INTRODUCTION

The Main Aims of the NHS Wirral Antimicrobial Guidelines

- To provide a guide to the management of common infections in primary care.
- To encourage the rational and cost effective use of antibiotics.
- To reduce the risk of patients developing disease caused by *Clostridium difficile* via rational use of antibiotics.
- To reduce the emergence of bacterial resistance.

This document is evidence-based where such evidence exists and has been produced in accordance with advice laid down in the Department of Health’s Standing Medical Advisory Committee Sub-Group on Antimicrobial Resistance. The guidelines take into consideration local sensitivity data and have been drawn up to provide ‘best guess’ therapy. These guidelines are not based on costs.

Please be prepared to change therapy in the light of:

- Culture results. (Please note that sensitivities for antimicrobials other than those recommended in the guidelines may be reported, but should only be prescribed where the guideline choices are inappropriate).
- Patient non-response or adverse reaction.
- Microbiological consultation.

The guidelines are not intended to be exhaustive. Doses quoted are for oral therapy in typical adults with normal renal and hepatic function. Be prepared to alter dosages in patients with impaired renal or hepatic function. Please refer to antibiotic monographs in Appendix 1 for further detail.

Where therapy has failed or special circumstances exist, advice can be obtained from Wirral Medical Microbiology, which operates a 24 hour, 365 day clinical microbiology service. Please feel free to phone the Microbiology Department by either contacting:

1) Clatterbridge Hospital switchboard 0151 334 4000 ext 4512 during normal working hours.
or
2) Arrowe Park switchboard 0151 678 5111 if out-of-hours.

Including as much clinical information as possible on the sample request form will allow the most appropriate sensitivities to be reported e.g. type of urine sample, antibiotics already tried, pregnancy, significant co-morbidities.

**Intravenous Antibiotics - Wirral Community NHS Trust Community Nursing Service.**
(Also see Appendix 2 for more information)

The prescriber may wish to prescribe intravenous antibiotics if the intravenous route is required (e.g. suitable oral alternative not available or appropriate) and admission to hospital is either inappropriate or not possible (for clinical or domestic reasons).
Please discuss options with the Medical Microbiologist before prescribing intravenous antibiotics. If intravenous antibiotics are an appropriate choice please discuss options for administration with the Wirral Community NHS Trust Community Nursing Service and endorse the Patient Medicines Administration Chart (PMAC) with “Discussed with the Microbiologist”.

Microbiology MUST be formally consulted before using Wirral Community NHS Trust Community Nursing Service for intravenous antibiotic administration. Patient Medicines Administration Charts (PMAC) that have not been endorsed with “Discussed with the Microbiologist” will be queried with the Prescriber.

**Long-Term Antibiotic Prophylaxis in Adults**

It is recognised that in certain clinical scenarios (end-stage COPD with repeated infected exacerbations, recurrent urinary tract infections associated with catheterisation, calculi or uroscopy) Secondary Care consultants may recommend long-term antibiotic prophylaxis, often using rotating agents. While this may confer short-term benefit to the patient, this must be balanced against the increased risk of long-term development of resistance. This is frequently seen in such patients and can result in therapeutic difficulties (such as requirement for in-patient therapy) when infection does arise.

In cases where long-term prophylaxis is used, it may be of benefit to have a review point to assess the continual need, balancing continued perceived benefit versus potential risks.

Long-term antibiotic prophylaxis can result in particular problems in patients known to be MRSA or multi-resistant coliform colonised and these patients should be discussed with the microbiologist.

The National Collaborating Centre for Chronic Conditions (2004) states that prophylactic antibiotics are not recommended for people with stable chronic obstructive pulmonary disease, due to concerns about antibiotic resistance and potential adverse effects.

**Penicillin Allergy**

All prescribers are reminded of the advice contained in the British National Formulary (BNF):

Individuals with a history of anaphylaxis, urticaria, or rash immediately after penicillin administration are at risk of immediate hypersensitivity to a penicillin; these individuals should not receive a penicillin. Patients who are allergic to one penicillin will be allergic to all because hypersensitivity is related to the basic penicillin structure. As patients with a history of immediate hypersensitivity to penicillins may also react to cephalosporins and other beta-lactam antibiotics, they should not receive these antibiotics.

Individuals with a history of a minor rash (i.e. non-confluent, non-pruritic rash restricted to a small area of the body) or a rash that occurs more than 72 hours after penicillin administration are probably not allergic to penicillin and in these individuals a penicillin should not be withheld unnecessarily for serious infections; the possibility of an allergic reaction should, however, be borne in mind. Other beta-lactam antibiotics (including cephalosporins) can be used in these patients.

**Current Statutorily Notifiable Diseases and Food Poisoning**

Doctors must inform the Consultant in Health Protection when attending a patient suspected of suffering from any of the diseases listed under Notifiable Diseases in Chapter 5 in the BNF. For the local contact, please telephone 0844 255 1295 (daytime 9am to 5pm).

For further details please go to the Health Protection Agency website - www.hpa.org.uk

**Things You Can Do to Make a Difference...**

- Do not prescribe antibiotics for simple coughs, colds and sore throats unless good reason as per NICE Guidance on Respiratory Tract Infections - Antibiotic Prescribing.
- Limit prescribing of antibiotics for uncomplicated cystitis to three days in otherwise healthy women (less than 60 years of age).
- Avoid prescribing antibiotics over the telephone, except in exceptional circumstances.
- Consider using a deferred antibiotic prescription.
- Use microbiology tests where appropriate before prescribing an antibiotic.
- Use antibiotic resources to assist in educating the public.

**Main Changes Since the Last Edition**

Each section has been reviewed to ensure that it is in line with the most up-to-date national and local guidance.

The main changes in this edition are:

- Additional guidance on when to treat AOM in children
- Risk factors for antibiotic resistant organisms in COPD
- Consideration of 3 day course of antibiotics for women > 60 years
- Prophylactic antibiotics for patients with indwelling catheter
- Facial cellulitis
- Recurrent vulvovaginal candidiasis
- For guidance on potential pandemic influenza then please visit the Health Protection Agency website at www.hpa.org.uk

The NHS Wirral Antimicrobial Guidelines can also be accessed electronically via the Wirral Medicines Management internet site at the following address:


Please be aware that the electronic document will be the most up-to-date version of the NHS Wirral Antimicrobial Guidelines in between revision dates. There may be differences between the hard copy and electronic copy of the document.

At the end of this guide (Appendix 1) there is a section of antibiotic monographs to provide information about the recommended antimicrobials. These monographs are not intended to be exhaustive. If any further information is required, it is recommended that the BNF should be consulted.

- The traffic light system in the monograph section of the guidelines is used to highlight those antibiotics with the greatest propensity for causing *C difficile* infection.
- Any antibiotics coloured red or amber are more likely to cause *C difficile* infection whereas those coloured green are less likely.

Doses in this guideline are for adults with normal renal and hepatic function unless otherwise specified. Paediatric doses can be found on pages 34 to 35.

**Acknowledgements**

We would like to acknowledge the Antimicrobial Guide and Management of Common Infections in Primary Care produced by a joint initiative between Primary Care Trusts of Sefton, Liverpool, Central Lancashire (West Lancs. Locality) and Knowsley with Aintree University Hospitals NHS Foundation Trust, Southport and Ormskirk Hospital NHS Trust, Royal Liverpool and Broadgreen University Hospitals Trust and Royal Liverpool Children’s Hospital Trust (Alder Hey) 12th edition and the Antibiotic Formulary, Wirral University Teaching Hospital NHS Foundation Trust.
FIVE MAIN PRINCIPLES

1. USE ANTIBIOTICS APPROPRIATELY
   Avoid antibiotics in viral and mild self-limiting infections.

2. USE NARROW SPECTRUM AGENTS
   Broad spectrum agents are generally more expensive and potentially more toxic than narrow spectrum agents. They also produce more super-infection problems because of their capacity to deplete the commensal ('normal') flora.
   For many indications first line therapy with amoxicillin is recommended in this guidance, rather than co-amoxiclav.

   Note:
   Use simple generic antibiotics first whenever possible. Avoid broad spectrum antibiotics (eg. co-amoxiclav, quinolones and cephalosporins) when narrow spectrum antibiotics remain effective as they increase risk of Clostridium difficile, MRSA and resistant UTIs. (Health Protection Agency).

3. USE WELL ESTABLISHED AGENTS
   Well established agents are preferable to novel ones because of the length of time required for the definition of adverse effects and interactions. Although the use of newer antibiotics such as quinolones is increasing, they should be reserved for serious infections in primary care. Overuse of these agents will lead to increasing resistance diminishing their vital role in the treatment of severe life threatening infections.

4. USE DIFFERENT AGENTS FOR DIFFERENT INDICATIONS
   Generally there is no such thing as a good or a bad agent but there is optimal therapy for particular types of patients, infections and infecting agents.

5. USE SHORT COURSES FOR UNCOMPLICATED INFECTIONS
   For example, uncomplicated cystitis in female adults less than 60 years of age can be treated with a 3 day course of antibiotics.

Antibiotic Prescribing Strategies for Respiratory Tract Infections (RTIs)
(Adapted from NICE Guidance on Respiratory Tract Infections - Antibiotic Prescribing)

Agree a no antibiotic or delayed antibiotic prescribing strategy for the following (see exceptions below where immediate prescribing strategy may be considered).

- Acute sore throat/acute pharyngitis/acute tonsillitis.
- Acute otitis media.
- Common cold.
- Acute rhinosinusitis.
- Acute cough/acute bronchitis.

Exceptions
Depending on clinical assessment of severity, an immediate prescribing strategy should be considered for:

- Children younger than 2 years with bilateral acute otitis media.
- Patients with otorrhoea who have acute otitis media.
- Patients with acute sore throat/acute pharyngitis/acute tonsillitis when 3 or more Centor criteria are present.

Offer immediate antibiotics or further investigation/management for patients who:

- Are systemically very unwell.
- Have symptoms and signs suggestive of serious illness and/or complications (particularly pneumonia, mastoiditis, peritonsillar abscess, peritonsillar cellulitis, intraorbital or intracranial complications).
- Are at high risk of serious complications because of pre-existing comorbidity. This includes patients with significant heart, lung, renal, liver or neuromuscular disease, immunosuppression, cystic fibrosis, and young children who were born prematurely.
- Are older than 65 years with acute cough and 2 or more of the following, or older than 80 years with acute cough and 1 or more of the following:
  - Hospitalisation in previous year.
  - Type 1 or type 2 diabetes.
  - History of congestive heart failure.
  - Current use of oral glucocorticoids.

It is important to provide advice about the usual natural history of the illness and average total illness length.

For further information:
http://www.nice.org.uk/CG69
1 UPPER RESPIRATORY TRACT INFECTIONS

1a Acute Sore Throat

Most sore throats are viral and do not require an antibiotic. Throat swabs should not be carried out routinely. Consider a throat swab only in persistent infections, where there are systemic signs or family/institutional outbreaks. A delayed prescription strategy may be useful when it is felt safe not to prescribe an antibiotic immediately. Advise regular use of paracetamol or ibuprofen to relieve pain and fever.

Limit use of antibiotics as 90% resolve in 7 days without antibiotic therapy, and pain is only reduced by 16 hours.

Clinical prediction for the presence or absence of Group A beta-haemolytic streptococcus in acute sore throat in adults (GABHS):

The Centor Criteria

- Tonsillar exudate.
- Tender anterior cervical lymphadenopathy.
- Absence of cough.
- History of fever.
- If none of the above are present, less than 3% of patients will have GABHS.
- If 3 out of 4 of the above are present, then 40% of patients are likely to have GABHS.

First line:
Phenoxymethylpenicillin (penicillin V) 500mg qds for 10 days
or
Clarithromycin 250-500mg bd for 5 days
(If allergic to penicillin)

Note:
Ten days therapy with penicillin is required to eradicate carriage of GABHS. Prescribing of clarithromycin should be reserved for those patients with true penicillin allergy. BNF current duration recommendation is for 10 days, however this study shows 5 days is efficacious.

Treatment failures:
Amoxicillin 250mg tds plus Metronidazole 400mg bd for 5 days
or
Co-amoxiclav 375mg tds for 5 days
Consider sources of re-infection.

Remember:
- Do not use ampicillin, amoxicillin or co-amoxiclav unless you are confident it is not glandular fever. Consider sending a Paul-Bunnell test.
- Beware blood dyscrasia in patients who do not respond to treatment.

1b Acute Otitis Media (AOM)

Recent studies have questioned the need for antibiotics in AOM. Antibiotics should not be routinely prescribed for uncomplicated AOM. Adequate analgesia may be all that is required. Swabs should always be taken from acute discharge.

Only offer an immediate antibiotic prescription to:
- People who are systemically very unwell (but who do not require admission).
- People at high risk of serious complications because of significant heart, lung, renal, liver, or neuromuscular disease, immunosuppression, or cystic fibrosis, and young children who were born prematurely.
- People whose symptoms of AOM have already lasted for 4 days or more and are not improving.

Depending on severity, consider offering an immediate antibiotic prescription to:
- Children younger than 2 years of age with bilateral AOM.
- Children younger than 2 years of age with bulging membrane and ≥4 symptoms:
  - Fever
  - Tugging ears
  - Crying more
  - Irritability
  - Difficulty sleeping
  - Less playful
  - Eating less
- Patients of all ages with perforation and/or discharge in the ear canal (otorrhoea) associated with AOM.
- For children younger than 3 months of age with AOM, have a low threshold for admitting or prescribing antibiotics.

First Line:
Amoxicillin 500mg to 1g tds for 5 days
or
Clarithromycin 250mg bd for 5 days
(If allergic to penicillin)

Information on the Management of AOM

If children have AOM and:
- Fever (>37.5°C) or vomiting
  Half of this group of patients would settle within 72 hours without antibiotics. 3 to 6 children would need to be treated with antibiotics in order for 1 extra child to benefit.
- There is no fever or vomiting
  For every 100 children with AOM without fever or vomiting 6 extra patients would suffer reduced pain at day 7 with antibiotics; 6 extra would suffer rash, diarrhoea or vomiting. So the number needed to treat equals the number needed to harm.

Delayed Prescriptions
- Use of delayed prescriptions plus a handout for parents for AOM in children who are not particularly ill reduced overall antibiotic prescribing for children by one fifth in one group practice.

First Line:
Amoxicillin 500mg to 1g tds for 5 days
or
Clarithromycin 250mg bd for 5 days
(If allergic to penicillin)

Treatment failures:
Co-amoxiclav 625mg tds for 5 days
1c Acute Sinusitis

Acute sinusitis nearly always follows an upper respiratory tract infection and is diagnosed by the presence of nasal blockage (obstruction/congestion) or nasal discharge (anterior/posterior nasal drip) with facial pain (or pressure) and/or reduction of, or loss of, the sense of smell, lasting for less than 12 weeks.

The following may be present:

- Nasal discharge - a thick, purulent, coloured discharge (especially green) is more likely to indicate bacterial involvement (unlikely with a clear discharge).
- Nasal blockage or congestion - usually bilateral and caused by rhinitis.
- Facial pain - may be described as pressure and localised over the infected sinus, or it may affect teeth, the upper jaw, or other areas (such as eye, side of face, forehead).
- In children, symptoms of rhinitis predominate, with facial pain being less prevalent. There may also be ear discomfort (Eustachian tube blockage).

Antibiotics are not required for most people presenting with acute sinusitis. Analgesia may be all that is required. An intranasal decongestant (maximum 1 week) may help if nasal congestion problematic.

Consider a delayed antibiotic prescribing strategy:

**First line:**
- Amoxicillin 500mg to 1g tds for 7 days

**or**
- Doxycycline may be considered as an alternative *(if allergic to penicillin)*:
  - Doxycycline 200mg on the first day followed by 100mg each day thereafter for a total of 7 days.
  - Swallow capsules whole with plenty of fluid at meal times. Avoid strong sunlight or sun lamps.
  - Not for use in children younger than 12 years.

**Treatment failures:**
- Co-amoxiclav 625mg tds for 7 days

Chronic sinusitis is diagnosed by the presence of nasal blockage (obstruction/congestion) or nasal discharge (anterior/posterior nasal drip) with facial pain (or pressure) and/or reduction of, or loss of, the sense of smell, lasting for longer than 12 weeks. Compared with acute sinusitis, in chronic sinusitis:

- Loss of smell is more commonly described.
- Facial pain is less common.

Chronic sinusitis may last several months. Antibiotic therapy is not usually warranted and should only be used after further discussion or referral to a specialist.

1d Acute Otitis Externa

Otomize® Ear Spray (dexamethasone 0.1%, neomycin 3250 units/ml)
- Apply 1 metered spray to the affected ear(s) tds for a minimum of 7 days (continue for a further 7 days if symptoms persist)

**or**
- Sofradex® ear drops (dexamethasone 0.05%, framycetin 0.5%, gramicidin 0.005%)
- Apply 2 to 3 drops to the affected ear(s) tds for a minimum of 7 days (continue for a further 7 days if symptoms persist)

Analgesia should be recommended for pain relief. It is important that a combination product is used as topical steroids should not be used alone. Keep the ear dry. If there is no improvement after 2 weeks of topical treatment, refer to the open access aural dressing clinic for aural toilet (Clinic 2 Outpatient Department, Arrowe Park Hospital).

The only indication for systemic antibiotics is perichondritis in which case a systemic anti-pseudomonal agent would be required.

Use Ciprofloxacin 500mg to 750mg bd for 7 days then review and consider ENT referral.

**Note:**
- In confirmed pseudomonas infection topical acetic acid 2% (EarCalm®) may also be of value.

1e Croup

Croup is usually a viral illness so antibiotics are not indicated. Only symptomatic treatment is required. Symptoms usually resolve within 48 hours, although occasionally they may last for up to a week.

2 LOWER RESPIRATORY TRACT INFECTIONS

MRSA

MRSA is typically resistant to many broad spectrum agents such as macrolide and quinolone antibiotics. Prescribing of inappropriate broad spectrum agents in patients colonised by MRSA disrupts the patient's normal flora and allows MRSA to increase in numbers. This renders the patient more vulnerable to (potentially severe) MRSA infection.

It is therefore of great importance to be aware of previous MRSA results prior to prescribing.

**NOTE:** Low doses of penicillins are more likely to select out resistance. Do NOT use quinolone (ciprofloxacin, ofloxacin) first line due to poor pneumococcal activity. Reserve all quinolones (including levofloxacin) for proven resistant organisms.

2a Bronchitis (Acute)

For people with acute bronchitis with no pre-existing conditions, antibiotics are not routinely recommended.

**Symptom resolution can take 3 weeks.**

Consider prescribing antibiotics for people who have a pre-existing condition that impairs their ability to deal with infection or is likely to deteriorate with acute bronchitis. This includes people:

- Who are over 75 years of age, with fever.
- With chronic obstructive pulmonary disease (COPD).
- With heart failure.
- Who are immunocompromised, including people with cancer or insulin dependent diabetes.

**Note:**
- More than 90% of cases of acute bronchitis do not have a bacterial cause.
- Purulent sputum can arise from either viral or bacterial infection. The presence of purulent sputum in isolation is not a predictor of bacterial infection.

If antibiotics are indicated, use empirical treatment:

**First line:**
- Amoxicillin 500mg tds for 5 days

**or**
- Doxycycline 200mg stat then 100mg od for 5 days in total
Alternative Management:
Delayed antibiotic prescriptions have been shown to reduce antibiotic use. Using a combination of a patient information leaflet with a delayed prescription reduced antibiotic use more than using the delayed prescription alone. There is also evidence that delayed prescriptions decrease re-attendance rates for similar symptoms.

2b Asthma (Acute Exacerbation of)
Antibiotics are not normally required.

2c Bronchitis (Chronic - Acute exacerbation) / Acute exacerbation of COPD
Antibiotics are only required if exacerbation of COPD is associated with:
- a history of increased purulent sputum
- without increased purulent sputum but has consolidation on chest radiograph or clinical signs of pneumonia

First line:
Amoxicillin 500mg tds for 5 days
or
Doxycycline 200mg stat then 100mg od for 5 days in total
(if allergic to penicillin)

Treatment failures or resistance risk factors:
Co-amoxiclav 625mg tds for 5 days

Risk factors for antibiotic resistant organisms include co-morbid disease, severe COPD frequent exacerbations, antibiotics in last 3 months.

Levofloxacin 500mg od for 5 to 7 days would normally be reserved for patients with known carriage of proven resistant organisms.

2d Pneumonia (Community acquired)
In pneumonia antibiotics are clearly beneficial.
Assess the CRB-65 score for all people diagnosed with pneumonia:
One point is awarded for each of the following features:
- Confusion - recent.
- Respiratory rate 30 breaths/min or greater.
- Blood pressure - systolic of 90 mmHg or less or a diastolic of 60 mmHg or less.
- 65 years of age or older.
For people with a CRB-65 score of 3 or more, arrange urgent admission to hospital.
For people with a CRB-65 score of 2, arrange same-day assessment in secondary care. Secondary care options include short-stay inpatient treatment or hospital-supervised outpatient treatment.
For people with a CRB-65 score of 1, consider arranging same-day assessment in secondary care.
For people with a CRB-65 score of 0, treatment at home is usually appropriate, depending on clinical judgement and available social support.

Give immediate IM benzylpenicillin or amoxicillin 1g PO if delayed admission/life threatening.

First line:
Amoxicillin 500mg to 1g tds for 7 to 10 days
or
Doxycycline 200mg stat then 100mg od for 7 to 10 days
(if known history of MRSA or high suspicion of MRSA or if allergic to penicillin)

Severe infection (that would normally be treated in hospital but if admission not possible):
Amoxicillin 1g tds in combination with clarithromycin 500mg bd for 7 to 10 days

Treatment failure:
Levofloxacin 500mg od for 10 to 14 days
Levofloxacin would not routinely be used in the context of community acquired pneumonia but may be considered in exceptional circumstances e.g. patients not responding to amoxicillin in combination with clarithromycin or patients with known carriage of resistant organisms.

If atypical pneumonia (e.g. mycoplasma infection) is suspected use both of the above first line agents (amoxicillin and clarithromycin) and continue for 14 days in total.

If post-influenzal or post chickenpox:
Add fluclaxocillin 500mg qds for 10 days to either amoxicillin or clarithromycin.

General Note:
- For more information regarding IV therapy then please see page 3 and Appendix 2.
- For further information regarding long term antibiotic prophylaxis in adults then please see page 4.

2e Infected Exacerbation of Bronchiectasis
A freshly collected sputum sample should be taken and treatment must be started on the basis of microbiological results.
If Pseudomonas aeruginosa has NOT been previously isolated then:
Co-amoxiclav 625mg tds for 7 days

For those patients known to be carrying Pseudomonas aeruginosa (as long as the isolate remains quinolone sensitive) then use:
Ciprofloxacin 750mg bd for 7 days

For empiric treatment outside of these scenarios then seek advice from Microbiology.

3 URINARY TRACT INFECTIONS (UTI)

MRSA
MRSA is typically resistant to many broad spectrum agents such as macrolide and quinolone antibiotics. Prescribing of inappropriate broad spectrum agents in patients colonised by MRSA disrupts the patient’s normal flora and allows MRSA to increase in numbers. This renders the patient more vulnerable to (potentially severe) MRSA infection.
It is therefore of great importance to be aware of previous MRSA results prior to prescribing.
• Nitrofurantoin should be taken with food.
• Nitrofurantoin is contra-indicated if CrCl <60ml/min.
• Both immediate and modified-release formulations of nitrofurantoin are recommended because there is no evidence to prefer one over the other.

3a Uncomplicated Acute Cystitis in Non Pregnant Women <60 years
Specimens are not required for ‘one-off’ infections in previously healthy women.

First line:
Trimethoprim 200mg bd for 3 days
or
Nitrofurantoin 50mg qds or 100mg MR bd for 3 days

Treatment failures:
If culture available, treat according to sensitivity results.
If not, obtain specimen for culture and sensitivity first and then prescribe:
Co-amoxiclav 375mg tds for 3 days
or
Ciprofloxacin 250mg bd for 3 days

Review when microbiology results available.

Notes:
• Nitrofurantoin should be taken with food.
• Nitrofurantoin is contra-indicated if CrCl <60ml/min.
• Both immediate and modified-release formulations of nitrofurantoin are recommended because there is no evidence to prefer one over the other.

3b Acute Cystitis in Women >60 years, Men and Other Complicated Infections
Obtain specimen before empirical treatment. Specimens from women are not infrequently contaminated so thorough vulval cleansing prior to collection must be stressed.

The definition of a complicated UTI is a UTI when one or more factors are present that predispose the person to persistent infection, recurrent infection or treatment failure. Examples include UTI with:
• Abnormal urinary tract (for example calculus, vesicoureteric reflux, reflux nephropathy, neurogenic bladder, indwelling catheter, urinary obstruction, recent instrumentation).
• Impaired host defences (for example poorly controlled diabetes mellitus, immunosuppressive treatment).
• Impaired renal function.

Note:
Asymptomatic bacteriuria in the elderly should not generally be treated.

Notes:
• For all UTIs encourage adequate fluid intake.
• Use simple generic antibiotics first line whenever possible.
• Avoid broad spectrum antibiotics (e.g. co-amoxiclav, quinolones and cephalosporins) when narrow spectrum antibiotics remain effective as they increase risk of Clostridium difficile, MRSA and resistant UTIs. (Health Protection Agency - www.hpa.org.uk)
• For more information regarding IV therapy then please see page 3 and Appendix 2.
• For further information regarding long term antibiotic prophylaxis in adults then please see page 4.

It may be appropriate to prescribe a 3 day course of antibiotics for women >60 years, providing there are no complicating factors or latent urological problems.16

First line:
1. Trimethoprim 200mg bd for 7 days
or
2. Nitrofurantoin 50mg qds or 100mg MR bd for 7 days
(Not in the elderly >70years due to side effects profile)
or
3. Cefalexin 500mg bd or tds for 7 days (depending on severity)

Treatment failures:
If culture available, treat according to sensitivity results.
If not, obtain specimen for culture and sensitivity first and then prescribe:
Co-amoxiclav 375mg tds for 7 days
or
Ciprofloxacin 250mg bd for 7 days

Review when microbiology results available.

Investigations in Adults
Uses and Limitations of Urine Dipstick Tests

<table>
<thead>
<tr>
<th>Test Result</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrite</td>
<td>Most urinary pathogens reduce nitrate to nitrite, and a positive test is suggestive of bacteriuria. A negative test does not rule out UTI, because some pathogens do not produce nitrate reductase, and frequent urination (which is common in cystitis) gives the enzyme less time to react. If the dipstick is exposed to air, the nitrite test can become inactive.</td>
</tr>
<tr>
<td>Leucocyte esterase (LE)</td>
<td>LE is a marker for leucocytes (i.e. pyuria) but the LE test is less sensitive than microscopy. A positive LE test indicated pyuria and therefore suggests UTI, but leucocytes can contaminate the specimen, so a positive test does not make a diagnosis of UTI certain. A negative LE test does not rule out the diagnosis of UTI, because the test is insensitive and pyuria is not always found in UTI.</td>
</tr>
<tr>
<td>Blood and protein</td>
<td>Blood and protein are sometimes found in the urine when there is a UTI, but neither their presence nor their absence helps in making a diagnosis of UTI.</td>
</tr>
</tbody>
</table>

Combination of tests
In adult patients it is reasonable to exclude UTI if both nitrite and LE dipstick tests are negative.

In otherwise healthy women with urinary symptoms:
If the dipstick is positive for nitrite and/or leucocyte esterase, also culture the urine, unless it is the first presentation. If the dipstick is negative, do not culture the urine. Culture the urine to support decisions made on dipstick test results.

In men, urine should be cultured whenever a urinary tract infection is suspected (even if dipstick tests are negative).

Urine dipstick tests are not suitable for screening for UTI in asymptomatic men.
3c Acute Cystitis in Pregnancy (or those at risk of pregnancy)
i. Symptomatic UTI in Pregnancy
Always obtain specimen before starting empirical treatment.

First line:
- Nitrofurantoin 50mg qds or 100mg MR bd for 7 days (but not in the third trimester of pregnancy)
or
- Cefalexin 500mg bd or tds for 7 days (depending on severity)

Treatment failures:
Guided by microbiological results.

ii. Asymptomatic (routine screening) in Pregnancy
Contaminants are common. Women with bacteriuria are advised to obtain a new clean catch specimen after showering or bathing.

Asymptomatic bacteriuria should be screened for at the first antenatal visit by sending urine for culture. If asymptomatic bacteriuria is found, a second urine sample should be sent for culture.

If the second urine culture confirms asymptomatic bacteriuria, treat with:
- Amoxicillin 250 mg tds for 7 days
or
- Nitrofurantoin 50 mg qds or 100 mg MR bd for 7 days (not in third trimester)
or
- Cefalexin 500mg bd may be used but is less preferred
or
- Based on the microbiological report

3d Urinary Tract Infection in Children (<16 years)
Always obtain specimen before starting empirical treatment. However treatment should not be delayed if a urine sample is unobtainable.

Infants younger than 3 months with a possible UTI should be referred immediately to the care of a paediatric specialist. Urine testing in this age group is not necessary or appropriate in primary care as it will not change management.

For infants and children 3 months or older with acute pyelonephritis / upper UTI:
- Consider referral to a paediatric specialist.
- Treat fever and pain with paracetamol. NSAIDs should be avoided.
- Treat with oral antibiotics for 7 to 10 days.

First line:
- Co-amoxiclav
or
- Cefixime

Treatment failures:
Guided by microbiology results.

For infants and children 3 months or older with cystitis / lower urinary tract infection:
- Treat fever and pain with paracetamol. NSAIDs should be avoided.
- Treat with oral antibiotics for 3 days

First line:
- Trimethoprim
or
- Nitrofurantoin
or
- Cefalexin

Treatment failures:
Guided by microbiology results.

(For appropriate paediatric doses see page 34 to 35)

Investigations in Children:
For information regarding investigations in children with UTI then please visit:
www.wirral.mapofmedicine.com
www.nice.org.uk/guidance/CG54
If required, seek specialist guidance from the Department of Paediatrics, Arrowe Park Hospital.

Collection / Storage for Women, Men and Children
- Careful collection, storage and transport of urine samples minimises contamination and deterioration.
- The urine sample should be collected, if possible, before antimicrobials are taken or changed.
- A clean catch mid-stream urine sample (MSU) is recommended.

Women:
- The perineum should be wiped from front to back with a gauze swab moistened with water (antiseptics should be avoided because they may inhibit bacterial culture). A wide mouthed gallipot or disposable funnel facilitates collecting an MSU. Women who are menstruating must take particular care to avoid contamination.

Men:
- Procedure: -
  - Withdraw prepuce and clean glans penis.
  - Discard the first portion of urine and catch the middle portion (a wide mouthed gallipot or disposable funnel is useful).

Children:
- In infants, urine can be collected from an absorbent pad in the nappy. Alternatively the clean catch method or an adhesive bag can be used.
- In toddlers, a potty is convenient. The potty should be cleaned with detergent and hot water (bleach should not be used because it may inhibit culture of bacteria).
- In older children, a clean catch MSU can be collected with little difficulty and is adequate for diagnosis.

Containers: - urine should be transferred within thirty minutes of collection to a specimen bottle.
Storage: - urine should be refrigerated at 4°C while waiting to be processed. Urine that has been stored at 4°C for 48 hours is suitable for culture but not for microscopy as many cells would have disintegrated.
3g Infection Associated with Indwelling Urinary Catheters

There is a high incidence of bacteriuria with long term catheters. Antibiotics do not eliminate these, but lead to the growth of resistant organisms. Culture of urine is not normally advised. Fluid intake must be encouraged.

Where there is systemic infection and an antibiotic needs to be prescribed, it may be of value to change the catheter while the patient is receiving therapy.

Blocked catheters may need to be changed. Bladder washouts require nothing stronger than normal saline. Chlorhexidine washouts are not thought to be helpful and may cause bladder irritation and haematuria.

Consider prophylactic antibiotics at time of catheter change for patients who:

- have a history of symptomatic urinary tract infection after catheter change
- have experienced frank haematuria after catheterisation
- have required two or more attempts of catheterisation.

No antibiotic is licensed for single dose or short course prophylaxis of urinary tract infections when changing long-term urinary catheter. It is important to fully inform patients about the advantages and disadvantages of using antibiotics for their individual circumstances, and the importance of fully adhering to the antibiotic prophylaxis regimen to reduce the risk of bacterial resistance. Patients should be asked their preference and to consent on the antibiotic prophylaxis prescribed.

Additional guidance will be available in the near future.

3h Epididymo-orchitis

In adolescents and men younger than 35 years of age, epididymitis and epididymo-orchitis are usually caused by sexually transmitted infections (Chlamydia trachomatis or Neisseria gonorrhoeae). In the context of likely sexual acquisition then referral to Contraception & Sexual Health Clinics or to GUM is imperative.

In men aged 35 years or older, epididymitis and epididymo-orchitis are usually caused by enteric organisms that cause urinary tract infections (when they are often in association with anatomical abnormalities of the urinary tract). Outside of sexual acquisition then use:

- Trimethoprim 200mg bd for 10 days
- Ciprofloxacin 500mg bd for 10 days

Notes:

- Refer patients with chronic prostatitis to Urologists.
- Repeat urine culture one week after completion of antibiotic course to ensure infection resolved.

3f Acute Prostatitis

Choice of antibiotic depends on activity against the likely pathogens and prostatic tissue penetration. An MSU taken prior to therapy should identify the organism but will not localise infection to the prostate.

- Trimethoprim 200mg bd for 28 days
  (High concentrations in prostatic fluid and inexpensive)
- Ciprofloxacin 500mg bd for 28 days
  (Broader activity but more expensive)

4 SKIN AND SOFT TISSUE INFECTIONS

MRSA and PVL-SA:

MRSA is typically resistant to many broad spectrum agents such as macrolide and quinolone antibiotics. Prescribing of inappropriate broad spectrum agents in patients colonised by MRSA disrupts the patient’s normal flora and allows MRSA to increase in numbers. This renders the patient more vulnerable to (potentially severe) MRSA infection.

It is therefore of great importance to be aware of previous MRSA results prior to prescribing. For information regarding Panton-Valentine Leucocidin producing Staphylococcus aureus (PVL-SA) please see [http://www.wirralct.nhs.uk/index.php/our-services/services/infection-prevention-and-control and www.hpa.org.uk](http://www.wirralct.nhs.uk/index.php/our-services/services/infection-prevention-and-control and www.hpa.org.uk)
Co-amoxiclav may be considered as a first line agent if the cellulitis is associated with a long term ulcer or pressure sore.

Co-amoxiclav exerts a considerably broader spectrum of activity including Gram-negative organisms and anaerobes which is usually unnecessary in the treatment of cellulitis.

Notes:
• ‘Routine’ swabs are not required from leg ulcers and should only be taken when there is a clear clinical indication. Antibiotics are only recommended if cellulitis is associated with the leg ulcer when the treatment regimen above for “More severe infections” should be used. Lower limb cellulitis may take up to 14 days to respond. Elevation of the limb may speed response.
• Severe cellulitis in patients with underlying pathology such as lymphoedema may require prolonged therapy of several weeks duration.
• Topical antibiotics should be reserved for very localised lesions. Monotherapy with topical treatments such as fusidic acid should be avoided when treating skin and soft tissue infections such as impetigo as resistance may develop to fusidic acid.
• Swabs are required for PEG site infections. Treatment should be provided accordingly.

Facial cellulitis
Co-amoxiclav 500/125mg tds for 7 to 14 days
or
If river or sea water exposure, discuss with microbiologist

Important Note:
Co-amoxiclav may be considered as a first line agent if the cellulitis is associated with a long term ulcer or pressure sore.

Co-amoxiclav exerts a considerably broader spectrum of activity including Gram-negative organisms and anaerobes which is usually unnecessary in the treatment of cellulitis.

Notes:
• ‘Routine’ swabs are not required from leg ulcers and should only be taken when there is a clear clinical indication. Antibiotics are only recommended if cellulitis is associated with the leg ulcer when the treatment regimen above for “More severe infections” should be used. Lower limb cellulitis may take up to 14 days to respond. Elevation of the limb may speed response.
• Severe cellulitis in patients with underlying pathology such as lymphoedema may require prolonged therapy of several weeks duration.
• Topical antibiotics should be reserved for very localised lesions. Monotherapy with topical treatments such as fusidic acid should be avoided when treating skin and soft tissue infections such as impetigo as resistance may develop to fusidic acid.
• Swabs are required for PEG site infections. Treatment should be provided accordingly.

4b Infected Diabetic Foot Ulcer
Referral to the Diabetic Foot Ulcer Clinic is essential as per the Diabetic Foot Ulcer Outpatient Pathway.
For superficial infection flucloxacillin may be considered for initial management - in all other cases expert opinion is required.

4c Mastitis
Suspect infectious mastitis if:
• Symptoms are severe from the beginning.
• A nipple fissure is visible.
• Symptoms do not improve after 12 to 24 hours despite effective milk removal.
• Bacterial culture is positive.

4a Skin and Soft Tissue Infections

Mild infection
Flucloxacillin 500mg qds for 7 days
or
Clarithromycin 250 to 500mg bd for 7 days
(If allergic to penicillin)

More severe infections (such as cellulitis)
Flucloxacillin 500mg qds for 7 to 14 days
(High dose flucloxacillin also gives cover against Group A Streptococci)
or
Clarithromycin 500mg bd for 7 to 14 days
(If allergic to penicillin)

Empirical treatment is:
Flucloxacillin 500mg qds for 7 to 14 days
or
Clarithromycin 250 to 500mg bd for 7 to 14 days
(if allergic to penicillin)

Advise the woman to continue to breastfeed. These antibiotics are only excreted in milk in very small amounts. Usually the infant is not affected, but occasionally stools may be looser or more frequent than usual or the infant may be more irritable.

If the results of breast milk culture are available, prescribe an antibiotic according to the sensitivities of the organism that has been identified.

4d Human/Animal Bites
Antibiotics are not generally needed if the wound is 3 or more days old and there is no sign of local or systemic infection.

i. Human bites:
Prophylaxis
Prescribe prophylactic antibiotics for all human bite wounds under 72 hours old, even if there is no sign of infection.
Co-amoxiclav 375mg tds for 7 days
or
Metronidazole 400mg tds plus doxycycline 100mg bd for a minimum of 7 days
(If allergic to penicillin)
Reassess at 24 & 48 hours after starting course of antibiotic treatment
or
Metronidazole 400mg tds plus clarithromycin 500mg bd for 7 days
(If allergic to penicillin)
Reassess at 24 & 48 hours after starting course of antibiotic treatment

Treatment
Co-amoxiclav 625mg tds for a minimum of 7 days
or
Metronidazole 400mg tds plus doxycycline 100mg bd for a minimum of 7 days
(if allergic to penicillin)
Reassess at 24 & 48 hours after starting course of antibiotic treatment
or
Metronidazole 400mg tds plus clarithromycin 500mg bd for a minimum of 7 days
(if allergic to penicillin)
Reassess at 24 & 48 hours after starting course of antibiotic treatment

In the context of human bites all patients should be reviewed for HIV Post Exposure Prophylaxis (PEP) and Hepatitis B prophylaxis. Consider if tetanus prophylaxis is appropriate.

ii. Animal bites:
Prescribe antibiotics for:
• All cat bites, animal bites to the hand, foot, and face, puncture wounds, wounds requiring surgical debridement, wounds involving joints, tendons, ligaments, or suspected fractures.
• Wounds that have undergone primary closure.
• People who are at risk of serious wound infection (e.g. those who are diabetic, cirrhotic, asplenic, or immunosuppressed).
• People with a prosthetic valve or a prosthetic joint.
**Prophylaxis**
- Co-amoxiclav 375mg tds for 7 days 
or Metronidazole 400mg tds plus doxycycline 100mg bd for 7 days
  (if allergic to penicillin)

Reassess at 24 & 48 hours after starting course of antibiotic treatment

**Treatment**
- Co-amoxiclav 625mg tds for a minimum of 7 days 
or Metronidazole 400mg tds plus doxycycline 100mg bd for a minimum of 7 days
  (if allergic to penicillin)

Reassess at 24 & 48 hours after starting course of antibiotic treatment 
or Azithromycin for 3 days plus metronidazole for a minimum of 7 days 
  (in penicillin allergy in children)

Reassess at 24 & 48 hours after starting course of antibiotic treatment

In the context of animal bites then assess the risk of acquiring rabies, and discuss the need for post-exposure prophylaxis urgently with the Virus Reference Department of the Health Protection Agency (telephone 020 8327 6017).

**Notes:**
- Erythromycin should never be used alone in prophylaxis or treatment of animal bite wounds. More than 80% of *P. multocida* are resistant and serious clinical failures including meningitis have been documented following erythromycin treatment.

**4e MRSA Decolonisation in Colonised Patients**

**Notes:**
- Methicillin-Resistant *Staphylococcus aureus* (MRSA) is a variety of *Staphylococcus aureus* that has developed resistance to a number of common antibiotics.
- It is usually commensal, neither harming nor benefiting the host.
- MRSA colonisation occurs when people carry MRSA on their skin or in the gut or nose but do not show symptoms and signs of infection.
- MRSA infection occurs when MRSA causes harm by entering the tissues for example through a cut or wound and requires treatment.
- Spread can be prevented through regular hand washing. For further information please see Infection Control Guidance at http://www.wirralct.nhs.uk/index.php/our-services/services/infection-prevention-and-control

Octenisan® is the antiseptic MRSA decolonisation product of choice.

i) **Prior to admission for elective procedures patients will be tested for MRSA.** For those patients with positive results, GPs will be asked to prescribe decolonisation therapy as follows:
- Octenisan® body wash 150ml (a 500ml bottle is available for larger patients).
- Apply daily for 5 days.
- Mupirocin 2% nasal ointment 3g. Apply tds to both nostrils for 5 days.

Eradication treatment should be commenced 7 days prior to admission.

ii) **For all other patients identified as MRSA positive, the MRSA Decolonisation Guidance should be followed, which can be found at the following web address:**

The MRSA Decolonisation Risk Assessment Tool must be completed to determine if decolonisation therapy is necessary.

**Note:**
Naseptin should NOT be routinely used for MRSA decolonisation. This is to be reserved for cases of mupirocin resistance only.

**Method and instructions for the use of Octenisan®**

Bath, wash or shower with Octenisan® body wash for a total of 5 days.
- Wet skin and/or hair.
- Apply an adequate amount of undiluted Octenisan® body wash onto a clean washcloth.
- Wash the whole body and/or hair, paying particular attention to moist, hairy areas including armpits, belly button, groin and perineum.
- Hair should be washed at least twice a week or upon every hair wash.
- After 1 minute, the wash may be rinsed off.
- Dry with a clean towel and dress in clean clothing.

If bathing, do not pour Octenisan® into the bath / wash water as the correct dilution will not be achieved.

**Method and instructions for the use of Mupirocin Nasal Ointment**

- Squeeze out a thin line of ointment about 1cm long.
- Apply ointment to the inside of the nostril and then repeat for the other nostril.
- Close nostrils by pressing the sides of the nose together for a moment - this ensures that the ointment is spread inside each nostril.
- Remain seated for 5 minutes after application to ensure the ointment trickles to the back of the nose and throat - you should taste the ointment at the back of your throat.
- Hands should be washed.

**4f Dental Abscess**

A dental practitioner should provide definitive treatment of a dental abscess. Antibiotics should only be prescribed for patients who are systemically unwell, if there are signs of severe infection or if emergency dental care is unavailable, a 5 day course of the following antibiotics could reasonably be prescribed:
- Amoxicillin or metronidazole (or clarithromycin if neither are suitable).

**4g Acne Vulgaris**

**4h Rosacea**

**4i Scabies**

**4j Treatment of Cutaneous Fungal Infections**

For treatment guidance for 4g, 4h, 4i and 4j please refer to the Wirral Formulary. The Wirral Formulary can be found at the following web address:
http://mm.wirral.nhs.uk/formulary/
5 EYES

5a Conjunctivitis

Management Strategies

Treat if severe, as most viral or self-limiting16.

A study was undertaken of 307 adults and children (aged 1 year or more) with uncomplicated acute infective conjunctivitis. The patients were assigned to receive immediate antibiotic treatment, delayed antibiotic treatment (prescription to be collected after 3 days if considered necessary) or no antibiotic therapy. Antibiotic treatment was with topical chloramphenicol.

Prescribing strategies did not affect the severity of symptoms but duration of moderate symptoms was less with antibiotics (no antibiotics - 4.8 days duration, delayed antibiotics - 3.9 days duration and immediate antibiotics - 3.3 days duration).

The authors concluded that delayed prescribing of antibiotics is probably the most appropriate strategy for managing acute conjunctivitis in primary care16.

Adults and Children

First line:
Chloramphenicol 0.5% eye drops, use 1 drop every 2 hours for 2 days, then every 4 hours (whilst awake) AND 1% ointment at night

Notes:

Gentamicin 0.3% eye drops could be considered as an alternative to chloramphenicol.
Fusidic acid 1% eye drops are more expensive than chloramphenicol eye drops but only need to be applied twice daily. They should be considered for:
- Patients who are pregnant.
- School children or those who require a carer to administer eye drops.

Remember:

Continue treating for a further 48 hours after signs and symptoms have been resolved.
Consider using delayed antibiotic prescriptions where appropriate.

Neonates

As per Adults and Children above.
Take a swab for Chlamydia if failure to respond. Ophthalmia neonatorum is a notifiable disease and should be reported to the Consultant in Health Protection.

5b Blepharitis

Cleansing of the eyelids can be carried out using a variety of agents (e.g. baby shampoo diluted with warm water).

Cleansing of the eyelids should be done twice daily initially. Once symptoms have improved this can be reduced to once daily. Daily cleansing should be continued indefinitely in order to reduce the likelihood of recurrence.

Topical antibiotics e.g. chloramphenicol 1% ointment (an alternative is fusidic acid 1% eye drops) should only be used if there is marked eyelid infection. They should be rubbed into the eyelid margin using a fingertip or cotton bud. This is to be carried out after cleansing the eyelid.

Note:

Treat for 4 to 6 weeks. Topical antibiotics are not recommended for long-term use.

6 SEXUAL HEALTH

Gonococcal and chlamydial infections are diagnosed by nucleic acid amplification techniques (NAATS). Samples used are:
- Endocervical / urethral / throat and rectal swabs.
- Urine sample.
- Self taken swab (women only).

Swabs for culture to enable antibiotic sensitivity to be established are always advised if a NAATS test is positive for gonorrhoea. All patients with positive NAATS for gonorrhoea should be referred to GUM clinic in Arrowe Park for further management.

Trichomonas infection may be diagnosed from a high vaginal swab (HVS).

Candidiasis and bacterial vaginosis (BV) are usually diagnosed in the light of clinical symptoms; however a HVS is usually needed for microscopy to confirm the diagnosis. Cases of recurrent BV need further review and should be referred to the GUM clinic.

In the case of a sexually transmitted infection, contacts will need to be traced and treated.

Attendance at Contraception & Sexual Health Clinics (CASH) or referral to Genito-Urinary Medicine (GUM) or Department of Obstetrics & Gynaecology may be appropriate.

6a Vulvovaginal Candidiasis

Clotrimazole vaginal preparations - a single dose of 500mg at night is as effective as a lower dose divided over several days.

Fluconazole - 150mg stat orally.

Note:

Fluconazole may be used first line as long as there are no azole interactions or contra-indications.

Pregnancy

- Use longer courses of topical clotrimazole (about 7 days or more) in pregnancy. Oral antifungal therapy should be avoided. If a pessary is used in pregnancy, then women should be advised not to use the applicator.
- Topical miconazole is a suitable alternative.

Recurrent Vulvovaginal Candidiasis

Recurrent vulvovaginal candidiasis occurs in less than 5% of women. It is defined as:

FOUR or more episodes of symptomatic vulvovaginal candidiasis in 1 year (with at least partial resolution of symptoms between episodes)

AND

Proven diagnosis with HVS culture on at least TWO occasions when symptomatic

Pre-disposing risk factors should be eliminated or controlled as much as possible (uncontrolled diabetes, immunosuppression, frequent antibiotic use).

In cases of recurrent vulvovaginal candidiasis it may be useful to ask the laboratory to formally identify the Candida species as non-albicans Candida may not respond to treatment with fluconazole.9
Referral to Genito-Urinary Medicine (GUM) or Department of Obstetrics & Gynaecology may be appropriate e.g. in non-albicans Candida species infections, pregnancy (or risk of), breastfeeding, girls <16 years or if treatment with oral fluconazole unsuitable or contra-indicated.

**An induction regimen to ensure clinical remission**
Fluconazole 150mg every 72 hours x 3 doses (off-label)

**Followed immediately by maintenance regimen**
Fluconazole 150mg once a week for 6 months (off-label)
or
Clotrimazole pessary 500mg once a week

Oral antifungal therapy should be avoided in pregnancy/risk of pregnancy and breastfeeding.

**6b Candida Balanitis**
Check for any underlying problems.
Clotrimazole 1% cream bd until symptoms settle.

**6c Bacterial Vaginosis**

**Oral treatment:**
Metronidazole 400mg bd for 5-7 days
(metronidazole 2g as a single oral dose may be considered as an alternative if adherence is an issue).

**Topical treatments** (if a woman prefers topical treatment or cannot tolerate oral metronidazole) include:
- Intravaginal clindamycin cream 2% once a day at night for 7 days
- Intravaginal metronidazole gel 0.75% once a day at night for 5 days

**Notes:**
- Bacterial vaginosis during pregnancy is associated with late miscarriage, premature rupture of membranes, pre-term birth and postpartum endometritis.
- Offer treatment to all pregnant women who are symptomatic.
- Although evidence suggests that metronidazole is safe in pregnancy and is not teratogenic, the high dose (2g) regimen must be avoided (as advised by the manufacturers).
- Topical clindamycin is safe to use in pregnancy, (however, the manufacturers advise caution in the first trimester due to a lack of safety data). Treatment with topical clindamycin may not prevent the above complications.

**6d Trichomonas Infection**
Metronidazole 400mg bd for 5 to 7 days or Metronidazole 2g stat (if compliance is a problem)

**Notes:**
- Intravaginal metronidazole is not recommended.
- Screen for coexisting sexually transmitted infections and advise contact tracing.
- Test of cure (TOC) is required to confirm eradication hence attendance at Contraception and Sexual Health Clinics or referral to GUM is recommended.

In pregnancy:
- For women with symptoms - metronidazole 400mg bd for 5 to 7 days. Manufacturers advise avoiding high dose (2g) regimen in pregnancy and breastfeeding.
- For women without symptoms - referral to a specialist department may be appropriate.

**6e Group B Streptococcus (GBS) Infection / Colonisation in Pregnancy**
If GBS infection / colonisation (diagnosed through vaginal swab or urine sample) is identified in pregnancy then this should be brought to the attention of the obstetric team as it will impact on antibiotic prophylaxis at the time of delivery.

**6f Chlamydial Infection**
For further advice consult the BASHH guidelines at http://www.bashh.org/

Provided the test request is made in line with Wirral’s Chlamydia Programme protocol, which involves all testing sites, all women testing positive in the community are sent their result and asked to contact the Chlamydia Programme Office (CO) on 0151 653 4416.

The CO with its team of Health Advisers provides
- Full counselling of the patient.
- Appropriate antibiotic therapy.
- Leaflets and a copy of the manufacturer’s patient information leaflet.
- Condoms and contraception advice.
- Partner notification as discussed with the patient at the time of treatment.
- Follow up contact with the patient by the Health Adviser 2 weeks after treatment date to check concordance and partner notification.
- Advice to contact the Health Adviser again if they feel that they have put themselves at risk of re-infection.

Patient Group Directions (PGDs) are available for azithromycin and doxycycline.

**Treatments include:**
- **First line:**
  - Azithromycin 250mg. Take 1g stat (i.e. 250mg x 4).
- **Second line:**
  - Doxycycline 100mg bd for 7 days. Swallow capsules whole with plenty of fluid at meal times.
  - Avoid strong sunlight or sun lamps.

**In pregnancy:**
- If a patient is pregnant then seek advice from CO.
- A test of cure must be arranged 5 to 6 weeks after treatment and if the pregnancy continues a further test is required before 36 weeks (in practice the patient is normally contacted at 34 weeks).

**6g Gonorrhoea**
Referral to GUM is recommended or Contraception and Health Clinics (CASH). Visit www.rcgp.org.uk for management in primary care.

Counselling, testing for other infections and partner notification are integral to patient management.

**6h Pelvic Inflammatory Disease**
Referral to GUM or Contraception and Health Clinics (CASH) is recommended.

Usual causes are *Chlamydia trachomatis* and/or *Gonorrhea neisseria* and genital mycoplasmas.

Counselling, testing for infections and partner notification are integral to patient management.

Rest, analgesia and review required.

**6i Syphilis**
There have been outbreaks of Syphilis in North West. All suspected cases of Syphilis (genital / oral ulcerations and skin rashes) should be referred to GUM for further management.
7a Acute Diarrhoea and Vomiting

Usually viral and self-limiting. Antibiotics only tend to prolong the carrier state, do not shorten the duration of the illness and may be contraindicated. Antibiotics should only be commenced on the advice of Medical Microbiology.

Oral rehydration therapy is the mainstay of treatment.

**Notes:**
- Food poisoning should be notified to the Consultant in Health Protection. For the local contact, please telephone 0844 225 1295 (daytime 9am to 5pm).
- For further details please go to the Health Protection Agency website - www.hpa.org.uk

7b Campylobacter Enteritis

(notifiable to Consultant in Health Protection)

Antibiotic treatment is not usually indicated. Initiate on the advice of Medical Microbiology if the patient is systemically unwell.

7c Cryptosporidium

(notifiable to Consultant in Health Protection)

There is no effective treatment available. Symptoms may take 2 to 3 weeks to resolve. Transmission from person to person is commonplace so strict hygiene measures must be followed.

7d Salmonellosis

(notifiable to Consultant in Health Protection)

Antibiotic treatment not usually indicated. Initiate on the advice of Medical Microbiology if the patient is systemically unwell.

7e Clostridium difficile Infection - CDI

**Stool specimen may be required in:**
- Suspected food poisoning (notifiable to Consultant in Health Protection).
- Patients with Inflammatory Bowel Disease.
- Immunosuppressed patients.
- Persistent diarrhoea (more than 1 week).
- Bloody diarrhoea (sample essential).
- Recent foreign travel.

**Notes:**
- *C difficile* is a bacterium present in the gut flora of some people.
- Antimicrobials disturb the balance of the gut flora allowing *C difficile* to multiply and cause infection.
- Symptoms of *C difficile* can vary from mild diarrhoea to fatal bowel inflammation.
- *C difficile* spores are shed in the faeces. The spores can survive for long periods in the environment.
- CDI has commonly been associated with hospital stay but it is being recognised that many cases originate in the community.
- Patients most at risk include:
  - Elderly.
  - Suffering from severe underlying diseases.
  - Immuno compromised.
  - In an environment where they are in close contact with one another.
- Other factors that increase the risk of CDI are:
  - Use of antimicrobials.
  - Cytotoxic chemotherapy.
  - Recent gastrointestinal procedures.
  - Presence of a nasogastric tube.
  - The use of Proton Pump Inhibitors (PPIs) might increase the risk of CDI.
Mild cases may respond to withdrawal of the predisposing antibiotic(s) and/or stopping of any Proton Pump Inhibitors if unnecessary. Manage fluid loss.

Otherwise for mild to moderate CD:
Metronidazole 400mg tds for 10 days for confirmed *Clostridium difficile* toxin positive diarrhoea.

A recurrent attack should be treated with a further course of metronidazole.

Patients with severe symptoms or who are not responding to oral metronidazole after 5 days of therapy should be considered for secondary care admission and/or oral vancomycin therapy (for 10 to 14 days). Seek further advice from Medical Microbiology.\(^1\)

**Notes:**
- Requires test of stool sample for the presence of *Clostridium difficile* toxin.
- May occur up to four weeks or even longer after antibiotic treatment.
- It is not necessary to send repeat stool samples after therapy has finished, as stool samples frequently remain toxin positive even in patients who are symptom free.
- Patients who have had previous *Clostridium difficile* infection remain vulnerable to recurrence or re-infection if further courses of broad-spectrum antibiotics are used.
- Consider stopping unnecessary PPI therapy in patients at higher risk or with *Clostridium difficile* infection.

**7f Giardia Lamblia**

*(notifiable to Consultant in Health Protection)*

**Adults:**
Metronidazole 400mg tds for 5 days or 2g once daily for 3 days.

**Children:**
- 1 to 3 years: 500mg once daily for 3 days
- 3 to 7 years: 600 to 800mg once daily for 3 days
- 7 to 10 years: 1g once daily for 3 days
- Over 10 years: as per adult dose

Consider ‘blind’ treatment of family contacts.

**7g Acute Cholecystitis**

Analgesia should be provided. Referral may be appropriate. In patients with raised temperature, co-amoxiclav 625mg tds for 5 days may be prescribed.

**7h Acute Diverticulitis**

Referral may be appropriate. Consider using:
- Co-amoxiclav 625mg tds for at least 5 days
- Ciprofloxacin 500mg bd plus metronidazole 400mg tds for at least 5 days
  *(if allergic to penicillin)*

**7i Helicobacter pylori Infection**

For further information please see the Wirral Dyspepsia Guidelines at: [http://mm.wirral.nhs.uk/guidelines/](http://mm.wirral.nhs.uk/guidelines/)

**8 CENTRAL NERVOUS SYSTEM INFECTIONS**

**Probable Bacterial Meningitis / Meningococcal Septicaemia**

Do not give antibiotics if this would delay urgent transfer to hospital.\(^2\)

**Community Pre-Admission Treatment:** Cefotaxime (single dose)

**Neonate or children - 50mg/kg (maximum 1g) stat IV or IM**

**Adults - 1g stat IV or IM**

- **Note:**
  - Cefotaxime is the most effective choice in terms of spectrum of activity (including penicillin resistant pneumococci). However benzylpenicillin would also be appropriate to use in an emergency situation or where there is a high index of suspicion regarding meningococcal aetiology.

**Community Pre-Admission Treatment:** Benzylpenicillin (single dose)

- **Children <1 year:** 300mg stat IV or IM
- **Children 1 to 9 years:** 600mg stat IV or IM
- **Adults and children over 10 years:** 1.2g stat IV or IM

**Control of Meningococcal Disease**

GP to liaise with Consultant in Health Protection (Daytime Tel (9am to 5pm): 0844 225 1295, Infection Control Team, Public Health and HPA with regards to arranging community control measures (e.g. prescriptions for antibiotic prophylaxis for close contacts).

For out of hours services (after 5pm) contact Public Health on call through the Royal Liverpool and Broadgreen University Hospitals NHS Trust switchboard on 0151 706 2000.

For more information go to [www.hpa.org.uk](http://www.hpa.org.uk)

**9 VIRAL INFECTIONS**

**9a Herpes Zoster (Shingles)**

Aciclovir 800mg five times daily for 7 days

Clinical value minimal unless started within 72 hours of onset of rash.\(^3\)

A course of famciclovir 750mg tablets costs significantly more than a course of aciclovir dispersible 800mg.\(^4\) It is not recommended for routine use.

**9b Varicella (Chickenpox)**

Offer symptomatic treatment.

For adults, consider prescribing aciclovir 800mg five times a day for 7 days if they present within 24 hours of the onset of the rash (particularly if severe chickenpox or risk of complications).

For children, aciclovir is not recommended in chickenpox.

**10 PARASITE INFECTIONS**

**Threadworm**

- **Children over 6 months or adults:**
  - Mebendazole 100mg as a single dose.\(^5\)
  - If re-infection occurs, a second dose may be needed two weeks later.
BNF-C recommends mebendazole as the drug of choice for treating threadworm infections in children over 6 months. However it is unlicensed for children less than 2 years of age. Parents must be informed that it is unlicensed as the package insert will state that mebendazole is not recommended for children less than 2 years of age.

Ananthelminics are effective in threadworm infections, but their use needs to be combined with hygiene measures to break the cycle of autoinfection. All members of the family require treatment. Washing hands and scrubbing nails before each meal and after each visit to the toilet is essential. A bath or shower taken immediately after rising will remove ova laid during the night.

11 ANTIBIOTIC PROPHYLAXIS

11a Antibiotic Prophylaxis against Infective Endocarditis

NICE GUIDANCE

Antibacterial prophylaxis and chlorhexidine mouthwash are not recommended for the prevention of endocarditis in patients undergoing dental procedures.

Patients at risk of endocarditis include:

- Acquired valvular heart disease with stenosis or regurgitation.
- Valve replacement.
- Structural congenital heart disease.
- Previous infective endocarditis.
- Hypertrophic cardiomyopathy.

Antibiotic prophylaxis is not recommended for the prevention of endocarditis in patients undergoing procedures of the:

- Upper and lower respiratory tract (including ear, nose and throat procedures and bronchoscopy).
- Genito-urinary tract (including urological, gynaecological and obstetric procedures).
- Upper and lower gastrointestinal tract.

Any infection in patients at risk of endocarditis should be investigated promptly and treated appropriately to reduce the risk of endocarditis.

If patients at risk of endocarditis are undergoing a gastrointestinal or genito-urinary tract procedure at a site where infection is suspected, they should receive appropriate antibacterial therapy that includes cover against organisms that cause endocarditis.

Patients at risk of endocarditis should be:

- Advised to maintain good oral hygiene.
- Told how to recognise the signs of infective endocarditis, and advised when to seek expert advice.

For further information: www.nice.org.uk/CG64

11b Malaria Prophylaxis

Malaria prophylaxis should not be prescribed on an NHS prescription form. Patients should be advised to purchase their medicines from a pharmacy where it often costs less than the prescription charge. Mefloquine, Maloprim, Malarone and Doxycycline (for this indication) are prescription only medicines which should be provided on a private prescription.

Local Community Pharmacists have access to up to date advice about appropriate regimens and can advise travellers accordingly.

The length and timing of commencement of prophylaxis is determined by the regime required. Regular GP literature also provides updated advice on the choice of antimalarials for different regions of the world. Further information is available from the Liverpool School of Tropical Medicine on 0151 708 9393.

Prophylactic medicines do not provide absolute protection against malaria. Personal protection against being bitten using mosquito nets, insect repellents and appropriate clothing is also important.

A leaflet entitled “Malaria. Information for people travelling overseas” is available from www.hpa.org.uk

For further information please see the Malaria Prophylaxis Prescribing Policy at: http://mm.wirral.nhs.uk/document_uploads/policies/PPMalariaProphylaxisv1-1.pdf

11c Management of Splenectomy Patients

Patients who suffer with asplenia or hyposplenia (including homozygous sickle cell disease and coeliac syndrome) are at increased risk of overwhelming bacterial infection. Infection is most commonly pneumococcal but other organisms such as *Haemophilus influenzae* type b and meningococci may be involved.

The risk is greatest in the first 2 years following splenectomy and is greater amongst children, but persists into adult life.

Refer to Vaccination Against Infectious Disease - ‘The Green Book’ Chapter 7 for up-to-date vaccination requirements - available at: http://immunisation.dh.gov.uk/gb-complete-current-edition/

Lifelong antibiotic prophylaxis is required in all cases. Phenoxymethylpenicillin (penicillin V) is preferred unless cover is also needed against *Haemophilus influenzae* for a child at least up to 16 years (in which case, give amoxicillin) or if the patient is allergic to penicillin (in which case, give erythromycin).

Adapted from the BNF for Children 2012-2013 and HPA Guidelines

Other measures to reduce risk include:

- Patients should be asked to consult if they have a febrile illness and may be given a stock of antibiotics to start treatment by themselves. They should carry a card and / or Medic-Alert bracelet or necklace.
- When travelling abroad patients should obtain advice from a reputable travel advice centre (e.g. Liverpool School of Tropical Medicine) to ensure precautions are adequate and up to date.
- Patients should avoid malaria (which is more severe in asplenic patients) by avoiding malarial areas or, if going to such areas, adhere scrupulously to antimalarial prophylaxis and anti-mosquito precautions.
- Avoid tick bites as there is a risk of Babesiosis and Lyme disease.

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenoxymethylpenicillin (Penicillin V)</td>
<td>Child &lt; 1 year 62.5mg bd&lt;br&gt;Child 1 to 5 years 125mg bd&lt;br&gt; &gt; 5 years and adults 250mg bd</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>Child 1 month to 5 years 125mg bd&lt;br&gt;Child 5 to 12 years 250mg bd&lt;br&gt;Child 12 to 18 years 500mg bd</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>Child 1 month to 2 years 125mg bd&lt;br&gt;Child 2 to 8 years 250mg bd&lt;br&gt; &gt; 8 years and adults 500mg bd</td>
</tr>
</tbody>
</table>

For further information: www.immunisation.dh.gov.uk
### PAEDIATRIC DOSES

<table>
<thead>
<tr>
<th><strong>Azithromycin</strong></th>
<th><strong>Amoxicillin</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month to 1 year</td>
<td>1 month to 1 year</td>
</tr>
<tr>
<td>1 to 5 years</td>
<td>1 to 5 years</td>
</tr>
<tr>
<td>5 to 18 years</td>
<td>125mg tds</td>
</tr>
<tr>
<td>250mg tds</td>
<td>250mg tds</td>
</tr>
<tr>
<td>Doses of 40mg/kg/day in 3 divided doses (max. 1.5g daily) are recommended in the treatment of Acute Otitis Media.</td>
<td></td>
</tr>
<tr>
<td>Doses may be doubled in severe infections</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Augmentin-Duo</strong></th>
<th><strong>Co-Amoxiclav</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Preparation for bd dosing)</td>
<td>1 month to 1 year</td>
</tr>
<tr>
<td>2 months to 2 years</td>
<td>1 to 6 years</td>
</tr>
<tr>
<td>2 to 6 years (13 to 21kg)</td>
<td>6 to 12 years</td>
</tr>
<tr>
<td>7 to 12 years (22 to 40kg)</td>
<td>12 to 18 years</td>
</tr>
<tr>
<td>5ml bd</td>
<td>250mg tds</td>
</tr>
<tr>
<td>2.5ml bd</td>
<td>250mg tds</td>
</tr>
<tr>
<td>300mg once daily for 3 days</td>
<td>250mg tds</td>
</tr>
<tr>
<td>400mg once daily for 3 days</td>
<td>500mg qds</td>
</tr>
<tr>
<td>500mg once daily for 3 days</td>
<td>1g qds</td>
</tr>
<tr>
<td>Doses may be doubled in severe infections</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Cefalexin</strong></th>
<th><strong>Cefixime</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month to 12 years</td>
<td>6 months to 1 year</td>
</tr>
<tr>
<td>1 to 5 years</td>
<td>1 to 5 years</td>
</tr>
<tr>
<td>5 to 12 years</td>
<td>5 to 10 years</td>
</tr>
<tr>
<td>12 to 18 years</td>
<td>10 to 18 years</td>
</tr>
<tr>
<td>12.5mg/kg twice daily.</td>
<td>75mg daily</td>
</tr>
<tr>
<td>(Maximum 25mg/kg qds (maximum 1g qd))</td>
<td>100mg daily</td>
</tr>
<tr>
<td>or</td>
<td>200mg daily</td>
</tr>
<tr>
<td>1 month to 1 year</td>
<td>200mg-400mg daily or 100mg - 200mg twice daily</td>
</tr>
<tr>
<td>12 to 18 years</td>
<td></td>
</tr>
<tr>
<td>250mg tds</td>
<td></td>
</tr>
<tr>
<td>500mg tds</td>
<td></td>
</tr>
<tr>
<td>Dose may be doubled in severe infection</td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th><strong>Clarithromycin</strong></th>
<th><strong>Co-Amoxiclav</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month to 12 years</td>
<td>1 month to 1 year</td>
</tr>
<tr>
<td>Body weight under 8kg</td>
<td>1 to 6 years</td>
</tr>
<tr>
<td>Body weight 8 to 11kg</td>
<td>6 to 12 years</td>
</tr>
<tr>
<td>Body weight 12 to 19kg</td>
<td>12 to 18 years</td>
</tr>
<tr>
<td>Body weight 20 to 29kg</td>
<td>250mg tds</td>
</tr>
<tr>
<td>Body weight 30 to 40kg</td>
<td>1000mg bd</td>
</tr>
<tr>
<td>12 to 18 years 250mg bd for 7 days, increased if necessary in severe infections to 500mg every 12 hours for up to 14 days</td>
<td>200mg bd</td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Cefixime</strong></th>
<th><strong>Ciprofloxacin</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month to 1 year</td>
<td>1 month to 1 year</td>
</tr>
<tr>
<td>1 to 5 years</td>
<td>1 to 6 years</td>
</tr>
<tr>
<td>5 to 12 years</td>
<td>6 to 12 years</td>
</tr>
<tr>
<td>12 to 18 years</td>
<td>12 to 18 years</td>
</tr>
<tr>
<td>4mg/kg (maximum 200mg) bd</td>
<td>2mg/kg (maximum 100mg) once daily at night</td>
</tr>
<tr>
<td>or</td>
<td>100mg once daily at night</td>
</tr>
<tr>
<td>6 weeks to 6 months</td>
<td>25mg bd</td>
</tr>
<tr>
<td>6 months to 6 years</td>
<td>50mg bd</td>
</tr>
<tr>
<td>6 to 12 years</td>
<td>100mg bd</td>
</tr>
<tr>
<td>12 to 18 years</td>
<td>200mg bd</td>
</tr>
<tr>
<td>For chronic infections or prophylaxis of urinary tract infection:</td>
<td></td>
</tr>
<tr>
<td>1 month to 12 years</td>
<td>2mg/kg (maximum 100mg) once daily at night</td>
</tr>
<tr>
<td>12 to 18 years</td>
<td>100mg once daily at night</td>
</tr>
</tbody>
</table>
OTHER SOURCES OF INFORMATION

- Standing Medical Advisory Committee Sub-Group on Antimicrobial Resistance “The Path of Least Resistance”. Department of Health 1998. This can be accessed via www.dh.gov.uk
- Immunisation Against Infectious Disease 2006 - “The Green Book.” This can be accessed via: http://immunisation.dh.gov.uk/category/the-green-book/
- Health Protection Agency - www.hpa.org.uk particularly:
  - HPA and Association of Infection Guidance for Primary Care for Consultation and Local Adaptation. (Last reviewed July 2010). Accessed via www.hpa.org.uk
- Map of Medicine via www.wirral.mapofmedicine.com
- Antibiotic Resistance Campaign - www.dh.gov.uk/en/Publichealth/Patientsafety/Antibioticresistance/DH_082512
- YOUR LOCAL MICROBIOLOGISTS
  Dr John Cunniffe, Dr David Harvey and Dr Kavya Mohandas

HOW TO OBTAIN ANTIBIOTIC RESOURCES

- Contact the Medicines Management Team on 0151 643 5338 or visit the Medicines Management Internet site via - http://mm.wirral.nhs.uk/default.aspx
- Department of Health Website - www.dh.gov.uk/
- Patient UK www.patient.co.uk/DisplayConcepts.asp?f=1&maxresults=&WordId=infection

APPENDIX 1 - Antibiotic Monographs

These monographs are intended as a guide only and should be used alongside the information in the BNF especially for areas such as doses, cautions, contra-indications, interactions and adverse events, which are not covered exhaustively in this section.

Traffic light colours will be used throughout the monograph section to highlight the propensity of an antibiotic to cause Clostridium difficile infection.

- RED = High Risk
- AMBER = Medium Risk
- GREEN = Lower Risk

Aciclovir

*Interaction*: Probenecid may reduce the excretion of aciclovir (increased plasma concentration).

*Acetic acid 2% (EarCalm)*

*Dosage*: One spray into the affected ear tds for a maximum of 7 days.

*Amoxicillin*

*Dosage*: 250 to 500mg tds.

*Contra-indications*: Penicillin hypersensitivity.

*Interaction*: May reduce the excretion of methotrexate leading to toxic effects.

*Clostridium difficile risk* - medium

*Azithromycin*

*Dosage*: 500mg daily for 3 days.

*Administration*: Take 1 hour before food or on an empty stomach.

*Contra-indications*: Hepatic impairment.

*Interaction*: Absorption is reduced by antacids. Levels of ciclosporin and digoxin may be increased.

*Clostridium difficile risk* - medium

*Cefalexin*

*Dosage*: 250mg every 6 hours or 500mg every 8 to 12 hours. Maximum dose in moderate to severe renal impairment 500mg every 12 hours.

*Side effects*: Diarrhoea and rarely antibiotic associated colitis (CSM has warned that both more likely with higher doses).

*Clostridium difficile risk* - medium-high
**Ciprofloxacin**

**Cautions and Contra-indications:** Quinolones should be used with caution in patients with a history of epilepsy and in children or adolescents. Dose reduction is needed in severe renal impairment.

**Interactions:** See Levofloxacin. Also anticoagulant effect of warfarin enhanced. May increase the plasma concentration of theophylline.

**Side effects:** CSM has warned that quinolones may induce convulsions in patients with or without a history of convulsions; taking NSAIDs at the same time may also induce them. Tendon rupture can occur within 48 hours of starting treatment; elderly patients and those on concomitant steroids are most at risk. If tendonitis is suspected, the quinolone must be stopped immediately.

**Clostridium difficile risk** - medium-high (especially in 027 strains)

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**Erythromycin**

**Dosage:** 250mg to 500mg every 6 hours or 500mg to 1g every 12 hours. Up to 4g daily in severe infection. Reduce dose in hepatic impairment. Maximum dose in severe renal impairment is 500mg every 8 hours.

**Cautions and Contra-indications:** Avoid concomitant administration with pimozide or terbinafine.

**Interactions:** See clarithromycin.

**Side effects:** Prolongation of QT interval causing ventricular tachycardia.

**Clostridium difficile risk** - medium to high (especially in 027 strain)

---

**Flucloxacillin**

**Dosage:** 500mg every 6 hours. May be doubled in severe infection.

**Side effects:** Cholestatic jaundice may occur. This can happen several weeks after discontinuing flucloxacillin therapy. Risk factors include treatment for more than two weeks and increasing age.

---

**Fluconazole**

**Dosage:** Vaginal candidiasis 150mg as a stat dose.

**Side effects:** Rash, less frequently hepatic disorders and hypersensitivity reactions.

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**Levofloxacin**

**Dosage:** 250mg to 500mg once daily. Dose in mild renal impairment is 500mg stat, then 250mg daily, doubled in severe infection. In moderate renal impairment 500mg stat, then 125mg daily, doubled in severe infection. In severe renal impairment 500mg stat then 125mg daily.

**Cautions and Contra-indications:** Epilepsy, history of tendon disorders due to quinolone administration, children and growing adolescents.

**Interactions:** Absorption reduced by antacids and iron. Separate administration by at least 2 hours.

**Side effects:** Tendon rupture can occur within 48 hours of starting treatment; elderly patients and those on concomitant steroids are most at risk. If tendonitis is suspected, levofloxacin must be stopped immediately.

CSM has warned that quinolones may induce convulsions in patients with or without a history of convulsions; taking NSAIDs at the same time may also induce them.

**Clostridium difficile risk** - medium to high (especially in 027 strain)

---

**Cautions and Contra-indications:** Contra-indicated in any patient with a history of co-amoxiclav or penicillin-associated jaundice or hepatic dysfunction. Caution in hepatic disease or impairment.

**Interactions:** See amoxicillin.

**Side effects:** See under erythromycin.

**Clostridium difficile risk** - medium

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**Doxycycline**

**Dosage:** 200mg on day 1 then 100mg daily thereafter. For severe infections 200mg daily.

**Cautions and Contra-indications:** Caution in hepatic impairment and with hepatotoxic drugs.

**Interactions:** Carbamazepine, phenytoin and primidone may increase the metabolism of doxycycline. Doxycycline may enhance the anticoagulant effect of warfarin. Avoid concomitant use with isotretinoin as can cause benign intracranial hypertension.

**Side effects:** Oesophageal irritation.

**Clostridium difficile risk** - low to medium
LYMECYCLINE 408mg

**Dosage:** 408mg daily for at least 8 weeks

**Cautions and Contra-indications:** Should not be given to children under 12 years of age or to pregnant or breast-feeding women as deposition of tetracyclines in growing bones and teeth (by binding to calcium) causes staining and occasionally dental hypoplasia. Avoid in liver and renal disease.

**Clostridium difficile risk** - low to medium

**Mebendazole**

**Side effects:** Very rarely abdominal pain, diarrhoea, convulsions (in infants) and rash.

**Metronidazole**

**Dosage:** 400mg tds for *Clostridium difficile* Infection.

**Cautions and Contra-indications:** Caution in hepatic impairment and hepatic encephalopathy as high plasma concentrations may cause symptoms of encephalopathy.

**Interactions:** Avoid alcohol during treatment and for at least 48 hours after last dose (risk of disulfiram-like reaction). May enhance anticoagulant effect of warfarin. Plasma concentrations of phenytoin increased. Metabolism of metronidazole increased by primidone. Lithium intoxication has been reported, avoid concurrent administration.

**Side effects:** Gastrointestinal disturbances, unpleasant taste, darkening of urine and peripheral neuropathy.

**Clostridium difficile risk** - low

**Ofloxacin**

**Cautions and Contra-indications:** Epilepsy, history of tendon disorders due to quinolone administration, children and growing adolescents. Hepatic impairment and history of psychiatric illness. May affect performance of skilled tasks (e.g. driving). Effects enhanced by alcohol.

**Interactions:** Absorption reduced by antacids and iron. Separate administration by at least 2 hours.

**Side effects:** Tendon rupture can occur within 48 hours of starting treatment; elderly patients and those on concomitant steroids are most at risk. If tendonitis is suspected, ofloxacin must be stopped immediately.

CSM has warned that quinolones may induce convulsions in patients with or without a history of convulsions; taking NSAIDs at the same time may also induce them.

**Clostridium difficile risk** - medium to high (especially in 027 strain)

**Phenoxyphenylpenicillin (Penicillin V)**

**Dosage:** 500mg every 6 hours, increased to 750mg every 6 hours in severe infections.

**Contra-indications:** Penicillin hypersensitivity.

**Side effects:** Hypersensitivity reactions including urticaria.

**Administration:** Take on an empty stomach or 1 hour before food to enhance absorption.

**Clostridium difficile risk** - low

**Trimethoprim**

**Dosage:** 200mg every 12 hours.

**Cautions and Contra-indications:** Avoid in patients with blood dyscrasias.

**Interactions:** May increase phenytoin levels. Increased risk of nephrotoxicity with ciclosporin. Increased risk of haematological toxicity with azathioprine. Increased antifolate effect of methotrexate - avoid concomitant use.

**Side effects:** Blood disorders on long-term treatment. Patients should be told how to recognise signs of blood disorders and advised to seek medical attention if symptoms such as fever, sore throat, rash, mouth ulcers, purpura, bruising or bleeding develop.

**Clostridium difficile risk** - low
APPENDIX 2
WIRRAL COMMUNITY NHS TRUST Community Nursing Service

To view the Standard Operating Procedure - Administration of Intravenous Antibiotics Policy, please go to:
http://www.wirral.nhs.uk/document_uploads/Policies_and_Procedures_Nursing/NPMM03SOPforI
VAdministrationofAntibiotics.pdf

Key Messages for GPs/Hospital Doctors and Consultants
Patients are referred to Wirral Community Nursing Service by:
• Discharging Hospital Doctor or Consultant (for patients requiring intravenous antibiotics on discharge from hospital to facilitate early discharge).
  or
• Patient’s own GP (for patients requiring initiation of intravenous antibiotics in the community to avoid admission to hospital).

The referrer will retain responsibility for any monitoring and/or review of the patient.

Patient Selection:
• The patient must be over 16 years of age.
• The patient has been assessed as fit for early supported discharge or to prevent hospital admission.
• Confirmation has been given by the medical referrer that they will remain responsible for any re-assessment of the patient’s condition.
• There is no available treatment via any other route which could be prescribed as an alternative.
• The patient has not previously suffered an anaphylactic reaction
• The referring doctor has discussed treatment with a consultant microbiologist and there are no contraindications to the proposed treatment.
• The patient has been prescribed an antibiotic that is on the agreed list of medicines in the
  Standard Operating Procedure for Administration of Intravenous Antibiotics, Wirral
  Community NHS Trust.
• The patient’s home situation must be suitable. There should be running water and access to a telephone, adequate lighting and sufficient space to maintain a sterile field.

Prescribing
• It is the responsibility of the patient’s own GP to prescribe intravenous antibiotics, diluents and flushes on a FP10 prescription.
• The referrer must contact the Microbiologist for advice on the correct antibiotic and route of administration. The Patient Medicines Administration Chart (PMAC) must be endorsed with “Discussed with the Microbiologist”.
• The GP must complete and sign a Patient Medicines Administration Chart (PMAC).
• The prescriber must provide clear, precise written instructions regarding the medicine, dose, frequency of administration and duration of treatment as well as allergy status. Verbal orders for commencement of or changes to intravenous medications will NOT be taken.

Supplies of Intravenous Antibiotics:
• The antibiotics plus diluents and flushes must be prescribed on a FP10 prescription. The FP10 prescription must be filled by a Community Pharmacy. Ringing the Community Pharmacy in advance is good practice in order to allow them to order in stock where necessary.
• If the prescribed antibiotics are not immediately available commencement of treatment will have to be delayed until a supply is available. Wirral Community Nursing Service do not stock drugs.
• Lloyds Pharmacy, Arrowe Park Hospital site keep a selected list of IV antibiotics (plus diluents / flushes) in stock for the Wirral Community Nursing Service Team.
APPENDIX 3
Sharing Good Practice
Useful tips from GPs and nurses at an antibiotic educational event
(February 2009)

Obstacles to Rational Antibiotic Prescribing
- Patient expectations and demands.
- Perceived employers' expectations.
- Time pressures.
- Language challenges.
- Care Home demands.
- Incorrect or incomplete documentation of drug allergies.
- Pressure from childcare establishments.
- Lack of consistency between partners in a practice.

Potential Solutions
- Educate patients via:
  - Local radio adverts.
  - Mailshots.
  - Explanation of the duration of anticipated symptoms.
  - Advising patients to visit their local pharmacy first for advice and symptomatic treatment.
  - Promoting messages to the media - how about antibiotic stories in soap operas?
  - Use of the language line if language barriers experienced.
- Do not "give in" to patient demand and consider that the patient might not actually want an antibiotic - just reassurance.
- Use of delayed antibiotic prescriptions.
- Use microbiology tests where appropriate before prescribing an antibiotic.
- Educate employers / Care Homes / Childcare establishments.
- Regular review of guidelines.
- Meeting with all GPs and practice pharmacist. Open discussion in practices about individual GP prescribing habits.
- Prescribers must be consistent in their messages and prescribing.
- Ensure all locums obtain educational messages, including the antibiotic guidelines.
- More antibiotic resources available to more centres!
- Audit and evaluation.
- Use microbiology services and infection control.

APPENDIX 4
Members of the Antibiotic Guideline Working Group

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr J G Cunniffe</td>
<td>Medical Microbiologist, Wirral University Teaching Hospital NHS Foundation Trust (Medical Lead)</td>
</tr>
<tr>
<td>Dr R Gokhale</td>
<td>Clinical Lead and Consultant in GU Medicine and HIV, Wirral University Teaching Hospital NHS Foundation Trust</td>
</tr>
<tr>
<td>Dr Y Graham</td>
<td>Consultant, Sexual Health Services, NHS Wirral</td>
</tr>
<tr>
<td>Dr A Lee</td>
<td>GP Prescribing Lead, WGPCC</td>
</tr>
<tr>
<td>Mrs H Oulton</td>
<td>Lead Nurse/Manager Infection Prevention &amp; Control, Wirral Community Trust</td>
</tr>
<tr>
<td>Dr B Taylor</td>
<td>Medicines Management Lead, WHCC</td>
</tr>
<tr>
<td>Mrs N Bradley</td>
<td>Practice Pharmacist, NHS Wirral (Medicines Management Lead)</td>
</tr>
<tr>
<td>Dr H Downs</td>
<td>GP Prescribing Lead, Wirral NHS Alliance</td>
</tr>
</tbody>
</table>

Contact details for further information

Medical Lead
Dr J Cunniffe 0151 604 7601 or 0151 604 7607

Medicines Management Lead 0151 643 5319