that those patients with purulent discharge were more likely to benefit from antibiotics with a NNT of 8. There was no additional benefit of antibiotics for: older patients; more severe symptoms or longer duration of symptoms.

LOWER RESPIRATORY TRACT INFECTIONS

Woodhead M, Blasi F, Ewig S, Huchon G, Leven M, Ortvqvist A, Schabert T, Torres A, can der Jeijden G, Werheij TJM. Guidelines for the management of adult lower respiratory tract infection. Eur Respir J 2005;26:1138-80. http://www.erj.ersjournals.com/contents-by-date.0.shtml (Accessed 3rd January 2010). Appendices 1, 2 and 3 give a detailed account of the definitions of LRTI, the microbiological aetiologies of LRTI unspecified, community acquired pneumonia, exacerbations of COPD and bronchiectasis and the pharmacodynamic/pharmacokinetic properties of the antibiotics used to treat them. Strep. Pneumoniae remains the most commonly isolated pathogen in all of the above except in bronchiectasis. The infective agents causing exacerbations of COPD differ according to the severity of the underlying condition suggesting that more broad spectrum antibiotics are indicated in patients with severe COPD (FEV1< 50%). Antibiotic classes are discussed with reference to their mode of action in terms of time dependent or concentration dependent effect, their tissue penetration and whether they exert a post antibiotic effect. Other factors such as bioavailability are also considered.

Acute bronchitis

NICE Clinical Guideline 69. Respiratory Tract Infections - antibiotic prescribing for self-limiting respiratory tract infections in adults and children in primary care. July 2008. Describes strategies for limiting antibiotic prescribing in self-limiting infections and advises in which circumstances antibiotics should be considered. A no antibiotic or a delayed antibiotic prescribing strategy should be agreed for patients with acute cough/chronic bronchitis. In the 2 RCTs included in the review, the delay was 7-14 days from symptom onset and antibiotic therapy. Patients should be advised that resolution of symptoms can take up to 3 weeks and that antibiotic therapy will make little difference to their symptoms and may result in side effects. Patients should also be advised to seek a clinical review if condition worsens or becomes prolonged. The evidence behind these statements is primarily from the studies referred to below.

Chronic cough due to acute bronchitis. Chest. 2006;129:95S-103S. Clinical guidelines on managing cough associated with acute bronchitis. Large body of evidence including meta-analyses and systematic reviews does not support routine antibiotic use.


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Utilising an information booklet during primary care consultations for children with RTIs significantly decreased antibiotic use (absolute risk reduction 21.3% (95%CI, 13.7-28.9 p<0.001). Reconsultation occurred in 12.9% of children in intervention group and 16.2% in control group (absolute risk reduction 3.3%, no statistical difference). There was no detriment noted to patient satisfaction in the intervention group.

Treatment of acute bronchitis available in Clinical Knowledge Summaries website: http://www.cks.library.nhs.uk/search?&page=1&q=sore%20throat%20acute&site=0  Accessed 05.08.10.


**COPD**


Chronic obstructive pulmonary disease. Management of COPD in adults in primary and secondary care. NICE Clinical Guideline 12 February 2004. http://guidance.nice.org.uk/CG101  Accessed 05.08.10. A meta analysis of nine trials found a small but statistically significant effect favouring antibiotics over placebo in patients with exacerbations of COPD. Effect size 0.22 (95% CI, 0.1 to 0.34).Four studies assessed whether there was a relationship between severity of exacerbation and the effectiveness of antibiotic use. Three of these studies suggest that the worse the COPD severity of exacerbation (lung function impairment (FEV1, PEFR), purulence of sputum) then the greater the degree of benefit from antibiotics.


**Community-acquired pneumonia**


Updated guideline on the management of CAP – includes diagnosis, severity assessment, microbiological profile and therapeutic management in both the community and hospital. Assessing severity using CRB65 scores in addition to clinical judgement allows patients to be stratified according to increasing risk of mortality. (score 0, mortality risk 1.2%; score 1. 5.3%; score 2. 12.2%; scores 3-4, up to 33%).Patients with a CRB65 score ≥1 are deemed to have moderately severe CAP and should be assessed with a view to hospital admission. Patients with moderately severe CAP should receive antibiotics which also cover atypical organisms.


Detailed review of pneumococcal pneumonia, the most common cause of CAP. Includes discussion of clinical features, risk factors and rationale for high dose penicillins to overcome resistance.

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HERPC Guidelines for the Treatment of Infections in Primary Care.  Date Approved:23/3/11  Review Date:March 2013
MENINGITIS

NICE. Bacterial meningitis and meningococcal septicaemia. National Collaborating Centre for Women’s and Children’s health 2009. http://guidance.nice.org.uk/CG102/Guidance Accessed 05.08.10. Expert opinion is that in children or young people with suspected bacterial meningitis or meningococcal septicaemia, transfer to hospital is the priority, and that intravenous benzylpenicillin should be given at the earliest opportunity, either in primary or secondary care. The NICE guideline development group recommended benzylpenicillin because it is the most frequently used antibiotic in primary care and they found no evidence to recommend an alternative antibiotic. Although the scope of this guideline is for children, it seems reasonable to extrapolate the advice to older age groups.

SIGN. Management of invasive meningococcal disease in children and young people. Scottish Intercollegiate Guidelines Network. 2008 http://www.sign.ac.uk/guidelines/fulltext/102/index.html Accessed 05.08.10. Expert opinion is that parenteral antibiotics (either benzylpenicillin or cefotaxime) should be administered in children as soon as invasive meningococcal disease is suspected, and not delayed pending investigations/

URINARY TRACT INFECTIONS

Notes

NICE. Infection control. Prevention of healthcare-associated infections in primary and community care. The National Collaborating Centre for Nursing and Supportive Care and the Thames Valley University. 2003 http://guidance.nice.org.uk/CG2 Accessed 05.08.10. This guideline originally stated that prophylactic antibiotics were also indicated for people with heart valve lesions, septal defects, patent ductus, or prosthetic valves. However, NICE state that this recommendation has been superseded by their 2008 guideline on prophylaxis of endocarditis, which states that prophylactic antibiotics are no longer required for people with those conditions requiring a catheter change.


Uncomplicated UTI

SIGN. Management of suspected bacterial urinary tract infection in adults: a national clinical guideline. Scottish Intercollegiate Guidelines Network. 2006 http://www.sign.ac.uk/guidelines/fulltext/88/index.html Accessed 05.08.10. Diagnosis in women: expert consensus is that it is reasonable to start empirical antibiotics in women with symptoms of UTI without urine dipstick or urine culture. Diagnosis in men: a urine sample is recommended because UTI in men is generally regarded as complicated (it results from an anatomic or functional abnormality) and there are no studies on the predictive values of dipstick testing in men. Duration of treatment for men: there is no evidence to guide duration of treatment; expert consensus is that 7 days of antibiotics should be used because men are likely to have a complicating factor. Second line treatment: resistance is increasing to all antibiotics used to treat UTI.


Note: Doses are oral and for adults unless otherwise stated. Please refer to BNF for further information.

A+ = systematic review, A- = rigorous RCT, B+ = RCT or cohort study, B- = case-control study
C = formal combination of expert opinion.
Christiaens TCM, De Meyere M, Verschragen G, Peersman W, Heytens S, De Maeseneer JM. Randomised controlled trial of nitrofurantoin versus placebo in the treatment of uncomplicated urinary tract infection in adult women. Brit J Gen Pract 2002;52:729-34. This small (n = 78) double-blind RCT found that nitrofurantoin 100mg qds for 3 days was more effective than placebo (NNT = 4.4, 95% CI 2.3 to 79).

DTB. Risks of extended-spectrum beta-lactamases. Drug and Therapeutics Bulletin 2008;46(3):21-24. Extended spectrum beta-lactamases (ESBLs) are able to hydrolyse antibiotics that were designed to resist the action of older beta-lactamases. These organisms may be resistant to most antibiotics commonly used to treat UTI, such as trimethoprim, ciprofloxacin, co-amoxiclav, and all cephalosporins. Most ESBL-producing E coli are sensitive to nitrofurantoin.

Falagas ME, Kastoris AC, Kapaskelis AM, Karageorgopoulos DE. Fosfomycin for the treatment of multidrug-resistant, including extended-spectrum beta-lactamase producing, Enterobacteriaceae infections: a systematic review. Lancet Infect Dis 2010;10:43-50. Ninety seven per cent of ESBL-producing E coli isolates and 81% of Klebsiella pneumonia ESBL-producing isolates were susceptible to fosfomycin.


Grabe M, Bishop MC, Bjerkland-Johansen TE, Botto H, Cek M, Lobel B, Naber KG, Palou, J, Tenke, P, Wagenlehner F. Guidelines on Urological Infections. European Association of Urology 2009: 1-110. Diagnosis in men: a urine sample is recommended because UTI in men is generally regarded as complicated (it results from an anatomic or functional abnormality) and there are no studies on the predictive values of dipstick testing in men. Duration of treatment for men: there is no evidence to guide duration of treatment; expert consensus is that 7 days of antibiotics should be used because men are likely to have a complicating factor.

Gossius G and Vorland L. The treatment of acute dysuria-frequency syndrome in adult women: Double-blind, randomized comparison of three-day vs ten-day trimethoprim therapy. Current Therapeutic Research, Clinical & Experimental 1985;37: 34-42. Two-weeks after completion of treatment, 94% of women using a 3-day course of trimethoprim achieved bacteriological cure compared with 97% of those using a 10-day course of trimethoprim (n =135).

HPA Comment
The HPA and the Association of Medical Microbiologists recommend trimethoprim and nitrofurantoin as first-line empirical treatment for uncomplicated UTI in women and men because they are narrow-spectrum antibiotics that cover the most prevalent pathogens. Broad spectrum antibiotics (e.g. co-amoxiclav, pivmecillinam, quinolones and cephalosporins) should be avoided when narrow spectrum antibiotics remain effective, as they increase risk of Clostridium difficile, MRSA and resistant UTIs. Several guidelines recommend that nitrofurantoin should not be used to treat UTI in men. This is on the grounds that it can be difficult to exclude the possibility of prostatitis, and that nitrofurantoin is not present in therapeutic concentrations in prostatic secretions. However, these recommendations refer to UTI with fever or other signs of acute prostatitis, and neither guideline expressed concern that acute prostatitis would be likely in men with symptoms of lower UTI and without fever and other symptoms of prostatitis.

MeReC Bulletin. Modified-release preparations. 2000;11(4). Modified- release preparations can be used to reduce dosing frequency. Reduced dosing frequency (e.g. from four times a day to twice a day) improves compliance.

Milo G, Katchman EA, Paul M, Christiaens T, Baerheim A, Leibovici L. Duration of antibacterial treatment for uncomplicated urinary tract infection in women. Cochrane Database Review. The Cochrane Library 2006, Issue 2. http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD004682/pdf_fs.html Accessed 05.08.10. No difference in outcome between 3 day, 5 day or 10 day antibiotic treatment course for uncomplicated UTI in women (RR 1.06; 95% CI 0.88 to 1.28; 32 trials, n = 9605).

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Naber KG, Schito G, Botto H, Palou J, Mazzei T. Surveillance study in Europe and Brazil on clinical aspects and Antimicrobial Resistance epidemiology in Females with Cystitis (ARESC): implications for empiric therapy. European Urology 2008;54:1164-1175. In all countries, susceptibility rate to E. coli above 90% ($p < 0.0001$) was found only for fosfomycin, mecillinam, and nitrofurantoin.

Spencer RC, Moseley DJ, Greensmith MJ. Nitrofurantoin modified release versus trimethoprim or co-trimoxazole in the treatment of uncomplicated urinary tract infection in general practice. J Antimicrob Chemother 1994;33(Suppl A):121-9. This non-blinded RCT ($n = 538$) found that nitrofurantoin MR had equivalent clinical cure rates to co-trimoxazole, and trimethoprim. The rate of gastrointestinal adverse effects was similar between groups (7-8%).

**UTI in pregnancy**


MSU should be performed routinely at the first antenatal visit. If bacteriuria is reported, it should be confirmed with a second MSU. Dipstick testing is not sufficiently sensitive to be used for screening for bacteriuria in pregnant women.


HPA Comment The Health Protection Agency and the British Society for Antimicrobial Chemotherapy recommend that cefalexin is reserved for third-line use for the treatment of a UTI in a pregnant woman. Cefalexin has a good safety record in pregnancy. However, because it is a broad-spectrum antibiotic, it increases the risk of Clostridium difficile, and there have been recent reports of C difficile in pregnant women.

Rouphael NG, O'Donnell JA, Bhatnagar J, Lewis F, Polgreen PM, Beekman S, Guarner J, Killgore GE, Koffman B, Campbell J, Zaki SR, McDonald LC Clostridium difficile-associated diarrhoea: an emerging threat to pregnant women. Am J Obstet Gynecol 2008;198:e1-635.e6 In this series of 10 cases, most were associated with antibiotic use. Seven of the women were admitted to intensive care. Three infants were stillborn and 3 women died.

Ruxton CHS and Derbyshire E. Women's diet quality in the UK. Nutrition Bulletin 2010;35:126-137. Data from the National Diet and Nutrition Surveys show that women's dietary intake of iron, vitamin D, calcium and folate remain below recommended levels.

UKTIS. The treatment of infections in pregnancy. The UK Teratology Information Service. 2008. (Tel: 0844 892 0909, [www.toxbase.org](http://www.toxbase.org)). Accessed 05.08.10. Amoxicillin and cefalexin: The available data suggest that neither penicillins nor cephalosporins are associated with an increased risk of congenital malformations when used during pregnancy. Nitrofurantoin: significant placental transfer of nitrofurantoin does not occur. Nitrofurantoin has not been associated with an increased risk of congenital malformations. Nitrofurantoin has been associated with haemolysis in people with glucose-6-phosphate dehydrogenase (G6PD) deficiency. However, the risk seems very small because placental transfer is so low. It is only one reported case of haemolytic anaemia in a newborn whose mother was treated at term with nitrofurantoin. Trimethoprim: trimethoprim is a folate antagonist. Folate supplementation during the first trimester reduces the risk of neural tube defects in offspring of pregnant women treated with trimethoprim. In women with normal folate status, who are well nourished, trimethoprim is unlikely to cause folate deficiency. However, it should not be used by women with established folate deficiency or low dietary folate intake, or by women taking other folate antagonists (e.g. antiepileptic drugs or proguanil).

**Children**

National collaborating centre for women’s and children’s health. NICE clinical guideline. Urinary tract infection in children. Diagnosis, treatment and long-term management. [http://www.nice.org.uk/nicemedia/pdf/CG54fullguideline.pdf](http://www.nice.org.uk/nicemedia/pdf/CG54fullguideline.pdf). Accessed 05.08.10. Diagnosis and referral: expert opinion is that children under the age of 3 months with suspected UTI should be admitted; that imaging during the acute episode is only needed for atypical UTI or for children under the age of 6 months with UTI. Choice of antibiotics for lower UTI: NICE identified 3 RCTs comparing trimethoprim to other antibiotics for UTI in children, and one

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systematic review comparing short and long course of antibiotics for UTI in children that included studies assessing trimethoprim, nitrofurantoin and amoxicillin. The NICE guideline development group recommend trimethoprim, nitrofurantoin, amoxicillin, or cefalexin for empirical treatment of lower UTI in children. Duration of antibiotics for lower UTI: one systematic review found no difference in efficacy between short-courses (2-4 days) and longer courses (7-14 days) of antibiotics in children with lower UTI. Upper UTI: one systematic review combined two studies of co-amoxiclav treatment for 10-14 days followed by oral therapy (10 days).

Hodson EM, Willis NS, Craig JC. Antibiotics for acute pyelonephritis. Cochrane Database of Systematic Reviews 2007. http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD003772/frame.html Accessed 05.08.10. Twenty three studies (3407 children) were eligible for inclusion. No significant differences were found in persistent kidney damage at six to 12 months (824 children: RR 0.80, 95% CI 0.50 to 1.26) or in duration of fever (808 children: MD 2.05, 95% CI -0.84 to 4.94) between oral antibiotic therapy (10 to 14 days of cefixime, cefituben or co-amoxiclav) and IV therapy (3 days) followed by oral therapy (10 days).

Acute pyelonephritis

Grabe M, Bishop MC, Bjerkland-Johansen TE, Botto H, Cek M, Lobel B, Naber KG, Palou, J, Tenke, P, Wagenlehner F. Guidelines on Urological Infections. European Association of Urology 2009: 1-110. Expert consensus is that admission should be arranged for more severe cases of acute uncomplicated pyelonephritis (e.g. dehydrated, cannot take oral medication, signs of sepsis).

HPA Comments
- The Health Protection Agency and the Association of Medical Microbiologists recommends that people with acute pyelonephritis are admitted if there is no response to antibiotics within 24 hours. Lack of response to treatment is likely to be due to antibiotic resistance. The complications of acute pyelonephritis can be life-threatening.
- The Health Protection Agency and the Association of Medical Microbiologists recommend ciprofloxacin and co-amoxiclav for the empirical treatment of acute pyelonephritis. This is based on the need to cover the broad spectrum of pathogens that cause acute pyelonephritis, and their excellent kidney penetration. Although they are associated with an increased risk of Clostridium difficile, MRSA, and other antibiotic-resistant infections, this has to be balanced against the risk of treatment failure and consequent serious complications in acute pyelonephritis.

Talan DA, Stamm WE, Hooton TM, Moran GJ, Burke T, Irvani A, Reuning-Scherer J and Church DA. Comparison of ciprofloxacin (7 days) and trimethoprim-sulfamethoxazole (14 days) for acute uncomplicated pyelonephritis in women. A randomized trial. JAMA 2000;283:1583-90. This randomized double-blind controlled trial found that 7 days of ciprofloxacin 500 mg bd was as effective as 14 days co-trimoxazole. (E coli isolates were 100% susceptible to ciprofloxacin in this study.)

Recurrent UTI in non-pregnant women


Acute prostatitis

BASHH. UK National Guidelines for the Management of Prostatitis. British Association for Sexual Health and HIV. 2008. MSU for all men: acute prostatitis is a severe illness. It is important that an MSU is sent for culture and sensitivities to ensure that an appropriate antibiotic is used. Treatment regimens: there are no randomized controlled trials of quinolones or trimethoprim for the treatment of prostatitis. Expert opinion is that, for men with acute prostatitis who are suitable for oral antibiotic treatment, ciprofloxacin 500mg BD for 28 days or ofloxacin 200mg BD for 28 days will provide sufficient levels within the prostate gland. Expert opinion is that trimethoprim 200mg BD for 28 days is a suitable alternative for men who are intolerant or allergic to quinolones. Duration of treatment: the optimum duration of

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treatment is unknown. Expert opinion is that a 4-week course of antibiotics is required to reduce the risk of developing chronic bacterial prostatitis.

Micromedex. Drugdex drug evaluations. Thompson Healthcare. 2009. Trimethoprim reaches good concentrations in prostatic tissue (peak prostate concentration was reported to be 2.3 mcg/g 280 minutes after an oral dose compared with serum levels of 2.2mcg/mL at 125 minutes after an oral dose). Ciprofloxacin reaches high concentrations in prostatic fluid, often exceeding serum levels (at 2 to 4 hours following oral administration, prostatic fluid levels ranged from 0.02 to 5.5 mcg/mL compared with serum levels of 1 to 2.5 mcg/mL). Ofloxacin also reaches high concentrations in prostatic fluid (at 1 to 4 hours following oral administration prostatic guide levels ranged from 3.22 to 4.25 mcg/g.

**Epididymo-orchitis**


**GENITAL TRACT INFECTIONS**

For current guidance on management of sexually transmitted infections check British Association of Sexual Health and HIV website [http://www.bashh.org/guidelines](http://www.bashh.org/guidelines)

**STI screening**


**Vaginal Candidiasis**

HPA Comment The Health Protection Agency and the Association of Medical Microbiologists recommend 6 nights treatment with clotrimazole 100mg pessaries during pregnancy because this is the quantity in one original pack of clotrimazole 100 mg pessaries.

Nurbhai M, Grimshaw J, Watson M, Bond CM, Mollison JA, Ludbrook A. Oral versus intravaginal imidazole and triazole anti-fungal treatment of uncomplicated vulvovaginal candidiasis (thrush). Cochrane Database of Systematic Reviews 2007, Issue 4. [http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD002845/frame.html](http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD002845/frame.html) Accessed 05.08.10. No statistically significant differences were observed in clinical cure rates of antifungals administered by the oral or the intravaginal route. At short-term follow-up, 74% cure was achieved with oral treatment and 73% cure with intra-vaginal treatment (OR 0.94, 95% CI 0.75 to 1.17).


UKTIS. Use of fluconazole in pregnancy. The UK Teratology Information Service. 2008. (Tel: 0844 892 0909, [www.toxbase.org](http://www.toxbase.org)) Accessed 05.08.10. Data on the outcomes of over 1,700 pregnancies exposed to low-dose fluconazole (150 mg stat) show no increased incidence of spontaneous abortions, malformations, or patterns of defects. However, there may be an increased risk of malformations associated with high-dose chronic therapy (>400 mg/day). First-line treatment of candidal infection in pregnancy should be with an imidazole. However, fluconazole (150mg stat) may be a suitable second-line treatment if clotrimazole is ineffective.


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Bacterial vaginosis

BASHH. National guideline for the management of bacterial vaginosis. British Association for Sexual Health and HIV. 2006. [http://www.bashh.org/documents/62/62.pdf](http://www.bashh.org/documents/62/62.pdf) Accessed 05.08.10. No reduction in relapse rate was reported from two studies in which male partners of women with BV were treated with metronidazole, tinidazole, or clindamycin.

Joesoef MR, Schmid GP. Bacterial vaginosis: review of treatment options and potential clinical implications for therapy. *Clin Infect Dis* 1995;20(Suppl 1):S72-S79. The 2g single dose is less effective than the 7-day course at 4-week follow up. When data from studies that only directly compared the two dose regimens were pooled, the cumulative cure rates 3-4 weeks after completion of treatment were 62% for the single-dose regimen and 82% for the 7-day regimen (p < 0.005).

Joesoef MR, Schmid GP, Hillier SL. Bacterial vaginosis: review of treatment options and potential clinical implications for therapy. *Clin Infect Dis* 1999;28(suppl 1):S57-S65. Pooled data from five RCTs found no significant difference between cumulative cure rates 5-10 days after finishing treatment for metronidazole 400 mg BD for 7 days (86%), intravaginal metronidazole 5g BD for 5 days (81%) or intravaginal clindamycin 5g at night for 7 days (85%).

McDonald HM, Brocklehurst P, Gordon A. Antibiotics for treating bacterial vaginosis in pregnancy. *Cochrane Database of Systematic Reviews* 2007, Issue 1. [http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD000262/frame.html](http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD000262/frame.html) Accessed 05.08.10. Pooled data from 10 RCTs indicated that both oral and intravaginal antibiotics are effective at eradicating bacterial vaginosis in pregnant women. Oral antibiotics compared with placebo (seven trials, n = 3244) OR 0.15, 95% CI 0.13 to 0.17. Intravaginal antibiotics compared with placebo (three trials, n = 1113) OR 0.27, 95% CI 0.21 to 0.35.

UKTIS. Use of metronidazole in pregnancy. *The UK Teratology Information Service*. 2008. (Tel: 0844 892 0909, [www.toxbase.org](http://www.toxbase.org)) Accessed 05.08.10. The available data (almost exclusively based on oral treatment) does not indicate an increased risk of adverse fetal effects associated with metronidazole use during pregnancy. The manufacturer advises avoidance of the 2g stat regimen during pregnancy.

Chlamydia trachomatis

BASHH. UK National Guidelines for the Management of Genital Tract Infection with *Chlamydia trachomatis*. British Association for Sexual Health and HIV. 2006 [http://www.bashh.org/documents/61/61.pdf](http://www.bashh.org/documents/61/61.pdf) Accessed 05.08.10. Treatment of partners: partners should also be treated for C trachomatis infection. Re-testing: expert opinion is that a test of cure is not routinely recommended, but should be performed in pregnancy, or where non-compliance or re-exposure are suspected. The higher rate of positive tests after treatment during pregnancy is attributed to either less efficacious treatment regimen, non-compliance, or re-infection.


SIGN. Management of genital *Chlamydia trachomatis* infection: a national clinical guideline. Scottish Intercollegiate Guidelines Network 2009. [http://www.sign.ac.uk/guidelines/fulltext/109/index.html](http://www.sign.ac.uk/guidelines/fulltext/109/index.html) Accessed 05.08.10. Treatment of partners: the treatment of partners prior to resuming sexual intercourse is the strongest predictor for preventing re-infection. Treatment in pregnancy: expert opinion is that azithromycin 1g stat is the first-line treatment for Chlamydia in pregnant women. Although there are fewer safety data than for amoxicillin or erythromycin, the available data are reassuring, it is better tolerated and, because it is a single dose, there are no issues with compliance or early cessation of treatment because of adverse effects.

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http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD000054/frame.html Accessed 05.08.10. Pooled data from four RCTs found that 8% of women taking azithromycin (11/145) failed to achieve microbiological cure compared with 19% of women taking erythromycin (27/145); OR 0.38, 95% CI 0.19 to 0.74). Pooled data from three RCTs found that 9% of women taking amoxicillin (17/199) failed to achieve microbiological cure compared with 15% of women taking erythromycin (28/191); OR 0.54, 95% CI 0.28 to 1.02.

Lau CY, Qureshi AK. Azithromycin versus doxycycline for genital chlamydial infections: a meta-analysis of randomised controlled trials. Sexually transmitted diseases. 2002;29:497-502. Pooled data (12 RCTs, n = 1543) found that microbiological cure was achieved in 97% of people taking azithromycin and 98% of those taking doxycycline, p = 0.296; no significant difference.

UKTIS. The treatment of infections in pregnancy. National Teratology Information Service. 2008. (Tel: 0844 892 0909, www.toxbase.org) Accessed 05.08.10. Azithromycin: there are fewer published data on the use of azithromycin during pregnancy and breastfeeding. The limited published data and follow-up data collected by the National Teratology Information Service do not demonstrate an increased risk of congenital malformations following exposure to azithromycin in human pregnancy. Erythromycin: data from more than 7000 pregnancies does not indicate that erythromycin is associated with an increased risk of congenital malformations or any other adverse fetal effects. A recent study has suggested a possible increased risk of cardiovascular malformations and pyloric stenosis; however, causality has not been established and the individual risk, if any, is thought to be low. Amoxicillin: there is no evidence to suggest that penicillins are associated with an increased risk of malformations or other forms of fetal toxicity in human pregnancy.

Trichomoniasis


Du Bouchet I, Spence MR, Rein MF, Danzig MR, McCormack WM. Multicentre comparison of clotrimazole vaginal tablets, oral metronidazole, and vaginal suppositories containing sulphamidine, aminacrine hydrochloride, and allantoin in the treatment of symptomatic trichomoniasis. Sex Transm Dis 1997;24:156-160. In this randomized, open-label trial (n = 168) clotrimazole vaginal tablets were not found to effectively eradicate trichomoniasis. However, a reduction in symptoms was reported. The numbers of patients who had positive cultures after treatment were 40/45 (88.9%) in the clotrimazole group, 35/43 (81.4%) in the AVC suppository group, and 9/45 (20%) in the metronidazole group (P < 0.001).

UKTIS. Use of metronidazole in pregnancy. The UK Teratology Information Service. 2008. (Tel: 0844 892 0909, www.toxbase.org) Accessed 05.08.10. The available data (almost exclusively based on oral treatment) does not indicate an increased risk of adverse fetal effects associated with metronidazole use during pregnancy. The manufacturer advises avoidance of the 2g stat regimen during pregnancy.

Pelvic Inflammatory Disease

BASH. UK National Guideline for the management of PID. British Association for Sexual Health and HIV. 2005. http://www.bashh.org/documents/118/118.pdf Accessed 05.08.10. Recommended regimen; the recommended regimens for outpatient management are either ofloxacin plus metronidazole for 14 days, or a stat dose of IM cefuroxime plus metronidazole and doxycycline for 14 days. Ofloxacin should be avoided in women who are at high risk of gonococcal PID, because of increasing quinolone resistance in the UK. Treatment of partners: partners should be screened for gonorrhoea and chlamydia.


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Inflammatory disease - PID

Accessed 05.08.10. Recommended regimens: the recommended regimens are broad spectrum to cover N. gonorrhoea, C. trachomatis, and anaerobes. For outpatient management, either ofloxacin plus metronidazole for 14 days, or a stat dose of IM cefuroxime plus metronidazole and doxycycline for 14 days are recommended. Broad-spectrum treatment is warranted in PID because of the consequences of untreated infection (ectopic pregnancy, infertility, pelvic pain). Cefotaxim has a better evidence base for the treatment of PID than ceftriaxone, but it is not readily available in the UK. Ceftriaxone is therefore recommended. Although the combination of doxycycline and metronidazole (without IM ceftriaxone) has previously been used in the UK to treat PID, there are no clinical trials that adequately assess its effectiveness and its use is not recommended.


HPA Comment The Health Protection Agency and the Association of Medical Microbiologists recommend that, for practical issues of administration in primary care, a stat dose of oral cefixime 400mg can be substituted for IM ceftriaxone. A stat dose of oral cefixime is one of the treatment options recommended by the WHO (www.who.int), the CDC (www.cdc.gov), and CKS (www.cks.nhs.uk) for the treatment of gonorrhoea. All accessed 05.08.10.

Meads C, Knight T, Hyde C and Wilson J. The clinical effectiveness and cost-effectiveness of antibiotic regimens for pelvic inflammatory disease. West Midlands Health Technology Assessment group. 2004. www.rep.bham.ac.uk Accessed 05.08.10. This systematic review identified 34 trials of antibiotic treatment for PID. Most studies were small, open-label, and of poor methodological study. One small trial was found that compared oral ofloxacin plus metronidazole with clindamycin plus gentamicin. The cure rate was 15/15 for ofloxacin plus metronidazole plus 17/18 for clindamycin plus gentamicin. The systematic review found one trial of ceftriaxone plus doxycycline and two trials of cefotixin plus probenicid and doxycycline, and three trials of cefotixin plus doxycycline compared to other antibiotics. Meta-analysis of these six studies found no difference in cure rates between IM cephalosporin plus doxycycline and the comparator antibiotics.

Genital Herpes


Genital Warts


Gastro-intestinal tract infections

Eradication of Helicobacter pylori

NICE. Dyspepsia: managing dyspepsia in adults in primary care. National Institute for Health and Clinical Excellence. August 2004 www.nice.org.uk/nicemedia/pdf/CG017fullguideline.pdf Accessed 05.08.10. NICE give guidance on when to consider H pylori test and treat in primary care. First-line H pylori eradication: NICE recommend a twice daily full-dose PPI plus clarithromycin 250mg bd and metronidazole 400mg bd, or a PPI plus clarithromycin 500mg bd plus amoxicillin 1g bd. Second-line H pylori eradication: NICE recommend that a regimen is used that does not include the antibiotics given previously. Duration of treatment: although 14-day triple therapy gives almost a 10% higher eradication rate, the absolute benefit of H pylori therapy is modest in NUD and undiagnosed dyspepsia and the longer duration of therapy does not appear cost effective. In patients with PUD increasing the course to 14 days also gives a nearly 10% higher eradication rate, but does not appear cost effective. MALTo Loma: expert opinion is that for MALT lymphoma, the increased efficacy of a 14-day regimen will reduce the need for chemotheraphy and/or gastric resection.

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Second-line therapy: expert opinion is that a 14-day course of quadruple therapy consisting of a PPI + bismuth + metronidazole + tetracycline can be used for eradication failure.

Costelloe C, Metcalfe C, Lovering A, Mant D, Hay AD. Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: systematic review and meta-analysis. BMJ 2010;340:c2096. Individuals prescribed an antibiotic in primary care for a respiratory or urinary infection develop bacterial resistance to that antibiotic. The effect is greatest in the month immediately after treatment but may persist for up to 12 months.

Fischbach L and Evans EL. Meta-analysis: the effect of antibiotic resistance status on the efficacy of triple and quadruple first-line therapies for Helicobacter pylori. Aliment Pharmacol Ther 2007;26:343-357. Pooled data found that the efficacy of a PPI + clarithromycin + metronidazole was reduced more by resistance to clarithromycin than by resistance to metronidazole. Metronidazole resistance reduced efficacy by 18% while clarithromycin resistance was estimated to reduce efficacy by 35%. Clarithromycin resistance reduced the efficacy of a PPI + clarithromycin + amoxicillin by 66%.

Fuccio L, Minardi ME, Zagari RM, Grilli D, Magrini N, Bazzoli F. Meta-analysis: duration of first-line proton-pump inhibitor based triple therapy for Helicobacter biberi eradication. Annals Internal Medicine 2007;147: 553-562. Pooled data found that extending the course of triple therapy from 7 to 14 days increased eradication rates only by about 5% (no statistically significant difference). The authors concluded that this is unlikely to be a clinically useful difference.

Luther J, Higgins PDR, Schoenfield PS, Moayyedi P, Vakil N, Chey WD. Empiric quadruple vs. triple therapy for primary treatment of Helicobacter pylori infection: systematic review and meta-analysis of efficacy and tolerability. Am J Gastroenterol 2010;105:65-73. Pooled data from 9 RCTs (n = 1679) found that eradication rates were comparable between clarithromycin triple therapy (77%) and bismuth-containing quadruple therapy (78%). Most trials of 7-10 days duration.


Moayyedi P, Soo S, Deeks JJ, Delaney B, Harris A, Innes M, Oakes R, Wilson S, Roafle A, Bennett C, Forman D. Eradication of Helicobacter pylori for non-ulcer dyspepsia. The Cochrane library 2006. Issue 2 http://mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD002096/frame.html Accessed 05.08.10. Pooled data from 17 RCTs (n = 3566) found there was a 10% relative risk reduction in dyspepsia symptoms in people with non-ulcer dyspepsia randomized to receive H pylori eradication (95% CI 6% to 14%) compared to placebo. The NNT to cure one case of dyspepsia was 14 (95% CI 10 to 25).

Infectious diarrhoea


HPA Comment The Health Protection Agency and Association of Medical Microbiologists recommend that, if campylobacter is strongly suspected as the cause of diarrhoea, consider empirical treatment with clarithromycin. Quinolones are not recommended because there is increasing resistance of campylobacter to quinolones, and broad

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spectrum antibiotics such as quinolones are not recommended for empirical therapy because they are associated with an increased risk of Clostridium difficile, MRSA, and resistant UTIs.


**Clostridium difficile**

DH and HPA. *Clostridium difficile* infection: how to deal with the problem. 2009. Department of Health and the Health Protection Agency. www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_093220 Accessed 05.08.10. Metronidazole is recommended for first- or second-episodes of *C. difficile* infection because it is cheaper than oral vancomycin and there are concerns that overuse of vancomycin will result in the selection of vancomycin-resistant enterococci. Oral vancomycin is preferred for severe *C. difficile* infection because of relatively high failure rates of metronidazole in recent reports, and a slower clinical response to metronidazole compared with oral vancomycin treatment.

Belmares J, Gerding DN, Parada JP, Miskevics S, Weaver F, Johnson S. Outcome of metronidazole therapy for *Clostridium difficile* disease and correlation with a scoring system. J Infect 2007;55:495-501. This retrospective review of 102 patients given a 5-day course of metronidazole for *clostridium difficile* infection found that 70.3% responded by the end of the 5-day course. Twenty-one of the remaining 30 patients eventually responded to metronidazole, but needed longer treatment courses.

Linsky A, Gupta K, Lawler EV, Fonda JR, Hermos JA. Proton pump inhibitors and risk for recurrent *Clostridium difficile* infection. Arch Intern Med 2010;170:772-778. This cohort study found that PPI use during incident *C difficile* treatment was associated with a 42% risk of recurrence.

**Traveller’s diarrhoea**

Centres for Disease Control and Prevention – Travellers’ Health: Yellow Book. http://wwwn.cdc.gov/travel/yellowBookCh4-Diarrhea.aspx Accessed 05.08.10. High-risk countries are defined as most of Asia, the Middle-East, Africa, Mexico, Central and Southern America. Expert opinion is that bismuth subsalicylate (Pepto-Bismol) can be used for prophylaxis: one trial found it reduced the incidence of traveller’s diarrhoea from 40% to 14%. However, adverse effects are common and, due to its salicylate content, bismuth subsalicylate has several contraindications.

de Bruyn, G., Hahn, S. and Borwick, A. Antibiotic treatment for travellers’ diarrhoea. The Cochrane Library. Issue 3. 2000 John Wiley & Sons, Ltd. http://mrw.interscience.wiley.com/cochrane/cochrane_search_fs.html?products%3DAll&Query5%3D&Query4%3D&Fr omYear%3D&Query3%3D&Query2%3D&Query1%3DTravellers%2BDiarrhoea&ToYear%3D&mode%3Dstartsearch&zones5%3DTables&zones4%3DAbstract&zones3%3DAuthor&zones2%3DArticle%2DTitle&zones1%3D%2528article%2 Dtitle%252Cabstract%252Ckeywords%2529&opt4%3DAND&opt3%3DAND&opt2%3DAND&opt1%3DOR& Accessed 05.08.10. Of 20 RCTS identified, ten RCTs evaluated short-courses of quinolones, three RCTs evaluated stat doses of quinolones, and one RCT evaluated azithromycin for travellers’ diarrhoea.

Dupont HL. Systematic review: prevention of travellers’ diarrhoea. Aliment Pharmacol Ther 2008;27:741-51. Expert opinion is that people travelling to a high-risk area whose condition could be worsened by a bout of diarrhoea may be considered for standby antibiotics.

**SKIN INFECTIONS**

**Impetigo**

*Note:* Doses are oral and for adults unless otherwise stated. Please refer to BNF for further information.

A+ = systematic review, A- = rigorous RCT, B+ = RCT or cohort study, B- = case-control study
C = formal combination of expert opinion.
Denton M, O’Connell B, Bernard P, Jarlier V, Williams Z, Santerre Henriksen A. The EPISA study: antimicrobial susceptibility of Staphylococcus aureus causing primary or secondary skin and soft tissue infections in the community in France, the UK, and Ireland. J Antimicrob Chemother 2008;61:586-588. Of S. aureus isolates from the UK, only 75.6% were susceptible to fusidic acid. A diagnosis of impetigo was associated with reduced fusidic acid susceptibility.

HPA Comment The Health Protection Agency and the Association of Medical Microbiologists recommend flucloxacillin for first-line treatment of impetigo because it is a narrow-spectrum antibiotic that is effective against Gram-positive organisms, including beta-lactamase producing Staphylococcus aureus, and it demonstrates suitable pharmacokinetics, with good diffusion into skin and soft tissues. Clarithromycin is recommended for people with penicillin allergy because it is also active against most staphylococcal and streptococcal species.

Koning S, Verhagen AP, van Suijlekom-Smit LWA, Morris AD, Butler C, van der Wouden JC. Interventions for impetigo. Cochrane Database of Systematic Reviews. 2003. Issue 2. http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD003261/frame.html Accessed 05.08.10. Many RCTs identified by this Cochrane review were of poor methodological quality. Pooled data from four RCTs found no difference in cure rates between topical mupirocin and topical fusidic acid (OR 1.22, 95% CI 0.69 to 2.16). Most RCTs that compared topical compared with oral antibiotics used mupirocin. However, mupirocin is reserved for MRSA and should not be used first-line for impetigo. Topical fusidic acid was significantly better than oral erythromycin in one study, but no difference was seen between fusidic acid and oral cefuroxime in a different arm of the same study. Topical bacitracin was significantly worse than oral cefalexin in one small study, but there was no difference between bacitracin and erythromycin or penicillin in two other studies. The results of one non-blinded RCT suggested that topical fusidic acid was more effective than topical hydrogen peroxide, but this did not quite reach statistical significance.

Cellulitis

CREST Guidelines on the management of cellulitis in adults. Clinical Resource Efficiency Support Team. 2005. www.crestni.org.uk Accessed 05.08.10. Expert consensus is that people who have no signs of systemic toxicity and no uncontrolled co-morbidities can usually be managed on an outpatient basis with oral antibiotics. Flucloxacillin 500mg QDS (or clarithromycin 500mg BD for those with penicillin allergy) are suitable oral antibiotics because they cover staphylococci and streptococci, the most commonly implicated pathogens. Clindamycin 300mg QDS is also recommended as a further alternative for people with penicillin allergy. Most cases of uncomplicated cellulitis can be treated successfully with 1-2 weeks of treatment.


Jones, G.R. Principles and practice of antibiotic therapy for cellulitis. CPD Journal Acute Medicine. 2002;1(2):44-49. Oral agents will be as effective as intravenous agents for cellulitis if they can maintain the free antibiotic level above the MIC of the pathogen for more than 40% of the dose interval. Flucloxacillin 500 mg, clarithromycin 500 mg and clindamycin 300 mg are suitable oral doses.

Morris AD. Cellulitis and erysipelas. Clinical Evidence. 2007. London. BMJ Publishing Group. This systematic review found no RCTs of antibiotics compared with placebo of sufficient quality for inclusion. Although 11 RCTs were identified that compared antibiotic treatments, these studies were small and only powered to demonstrate equivalence, not superiority, between antibiotics. Two RCTs using intravenous flucloxacillin were found, but none using oral flucloxacillin. Oral azithromycin was compared with erythromycin, flucloxacillin, and cefalexin in three RCTs. Oral co-amoxiclav was compared with fleroxacin (available in Germany) in one sub-group analysis.

MRSA


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MRSA, doxycycline or clindamycin monotherapy is recommended depending on susceptibility results, unless the infections is severe and/or carries a high risk of bacteraemia or endocarditis.

Nathwani D, Morgan M, Masteron RG, Dryden M, Cookson BD, French G, Deirdre Lewis on behalf of the British Society for Antimicrobial Chemotherapy. Guidelines for UK practice for the diagnosis and management of methicillin-resistant Staphylococcus aureus (MRSA) infections presenting in the community. J Antimicrob Chemother 2008;61:976-994. Community-acquired MRSA strains that are erythromycin-resistant are initially susceptible to clindamycin but can potentially develop resistance to clindamycin during therapy. The global reported rates of such inducible resistance vary from 2% to 94%. A double disc diffusion test (D-test) can be used to determine whether clindamycin-susceptible community-acquired MRSA strains harbour inducible resistance. The local laboratory should perform a D-test.

PVL Staphylococcus aureus


Leg ulcer


O'Meara S, Al-Khurdi D, Ovington LG. Antibiotics and antiseptics for venous leg ulcers. Cochrane Database of Systematic Reviews. 2010. Issue 1. http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD003557/frame.html Accessed 05.08.10. Most studies identified by this Cochrane review were of poor methodological quality. Use of antibiotics did not promote healing compared to placebo in four trials of people with leg ulcers without visible signs of infection.

RCN The nursing management of patients with venous leg ulcers. Recommendations. Royal College of Nursing. 2006 http://www.rcn.org.uk/development/practice/clinicalguidelines/venous_leg_ulcers Accessed 05.08.10. Expert consensus is that swabbing (and so by definition antibiotic therapy) is unnecessary unless there is evidence of clinical infection such as inflammation, redness, or cellulitis; increased pain; purulent exudates; rapid deterioration of the ulcer; pyrexia; or foul odour.

Eczema

National Collaborating Centre for Women's and Children's Health (2007) Atopic eczema in children: management of atopic eczema in children from birth up to the age of 12 years (full NICE guideline). National Institute for Health and Clinical Excellence. www.nice.org.uk Accessed 05.08.10. In view of the lack of robust trial evidence, the GDG's view was that flucloxacillin should normally be the first-line treatment for active S aureus and streptococcal infection because it is active against both. Erythromycin or clarithromycin should be used when there is local resistance to flucloxacillin and in children with a penicillin allergy because it is as effective as cephalosporins and less costly. It is the view of the GDG that topical antibiotics, including those combined with topical corticosteroids, should be used to treat localised overt infection only, and for no longer than two weeks.


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antibiotics to topical steroids reduced the numbers of S aureus in 4 trials (n = 302) but not in a further 9 trials (n = 677).

**Bites (human or animal)**


CKS. Bites – human and animal. Clinical Knowledge Summaries. 2007. http://www.cks.nhs.uk/bites_human_and_animal Accessed 05.08.10. Expert opinion is that prophylaxis for animal bites is not required unless bite to the hand, foot, and face; puncture wounds; all cat bites; wounds requiring surgical debridement; wounds involving joints, tendons, ligaments, or suspected fractures; wounds that have undergone primary closure; wounds to people who are at risk of serious wound infection (e.g. those who are diabetic, cirrhotic, asplenic, immunosuppressed, people with a prosthetic valve or a prosthetic joint).

**HPA Comments**
- First-line antibiotic. The Health Protection Agency and the Association of Medical Microbiologists recommend co-amoxiclav for treatment or prophylaxis of human or animal bites because it is a broad-spectrum antibiotic that is effective against the most commonly isolated organisms from human bites (alpha- and beta-haemolytic streptococci, S. aureus, S. epidermis, corynebacteria, and E. corrodens) and animal bites (such as Pasteurella [57% of dog bites and 75% of cat bites], streptococci, staphylococci, moraxella, neisseria, and anaerobes).

- First-line antibiotics in penicillin allergy for animal bites. The Health Protection Agency and the Association of Medical Microbiologists recommend metronidazole PLUS doxycycline for adults with penicillin allergy who require treatment or prophylaxis of an animal bite. Doxycycline has activity against pasturella species (the most common pathogen), staphylococci and streptococci. Metronidazole is included to cover anaerobes. Macrolides are not recommended for animal bites because they do not adequately cover pasturella. Seek specialist advice for children under the age of 12 years (doxycycline contraindicated).

- First-line antibiotics in penicillin allergy for human bites. The Health Protection Agency and the Association of Medical Microbiologists recommend metronidazole plus either doxycycline or clarithromycin for adults and children with penicillin allergy who require treatment or prophylaxis of a human bite. Both doxycycline and clarithromycin are active against staphylococci and streptococci (the most common pathogens). Metronidazole is included to cover anaerobes. Doxycycline, but not clarithromycin is active against Eikenella species, which is also a common pathogen isolated from human mouths.

- The Health Protection Agency and the Association of Medical Microbiologists recommend that people with penicillin allergy are reassessed at 24 and 48 hours after starting a course of antibiotic treatment because the recommended regimen covers the majority, but not all, of the likely pathogens from an animal or human bite.

For treatment or prophylaxis of human and animal bites in children with penicillin allergy: BNF for Children 2010-2011 Chapter 5: Infections: Table 1 Summary of Antibacterial therapy http://bnfc.org/bnfc/bnfc/current/102045.htm Accessed 10.02.10

Medeiros I, Saconat H. Antibiotic prophylaxis for mammalian bites. Cochrane Database of Systematic Reviews, 2001 Issue 2 http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD001738/pdf_fs.html Accessed 05.08.10. Human bites: only one trial (n = 48) analyzed human bites, and the infection rate in the antibiotic group (0%) was significantly lower than the infection rate in the control group (47%); OR 0.02, 95% CI 0.00 to 0.33. Dog bites: pooled results from six RCTs (n = 463) found that the infection rate was not reduced after the use of prophylactic antibiotics (4%) compared with the control group (5.5%); OR 0.74, 95% CI 0.30 to 1.8. Cat bites: one small study (n = 11) reported a lower infection rate in the treatment group who received prophylactic antibiotics (0%) compared with the control group (67%).

**Scabies**

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HERPC Guidelines for the Treatment of Infections in Primary Care. Date Approved:23/3/11 Review Date:March 2013
Treatment of all contacts: expert opinion is that the index case and all members of the household and sexual contacts should be treated within 24 hours of one another, even in the absence of symptoms, to reduce the risk of re-infestation. Two treatments, 7 days apart, expert opinion is that two treatment sessions are needed to treat scabies effectively.


Conjunctivitis

Reitveld RP, ter Riet G, Bindels PJ, Bink D, Sloos JH, van Weert HC. The treatment of acute infectious conjunctivitis with fusidic acid: a randomised controlled trial. Br J Gen Pract 2005;55:924-930. This primary care-based study (n = 163) found no statistically significant difference in clinical cure rates at 7 days in people using fusidic acid (62%) compared with placebo (59%). Adjusted risk difference 5.3%, 95% CI -11% to 18%.

Rose PW, Harnden A, Brueggemann AB, Perera R, Sheikh A, Crook D, Mant D. Chloramphenicol treatment for acute infective conjunctivitis in children in primary care: a randomised double-blind placebo-controlled trial. Lancet 2005;366:37-43. This study (n = 326) found that most children presenting with acute infective conjunctivitis in primary care will get better by themselves, and there is no statistically significant difference between using placebo or chloramphenicol. Clinical cure by day 7 occurred in 83% of children given placebo compared with 86% of children given chloramphenicol. Risk difference 3.8%, 95% CI -4.1% to 11.8%.

Sheikh A and Hurwitz B. Antibiotics versus placebo for acute bacterial conjunctivitis. Cochrane Database of Systematic Reviews 2006. Issue 2. http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD001211/frame.html Accessed 05.08.10. Meta-analysis of five RCTs (n = 1034) found that antibiotics (one trial each of ocular polymixin plus bacitracin, ciprofloxacin, norfloxacin, fusidic acid, and chloramphenicol) reduce early clinical remission rates (Risk Ratio on days 2 to 5 1.24, 95% CI 1.05 to 1.45). Clinical remission rates compared with placebo are lower if remission is assessed later (Risk Ratio on days 6 to 10 1.11, 95% CI 1.02 to 1.21). However, most cases resolve spontaneously, with clinical remission being achieved in 65% (95% CI 59 to 70%) by days 2 to 5 in those receiving placebo.

Walker S, Daiper CJ, Bowman R, Sweeney G, Seal DV, Kirkness CM. Lack of evidence for systemic toxicity following topical chloramphenicol use. Eye 1998;12:875-879. Despite widespread prescribing of topical chloramphenicol, the incidence of aplastic anaemia in the UK remains low, and epidemiological data do not suggest an association between aplastic anaemia and topical chloramphenicol. Furthermore, a study of chloramphenicol levels in 40 patients found that chloramphenicol failed to accumulate to detectable levels in serum following one and two weeks of topical treatment.

Dermatophyte infection – skin


one RCT (n = 41) found that oral terbinafine, 250 mg a day for 6 weeks, was more effective than placebo for treating athlete’s foot. At 8 weeks, 65% of the terbinafine group were cured, compared with none of the placebo group (relative risk [RR] of cure with terbinafine 25, 95% CI 2 to 384). Itraconazole: one RCT (n = 77) found that oral itraconazole, 400 mg a day for 1 week, was more effective than placebo. At 9 weeks, 55% of the itraconazole group were cured compared with 8% of the placebo group (RR of cure with itraconazole 7, 95% CI 2 to 20). Terbinafine vs itraconazole: Pooled data from three RCTs (n = 222) found no difference in cure rates between oral terbinafine 250 mg a day for 2 weeks (76% cured), and itraconazole 100 mg a day for 4 weeks (71% cured); risk difference 5%, 95% CI –6 to +27.


Terbinafine and imidazoles: pooled data (8 RCTs; n = 962) found little difference between allylamines (e.g. terbinafine for 1-2 weeks) and imidazoles (for 4-6 weeks) at 2 weeks after baseline. But at 6 weeks after baseline, there was a relative reduction in treatment failure with allylamines compared with imidazoles (RR 0.63, 95% CI 0.42 to 0.94). Treatment with an imidazole for 4-6 weeks reduced the risk of treatment failure by 60% compared with placebo at 6-weeks (Risk Ratio 0.40, 95% CI 0.35 to 0.46; n = 1235). Treatment with an allylamine for 1-4 weeks reduced the risk of treatment failure by 67% compared with placebo at 6 weeks (Risk Ratio 0.33, 95% CI 0.24 to 0.44; n = 1116).

Undecanoates: this systematic review identified two RCTs of undecanoates compared with placebo (n = 283). There was a 71% relative reduction in the risk of treatment failure at 6 weeks with 4 weeks treatment with undecanoates compared with placebo (Risk Ratio 0.29, 95% CI 0.12 to 0.70).

HPA and the Association of Medical Microbiologists. Fungal skin & nail infections: diagnosis & laboratory investigation. Quick reference guide for primary care for consultation and local adaptation. 2009 http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1240294785726 Accessed 05.08.10. The recommendation to send skin scrapings to confirm the diagnosis before starting oral treatment is based on expert opinion and clinical experience.

**Dermatophyte infection - nail**

CKS. Fungal nail infection (onychomycosis) Clinical Knowledge Summaries 2009. http://www.cks.nhs.uk/fungal_nail_infection Accessed 05.08.10. Non-dermatophyte nail infection: there is limited evidence that both terbinafine and itraconazole are effective. Candidal nail infection: there is evidence that itraconazole is effective for candidal nail infection. There is weak evidence that terbinafine is also effective. Specialist advice for children: this is because fungal nail infection is rare in children, and the preferred treatments are not licensed for use in children.

Crawford F & Ferrari J. Fungal toenail infections. In Clinical Evidence Concise. London. BMJ Publishing Group. 2006; 15: 561-63 Terbinafine vs itraconazole: one systematic review pooled data from two randomized controlled trials (n = 501). At 1-year follow-up, the cure rate following 12 weeks of treatment was greater for people with dermatophyte onychomycosis treated with oral terbinafine 250mg once a day (69%) compared with oral itraconazole 200mg daily (48%). Absolute risk reduction 21%, 95% CI 13% to 29%. Pulsed vs continuous itraconazole: four small RCTs were identified that found no statistically significant difference between continuous and pulsed itraconazole for dermatophyte onychomycosis.

Chung CH, Young-Xu Y, Kurth T, Orav JE, Chan AK. The safety of oral antifungal treatments for superficial dermatophytosis and onychomycosis: a meta-analysis. Am J Med 2007;120:791-798. Pooled data from about 20,000 participants found that both continuous and pulse therapy with terbinafine, itraconazole, or fluconazole were well tolerated. The risk of having asymptomatic raised liver transaminases was less than 2% for all treatments. The risk of having raised liver transaminases that required treatment discontinuation with continuous treatment ranged from 0.11% (itraconazole 100mg/day) to 1.22% (fluconazole 50mg/day). The risk with pulse treatment ranged from 0.39% (itraconazole 400mg/day) to 0.85% (fluconazole 300-450mg/week).

HPA Comments The HPA Mycology Reference Laboratory recommends itraconazole for non-dermatophyte infections because although some of the infecting organisms are not particularly susceptible to this agent in vitro, it does reach high concentrations in nail tissue. It can be given as a pulse therapy regimen rather than continuous treatment.

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A+ = systematic review, A- = rigorous RCT, B+ = RCT or cohort study, B- = case-control study
C = formal combination of expert opinion.
Reinel, D. Topical treatment of onychomycosis with amorolfine 5% nail lacquer: comparative efficacy and tolerability of once and twice weekly use. Dermatology. 1992;184(Suppl 1): 21-24. One RCT (n = 456) without a placebo control found that 46% of those randomized to amorolfine applied once a week for 6 months achieved mycological cure of dermatophyte infection compared with 54% of those who applied topical amorolfine twice a week.

Roberts DT, Taylor WD, Boyle J. Guidelines for treatment of onychomycosis. Brit J Dermatol 2003;148:402–410. Confirmation of diagnosis: only 50% of cases of nail dystrophy are fungal, and it is not easy to identify these clinically. The length of treatment needed (6-12 months) is too long for a trial of therapy.

**Threadworm**

CKS (2007) Threadworm. Clinical Knowledge Summaries. http://www.cks.nhs.uk/search?&page=1&q=threadworm&site=0 Accessed 05.08.10. There is only limited evidence regarding the two products licensed for the treatment of threadworm in the UK. Mebendazole is recommended first line based on expert opinion and its relatively better safety profile compared with piperazine. Piperazine is licensed only from 3 months of age, and although the BNF recommends off-label use of mebendazole for children aged 6 months and over, it does not recommend it for infants under 6 months of age. Expert opinion is that strict hygiene methods for 6 weeks can be used as an alternative treatment in those who cannot take mebendazole or piperazine. This is based on the life cycle of the threadworm (adults survive for about 6 weeks) and the long viability of eggs (up to 2 weeks).

**Chickenpox/shingles**

DH. Immunisation against infectious diseases – The Green book. Chapter 34. Varicella. Department of Health 2006. http://www.dh.gov.uk/en/Publichealth/Healthprotection/Immunisation/Greenbook/DH_4097254 Accessed 05.08.10. Pregnant women are at greater risk of varicella pneumonia, and there is a risk to the fetus of congenital varicella syndrome if exposure occurs during the first 20 weeks of pregnancy, and severe disease in the neonate if varicella is contracted a week before delivery. Neonates and immunocompromised individuals are at greater risk of disseminated or haemorrhagic varicella. Urgent specialist assessment is needed for all neonates, pregnant women, or immunocompromised individuals with varicella to assess the need for varicella immunoglobulin and antiviral treatment.


HPA Comments The Health Protection Agency recommends that treatment with aciclovir should be considered (if it can be started within 24 hours of the rash) in those with severe chickenpox (including secondary cases) and in those at increased risk of complications (adults and adolescents aged 14 years and over, smokers, people on steroids).

Hope-Simpson RE. Postherpetic neuralgia. Brit J Gen Pract 1975;25:571-75. Study showing that incidence of post-herpetic neuralgia in a general practice population increases with age and is much more common in over 60 year olds.

International Herpes Management Forum. Improving the management of varicella, herpes zoster, and zoster-associated pain. 2002. www.ihmf.org Accessed 05.08.10. Antiviral treatment is recommended for ophthalmic shingles to prevent the potentially sight-threatening complications than can occur following herpes zoster involving the trigeminal nerve. Aciclovir, famciclovir, and valaciclovir have all been shown to reduce the complications of ophthalmic shingles in RCTs.

Klassen TP and Hartling L. Aciclovir for treating varicella in otherwise healthy children and adolescents. Cochrane Database of Systematic Reviews. 2005. Issue 4. http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD002980/frame.html Accessed 05.08.10. Pooled data from three studies who enrolled participants within 24 hours of rash onset found that aciclovir was associated with a small reduction in the number of days with fever (-1.1, 95% CI -1.3 to -0.9) and in reducing the maximum

**Note:** Doses are oral and for adults unless otherwise stated. Please refer to BNF for further information. A+ = systematic review, A- = rigorous RCT, B+ = RCT or cohort study, B- = case-control study C = formal combination of expert opinion.
number of lesions. Results were less supportive of a reduction in the number of days of itching. There were no differences in complication rates between those treated with aciclovir or placebo.

Swingler G. Chicken Pox. In: Clinical Evidence Concise. London. BMJ Publishing Group. 2006;15:267-79. One systematic review was identified that found one RCT (n = 148 adults) which compared early versus late administration of acyclovir 800mg five times a day compared with placebo. It found that aciclovir given within 24 hours of the onset of rash significantly reduced the maximum number of lesions (P < 0.01) and the time to full crusting of lesions (P = 0.001) compared with placebo. It found no significant difference in time to full crusting of lesions if aciclovir was given 24–72 hours after the rash (P > 0.2).


Wood MJ, Shukla S, Fiddian AP, Crooks RJ. Treatment of acute herpes zoster: effect of early (<48 h) versus late (48-72 h) therapy with acyclovir and valaciclovir on prolonged pain. J Infect Dis 1998;127(Suppl 1);S81-S84. A study of two databases (n = 1076) found no difference in time to complete resolution of zoster-associated pain whether treatment was started within 48 hours or between 48 and 72 hours of the onset of cutaneous herpes zoster. Acyclovir HR 2.2, 95% CI 1.03 to 4.71. Valaciclovir HR 1.40, 95% CI 1.04 to 1.87.

**Cold sores**

Arduino PG and Porter SR. Oral and perioral herpes simplex type 1 (HSV-I) infection: review of its management. Oral Dis 2006;12(3):254-70. Prophylaxis with oral antivirals may be of use for those with frequent, severe episodes, predictable triggers e.g. sunlight or for immunocompromised individuals (i.e. at higher risk of complications). Seek specialist advice if long-term prophylaxis is being considered.


**Oral Infections**


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