North East and Cumbria antibiotic prescribing guideline for primary care

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

Treatment guidelines contained in this guide have been adapted from the Public Health England (formerly HPA) Management of Infection for Primary Care guidelines.

Version 1.2 valid from November 2014. Review date November 2015.

Introduction to the North East and Cumbria antibiotic prescribing guideline for primary care

Background

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

Development of a single primary care guideline for the North East and Cumbria

Previously there were at least five local primary care guidelines in circulation across the North East and Cumbria, all based on the PHE management of infection guidance, many of which had expired or were due for review in 2014. A comprehensive review of all the guidelines found they were all very similar to one another which led to the concept of the development of a single regional guideline.

Having a single guideline across primary care organisations in the North East and Cumbria will improve consistency of antibiotic prescribing across the region. Some prescribers can work over several organisational boundaries and one primary care guideline would remove ambiguity and promote clinically appropriate antibiotic prescribing practices.

The development of the single guideline was discussed at the Northern CCG forum and clinical senate where it was agreed that this was a sensible approach. Professor Kate Gould, Lead Public Health Microbiologist from Public Health England, has given the regional guideline her full support.

This regional guideline will supersede the existing local primary care guidelines but the approval process for the guideline will remain with the relevant medicines approval committees throughout the region

Guideline review process

The North East and Cumbria primary care antibiotic guide will be reviewed by the NECS Medicines Optimisation Team in conjunction with key stakeholders, in line with future reviews of the national PHE management of infection guideline.

Contents

Foreword

These guidelines are intended to provide advice on the effective and safe treatment of common infections presenting in primary care in the North East and Cumbria. The guidelines incorporate previous PCT management of infection guidelines, and are largely based on the Public Health England (formerly HPA) Management of Infection Guidance for Primary Care.

Further information, evidence and references are available through the Public Health England website. This document is for guidance only.

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

10 steps for good antimicrobial prescribing practice

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

Risk of *Clostridium difficile* infection

Antibiotic exposure is associated with a significantly higher risk of *C.diff* infection (CDI) than no antibiotics.

Ciprofloxacin, **c**ephalosporins, **c**lindamycin and **c**o-amoxiclav (the 4C antibiotics) and other broad spectrum antimicrobials are associated with an increased risk of CDI.

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

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

Further information on *Clostridium difficile* infection (CDI) can be found on page 17.

Penicillin allergy

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

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

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

Further information on treating penicillin allergic patients can be found on page 18.

Microbiology contacts

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

Northumbria Healthcare Foundation Trust 0344 811 8111
Newcastle upon Tyne Hospitals NHS Foundation Trust 0191 233 6161
Gateshead Health NHS Foundation Trust 0191 482 0000
South Tyneside NHS Foundation Trust 0191 404 1000
City Hospitals Sunderland 0191 565 6256
County Durham and Darlington NHS Foundation Trust 0191 333 2333
North Tees and Hartlepool NHS Foundation Trust 01642 617617
South Tees Hospitals NHS Foundation Trust 01642 850850
North Cumbria University Hospitals NHS Trust 01228 523444
University Hospitals of Morecambe Bay 01229 870870

Quick reference guide to common infections in primary care

This quick reference guide shows recommended first line drugs, adult doses and treatments for some of the more common infections in primary care. Please refer to the North East and Cumbria antibiotic prescribing guideline for primary care for full details.

Upper respiratory tract infections

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

Acute sore throat – avoid antibiotics, 90% resolve in 7 days without and pain only reduced by 16 hours. Assess severity using CENTOR criteria

- First line: **Phenoxymethylpenicillin** *500mg QDS for 10 days*
- Penicillin allergy: **Clarithromycin** *250-500mg BD for 5 days*

Acute rhinosinusitis – avoid antibiotics, 80% resolve in 14 days without, and they only offer marginal benefit after 7 days

- First line: **Amoxicillin** *500mg TDS for 7 days* or
- Penicillin allergy: **Doxycycline** *200mg stat then 100mg OD for 7 days*

Acute otitis media in children – avoid antibiotics as 60% are better within 24 hours

- First line: **Amoxicillin** *(see BNF-C for doses)*
- Penicillin allergy: **Erythromycin** (children <12), **Clarithromycin** (children ≥12) *for 5 days (see BNF-C for doses)*

Lower respiratory tract infections

Acute cough, bronchitis – antibiotics of little benefit if no co-morbidity. Consider delayed antibiotic with advice. Consider immediate antibiotics if >80years **and** one of: hospitalisation in the past year, oral steroids, diabetic, congestive heart failure **OR** >65 years with two of the above.

- First line: **Amoxicillin** *500mg TDS for 5 days*
- Penicillin allergy: **Doxycycline** *200mg stat then 100mg OD for 5 days*

Acute exacerbation of COPD – treat promptly with antibiotics if purulent sputum and increased shortness of breath and/or increased sputum volume.

- **Amoxicillin** *500mg TDS for 5 days* or **Doxycycline** *200mg stat then 100mg OD for 5 days*
- Alternative (if resistance risk factors) **Co-amoxiclav** ⊗ *625mg TDS for 5 days*

Urinary tract infections

UTI in men and non-pregnant women (no fever or flank pain)

- First line: **Trimethoprim** *200mg BD for 3 days in women/ 7 days in men*
- Alternative: **Nitrofurantoin** *100mg BD (modified release)* or *50mg QDS (standard release) for 3 days in women/ 7 days in men*

Skin infections

Cellulitis and wound infection

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

Impetigo (also boils, carbuncles, folliculitis, staphylococcal paronychia and staphylococcal whitlow)

- First line: **Flucloxacillin** *500mg – 1g QDS for 7 days (see BNF-C for patients <18 years of age)*
- Penicillin allergy: **Clarithromycin** *500mg BD for 7 days*
- If liquid formulation required: **Erythromycin** *(see BNF-C for doses)*

Bites (human and animal)

- First line: **Co-amoxiclav** ⊗ *625mg TDS for 7 days*
- Penicillin allergy: **Metronidazole** *400mg TDS for 7 days **AND** doxycycline 100mg BD for 7 days*

Antibiotics highlighted in red and with ⊗ are associated with an increased risk of *Clostridium difficile* infection. Counsel patients at risk to be alert for signs and symptoms of CDI and seek medical help if CDI develops.

Upper respiratory tract infections

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

Consider a delayed antibiotic prescription strategy (see page 19). Giving our antibiotics automatically for upper respiratory tract infections increases the number of future consultations for the same symptoms.

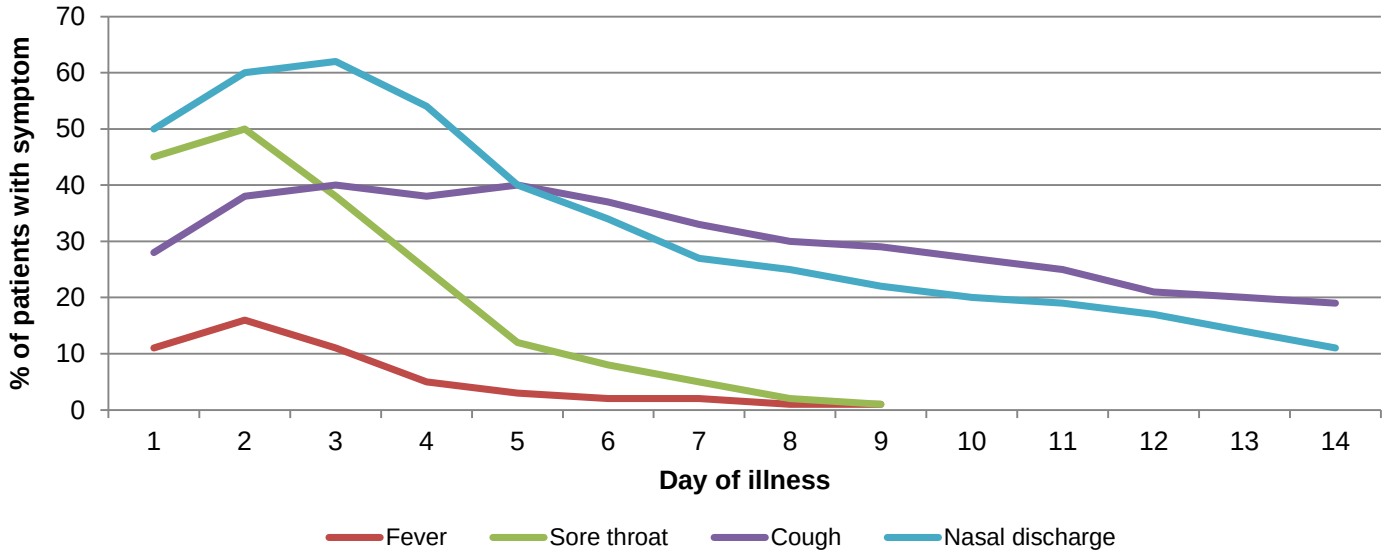
The NICE care pathway for respiratory tract infections states that all patients should be offered:

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

	When to treat	Prescribing notes and general advice	When antibiotics are needed	References and further information
Acute sore throat	The majority of sore throats are viral; most patients do not benefit from antibiotics. 90% of cases resolve in 7 days without antibiotics, and pain only reduced by 16 hours. Adequate analgesia and fluids will usually be all that is required. **Consider a delayed antibiotic prescription strategy.** Use Centor criteria score to help decide whether to prescribe an antibiotic. • A low Centor score (0-2) indicates a low chance of *Group A Beta-haemolytic Streptococci* (GABHS). • Patients with 3-4 Centor score or history of otitis media consider a 2 or 3 day delayed antibiotic prescription strategy or immediate antibiotics.	**The Centor criteria**: the presence of each clinical feature scores 1 point: • History of fever • Absence of cough • Tender anterior cervical lymphadenopathy • Tonsillar exudate	**First line: Phenoxymethylpenicillin** *500mg QDS for 10 days.* **Alternative (penicillin allergy): Clarithromycin** *250 – 500mg BD for 5 days*	NICE Clinical Knowledge Summaries: Acute sore throat NICE CG 69: Respiratory tract infections – antibiotic prescribing
Acute otitis media in children (AOM)	**Avoid antibiotics** as 60% are better within 24 hours without: they only reduce pain at 2 days (NNT = 15) and do not prevent deafness. **Consider a delayed antibiotic prescription strategy.** Public Health England suggest you consider a 2 or 3 day delayed or immediate antibiotics for pain relief if: • <2 years with bilateral AOM (NNT = 4) • All ages with otorrhoea (NNT = 3)	Use NSAIDs or paracetamol for pain relief. Inform the parent/ carer that the total duration of illness for untreated acute otitis media, before and after seeing a healthcare professional is 4 days. Advise the person to re-consult if the condition worsens or if symptoms are not starting to settle within 3 days of the onset of the illness.	**First line: Amoxicillin** *see latest BNF for children for accurate doses.* **Alternative (penicillin allergy): Erythromycin*** for children <12 years *see latest BNF for children for accurate doses.* **Clarithromycin** for children ≥12 years *250 – 500mg BD for 5 days* *macrolides concentrate intracellularly and so are less active against the extracellular *H. influenzae*	NICE Clinical Knowledge Summaries: Otitis media NICE CG47: Feverish illness in children NICE CG69: Respiratory tract infections

Acute otitis externa (AOE)	**It is important to exclude an underlying chronic otitis media before treatment is commenced. Many cases recover after thorough cleansing of the external ear canal by suction or dry mopping.** **Cure rates are similar at 7 days for topical acetic acid or antibiotic +/- steroid.** If cellulitis or disease extending outside ear canal start oral antibiotics +/- steroid.		First line: Acetic acid 2% spray **(Ear-calm®) *1 spray TDS for 7 days*** and analgesia ***For patients who pay for prescriptions Ear-calm® spray is available to purchase from pharmacies for less than a prescription charge.** Alternative: Neomycin sulfate with corticosteroid drops **(Betnesol N® or Predsol N®) *3 drops TDS for a minimum of 7 days; maximum 14 days.*** **Or** Otomize® spray **(neomycin sulfate with dexamethasone) *1 spray TDS***	NICE Clinical Knowledge Summaries: Otitis externa
Acute rhinosinusitis	**Avoid antibiotics** as 80% resolve in 14 days without, and they only offer marginal benefit after 7 days (NNT = 15). Consider a delayed antibiotic prescription strategy. Consider 7-day delayed or immediate antibiotic when fever >38°C, toothache.	Use adequate analgesia.	**First line: Amoxicillin** *500mg TDS for 7 days* **Alternative (penicillin allergy): Doxycycline** *200mg stat then 100mg OD for 7 days* **Persistent symptoms: Co-amoxiclav ⊗** *625mg TDS for 7 days*	NICE Clinical Knowledge Summaries: Sinusitis NICE CG69: Respiratory tract infections

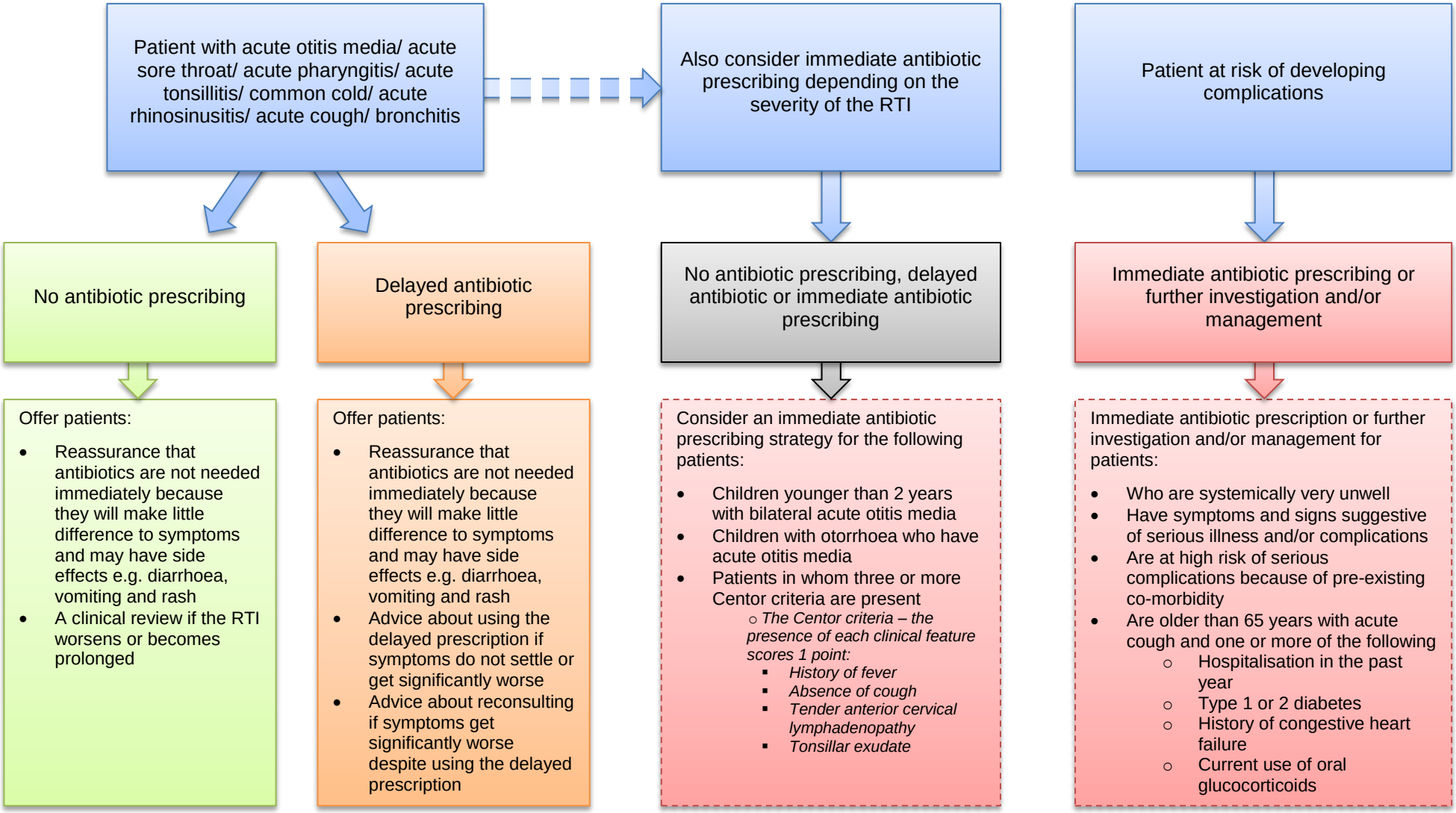
Natural history and average illness length for common respiratory tract infections:



Average total illness lengths for common respiratory tract infections:

Acute otitis media - 4 days
Acute sore throat/ acute pharyngitis/ acute tonsillitis - 1 week
Common cold - 1.5 weeks
Acute rhinositis - 2.5 weeks
Acute cough/ acute bronchitis - 3 weeks

Key points from the NICE care pathway for respiratory tract infections



Adapted from the [NICE pathway for self-limiting respiratory tract infections – antibiotic prescribing overview]

Lower respiratory tract infections

Low doses of penicillins are more likely to select out resistance.

Do **not** use ciprofloxacin first line. Reserve **all** quinolones for proven resistant organisms.

	When to treat	Prescribing notes and general advice	When antibiotics are needed	References and further information
Acute cough, bronchitis	**Consider 7 days delayed antibiotic with symptomatic advice/ patient information leaflet.** Care should be taken to exclude a differential diagnosis of pneumonia. Antibiotics are not indicated in people who are otherwise well. Routine follow up is not necessary, however patients should be advised to seek advice if their condition deteriorates significantly or symptoms persist for longer than 3 weeks. Consider immediate antibiotics if >80 years of age and with one of the following: • Hospitalization in past year • Oral steroids • Diabetic • Congestive heart failure OR >65 years of age and two of the above.	Use paracetamol or ibuprofen as required, drink plenty of fluids. Symptom resolution can take up to 3 weeks.	**Amoxicillin** *500mg TDS for 5 days.* Or **Doxycycline** *200mg stat, then 100mg OD for 5 days*	NICE Clinical Knowledge Summaries: Chest infections NICE CG69: Respiratory tract infections
Acute exacerbation of COPD	Treat exacerbations promptly with antibiotics if purulent sputum and increased shortness of breath and/or increased sputum volume Risk factors for antibiotic resistant organisms include co-morbid disease, severe COPD, frequent exacerbations, antibiotics in last 3 months.	**! Increased risk of *C.diff* infection with co-amoxiclav**.	**Amoxicillin** *500mg TDS for 5 days* Or **Doxycycline** *200mg stat, then 100mg OD for 5 days* **Alternative (if resistance risk factors): Co-amoxiclav** ⊗ *625mg TDS for 5 days*	NICE Clinical Knowledge Summaries: Chest infections NICE CG69: Respiratory tract infections – antibiotic prescribing

Community acquired pneumonia (treatment in the community)	Do not routinely offer microbiological tests to patients with low-severity community acquired pneumonia. For patients with moderate or high-severity community acquired pneumonia: • Take blood and sputum cultures and • Consider pneumococcal and legionella urinary antigen tests Use CRB-65 score to help guide and review: • Consider home-based care for patients with a CRB-65 score of 0 • Consider hospital assessment for all other patients, particularly those with a CRB-65 score of 2 or more Do not routinely offer a glutocorticosteroid to patients with community acquired pneumonia unless they have other conditions for which glucocorticosteroid treatment is indicated.	**CRB-65 score for mortality risk assessment in primary care:** Each scores 1: • Confusion (AMT <8) • Raised respiratory rate (≥30 breaths per minute) • Low blood pressure (systolic ≤90mmHg or diastolic ≤60mmHg) • Age ≥65 years Patients are stratified for risk of death as follows: • 0: low risk (<1% mortality risk) • 1 or 2: intermediate risk (1-10% mortality risk) • 3 or 4: high risk (more than 10% mortality risk)	**If CRB-65=0** **First line: Amoxicillin** *500mg TDS for 5 days** **Alternative (penicillin allergy): Clarithromycin** *500mg BD for 5 days** **Or: Doxycycline** *200mg stat, then 100mg OD for 5 days** *consider extending the course of the antibiotic for longer than 5 days as a possible management strategy for patients with low-severity community acquired pneumonia whose symptoms do not improve as expected after 3 days. Explain to patients/carers they should seek further medical advice if their symptoms do not begin to improve within 3 days of starting the antibiotic, or earlier if their symptoms are worsening.	**If CRB-65=1 and able to be managed at home** **First line: Amoxicillin** *500mg TDS for 7-10 days* **AND** **Clarithromycin** *500mg BD for 7-10 days* **Or: Doxycycline** *200mg stat, then 100mg OD for 7-10 days*	NICE Clinical Knowledge Summaries: Chest infections - adult BTS Guidelines for the Management of Community Acquired Pneumonia NICE CG191: Pneumonia: Diagnosis and management of pneumonia in adults

	When to treat	Prescribing notes and general advice	When antibiotics are needed	References and further information
UTI in men and non-pregnant women (no fever or flank pain)	Do not treat asymptomatic bacteriuria; it is common but it is not associated with increased morbidity. **Women with severe/ ≥3 symptoms:** treat. **Women with mild/ <2 symptoms:** use dipstick to guide treatment. **Men:** consider prostatitis and send pre-treatment MSU or if symptoms mild/ non-specific use –ve nitrites and leucocytes to exclude UTI. **People >65 years:** do not treat asymptomatic bacteriuria; it is common but not associated with increased morbidity. **Do not routinely dipstick.** Please refer to SIGN guidance 88 for guidance on dipstick testing in the community	Community multi-resistant **extended-spectrum beta-lactamase** *E.coli* is increasing: seek advice from microbiologist. Nitrofurantoin, pivmecillinam or fosfomycin are options (please refer to your local formulary for status before prescribing).	**Trimethoprim** *200mg BD for 3 days in women/ 7 days in men* **Or Nitrofurantoin (modified release)** *100mg BD (modified release) or 50mg QDS (standard release) for 3 days in women/ 7 days in men** **Second line:** Perform culture in all treatment failures. Amoxicillin resistance is common; only use if susceptible. *contra-indicated in patients with eGFR<45ml/min Short courses of nitrofurantoin may be used with caution in patients with eGFR 30-44ml/min. For further information see MHRA Drug Safety Update September 2014.	NICE Clinical Knowledge Summaries: Urinary tract infection (lower) – women NICE Clinical Knowledge Summaries: Urinary tract infection (lower) – men SIGN guidance: Management of suspected bacterial UTI in adults
UTI in patients with catheters	For every day a catheter is left in, 5-10% of patients will become colonised with bacteria. Unless catheterisation is short term all patients can be assumed to have bacteria in their urine. If signs/ symptoms are consistent with a catheter-associated UTI please discuss with microbiologist regarding appropriate antibiotics. Management should include a change of catheter (if safe to do so) whilst on appropriate antibiotics.	**Do not use dipstick testing to diagnose UTI in patients with catheters**. A catheter specimen of urine sample is necessary in suspected catheter related UTI but CSU samples should not be sent in the absence of clinical evidence of a UTI.	Therapy is not indicated for asymptomatic patients.	SIGN guidance: Management of suspected bacterial UTI in adults
Recurrent UTIs	Please refer to local policy and consider referral to urology.			
UTI in pregnancy	Symptomatic bacteriuria occurs in 17-20% of pregnancies. Pregnant women with mild to moderate symptomatic UTI should be treated with an antibiotic. **Send MSU for culture and sensitivity** stating clearly which trimester and start empirical antibiotics.	Short term use of nitrofurantoin in pregnancy is unlikely to cause problems to the foetus. The BNF recommends that nitrofurantoin should be avoided at term, because of the risk of neonatal haemolysis. Avoid trimethoprim if low folate status or on folate antagonist (e.g. antiepileptics)	**First line: Nitrofurantoin*** *100mg BD (modified release) or 50mg QDS (standard release) for 7 days ** *contra-indicated in patients with eGFR<45ml/min Or **Amoxicillin** (if susceptible) *500mg TDS for 7 days* **Alternative: Trimethoprim** *200mg BD for 7 days (unlicensed)* Also give folic acid 5mg daily if 1st trimester Or **Cefalexin** *500mg BD for 7 days*	NICE Clinical Knowledge Summaries: Urinary tract infection (lower) – women

UTI in children	Assess the risk of serious illness in line with NICE CG47 (Feverish illness in children). **Infants <3 months**: urgently refer all infants less than 3 months of age if UTI is suspected. Treat mildly unwell children aged 3 months and older. Use positive nitrite to guide. Send pre-treatment MSU for all. Imaging: only refer if child younger than 6 months of age or recurrent or atypical UTI.	Most children are well 24-48 hours after starting treatment. If the infant or child is still unwell after 24-48 hours they should return for reassessment. Encourage adequate fluid intake (for example check that the child is passing adequate amounts of urine or is having wet nappies).	**Lower UTI** **Trimethoprim** *for 3 days** Or **Nitrofurantoin** *for 3 days** Or **Amoxicillin** (if susceptible) *for 3 days** Or **Cefalexin** *for 3 days** **see BNF for children for accurate dosing information*	**Upper UTI** **Co-amoxiclav** ⊗ *for 7-10 days (see BNF for children for accurate doses)*	NICE Clinical Knowledge Summaries: Urinary tract infection – children NICE CG54: Urinary tract infections in children
Acute pyelonephritis	Whether or not a person with acute pyelonephritis should be admitted to hospital depends on a number of factors including the severity of their symptoms, their general state of health, comorbidities and age. If admission is not needed, send MSU for culture and sensitivities and start antibiotics. **If no response within 24 hours, admit.**	**! Increased risk of *C.diff* infection with ciprofloxacin and co-amoxiclav**.	**Co-amoxiclav** ⊗ *625mg TDS for 7 days* Or **Ciprofloxacin** ⊗ *500mg BD for 7 days** *may not be as effective in patients with renal impairment.		NICE Clinical Knowledge Summaries: Pyelonephritis – acute

	When to treat	Prescribing notes and general advice	When antibiotics are needed	References and further information
***Clostridium difficile* infection**	**ALL positive cases of *C.diff* infection should be discussed with a microbiologist prior to initiating treatment.** **Non-severe CDI:** treat in primary care (see treatment choices below). • Mild CDI: not associated with a raised WCC, typically associated with <3 stools of type 5-7 on the Bristol Stool Chart per day. • Moderate CDI: associated with a raised WCC (<15x10^9/L), typically associated with 3-5 stools per day. **Severe CDI:** specialist treatment only. **Admit as an emergency.** • Severe CDI: associated with WCC >15x10^9/L or an acute rising serum creatinine (i.e. 50% above baseline), or evidence of severe colitis. • Life-threatening CDI: includes hypotension, partial or complete ileus of toxic megacolon, or CT evidence of severe disease.	How to respond to positive lab results: 1. Initiate treatment as indicated (and isolate the patient if in a nursing/ care home) 2. Stop concomitant (non *C.difficile*) antibiotics if safe to do so and any laxatives 3. Review and stop any concomitant PPI use if possible 4. Do not use antimotility drugs e.g. loperamide	**First episode: Metronidazole** *400mg TDS for 10-14 days* (70% of patients respond to metronidazole in 5 days; 92% in 7 days) **If not responding or second episode:** contact local medical microbiologist or infectious disease physician. Please note vancomycin caps 125mg QDS cannot be administered via PEG.	NECS/ North East CCGs Risk Assessment for *C.diff* infection NICE Clinical Knowledge Summaries: Diarrhoea – antibiotic associated
Detection and eradication of *H.pylori*	The presence of *H.pylori* should be confirmed before starting eradication therapy. One week triple treatment eradicates *H.pylori* in >90% of cases. There is no need to continue PPI beyond eradication treatment unless ulcer is complicated by haemorrhage or perforation. Do not use clarithromycin, metronidazole or quinolone if used in past year for any infection. **Retest for *H. pylori*** post DU/GU or relapse after second line therapy: using breath or stool test OR consider endoscopy for culture and susceptibility.	*H.pylori* can be initially detected using a stool antigen test or urea breath test. Where re-testing is necessary a breath test should be used. Testing for *H.pylori* should not be performed within 4 weeks of treatment with any antibiotic or 2 weeks with any PPI.	Always use PPI *twice daily* (refer to local formulary for first line choice). **First line treatment:** PPI **WITH** amoxicillin *1g BD for 7 days* **PLUS** either clarithromycin* *500mg BD for 7 days* OR metronidazole* *400mg BD for 7 days* *choose the treatment regimen with the lowest acquisition cost, and take into account previous exposure to clarithromycin or metronidazole. **Penicillin allergy:** PPI **WITH** clarithromycin *500mg BD for 7 days* **PLUS** metronidazole *400mg BD for 7 days*	NICE Clinical Knowledge Summaries: Dyspepsia – proven peptic ulcer NICE CG184: Dyspepsia and gastro-oesophageal reflux disease

			People who are allergic to penicillin and who have had previous exposure to clarithromycin: PPI **WITH** tripotassium dicitratobismuthate (De-Noltab®) *240mg BD for 7 days* **PLUS** metronidazole *400mg BD for 7 days* **PLUS** tetracycline *500mg QDS for 7 days* For relapses discuss with specialist prior to initiating treatment	
Gastroenteritis	Treatment should only be considered on the advice of a microbiologist in severe or invasive infections (severe systemic upset and/or dysentery). **Antibiotic therapy is not usually indicated.** Fluid replacement essential. Do not use antimotility drugs if stools are bloody.			
Traveller's diarrhoea	For assessment of individual countries see the National Travel Health Network and Centre (NaTHNaC) website (www.nathnac.org). If a prescription is considered necessary for people travelling to remote areas, treatment should be via private prescription.			NaTHNaC: Health Professionals – travellers' diarrhoea
Threadworms	Treatment is recommended if threadworms have been seen or eggs detected. All household contacts should be treated simultaneously.	Advise morning shower/ baths and hand hygiene. Wash sleepwear, bed linen, towels, and cuddly toys at normal temperatures and rinse well. Thoroughly vacuum and dust, paying particular attention to the bedrooms, including vacuuming mattresses.	**Adults and children >6 months of age: Mebendazole** *100mg single dose* (a second dose may be needed after 2 weeks) Mebendazole is unlicensed for children under 2 years of age, however it is an accepted treatment in children >6 months and is endorsed by the BNF for children. For patients who pay for prescriptions Mebendazole (suspension and chewable tablets) are available to purchase from pharmacies for less than a prescription charge (for adults and children over 2 years of age).	NICE Clinical Knowledge Summaries: Threadworm BNF for Children: 5.5.1 Drugs for threadworms

STI screening

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

	When to treat	Prescribing notes and general advice	When antibiotics are needed	References and further information
Chlamydia trachomatis	Treatment should be initiated promptly in all people who test positive for chlamydia, or have signs or symptoms strongly suggestive of chlamydia (after testing for other sexually transmitted infections as appropriate). Opportunistically screen all aged 15 – 25 years. If acceptable, refer to a GUM clinic who will arrange treatment, screening for other STIs, detailed information on STIs, and partner notification.	Sexual intercourse should be avoided until both the person diagnosed with chlamydia and any partners have completed the course of treatment. (If single dose azithromycin is given, sexual abstinence for the following 7 days is advised or until any sexual partners have completed their treatment, whichever is the longer.)	**Doxycycline** *100mg BD for 7 days* Or **Azithromycin** *1g stat (taken 1 hour before or 2 hours after food)* **Pregnancy and breastfeeding:** **Azithromycin** (off-label use) *1g stat* Or **Erythromycin** *500mg QDS for 7 days* Or **Amoxicillin** *500mg TDS for 7 days*	NICE Clinical Knowledge Summaries: Chlamydia British Association for Sexual Health & HIV: Chlamydia guideline SIGN: Management of genital chlamydia trachomatis infection
Vaginal candidiasis	Topical and oral azoles give 75% cure. Pregnancy: Avoid oral azole – use intravaginal		**First line:** **Clotrimazole pessary** *500mg stat* Or **Clotrimazole vaginal cream** *10% stat* Or **Fluconazole PO** *150mg stat* **Alternative or pregnancy:** **Clotrimazole pessary** *100mg at night for 6 nights* Or **Miconazole intravaginal cream** *2% 5g BD for 7 days*	NICE Clinical Knowledge Summaries: Candida – female genital
Bacterial vaginosis	Approximately 50% of women with BV are asymptomatic. When symptoms are present, BV is characterized by a fishy-smelling vaginal discharge. Women with asymptomatic bacterial vaginosis (BV) do not usually require treatment. Symptomatic women should be managed as per the treatment choices outlined below. **Pregnant women** should be managed as per treatment choices below, however the 2g stat dose of metronidazole should not be used.	Clindamycin 2% cream weakens condoms. Women should be advised not to rely on barrier methods during treatment and for 5 days following. Oral metronidazole is as effective as topical treatment but is cheaper. Less relapse at 4 weeks with 7 day course than 2g stat.	**First line:** **Metronidazole PO** *400mg BD for 7 days* Or **Metronidazole PO** *2g stat** *2g stat dose of metronidazole should not be used in pregnant women **Alternative:** **Metronidazole vaginal gel** *0.75% 5g (1 applicatorful) intravaginally at night for 5 nights* Or **Clindamycin cream** *2% 5g (1 applicatorful) intravaginally at night for 7 nights*	NICE Clinical Knowledge Summaries: Bacterial vaginosis – summary

Trichomoniasis	Treat partners and refer to GUM clinic.	Trichomoniasis is a sexually transmitted infection. Advise sexual abstinence until treatment is completed and any partners have also been treated and followed up.	**First line:** **Metronidazole* tablets** *400mg BD for 5-7 days* Or **Metronidazole* tablets** *2g stat** *manufacturer advises avoid in pregnancy **Alternative:** **Clotrimazole pessary** *100mg pessary at night for 6 nights*	NICE Clinical Knowledge Summaries: Trichomoniasis
Pelvic inflammatory disease	Refer women and contacts to GUM clinic. Start empirical antibiotics as soon as a presumptive diagnosis of PID is made clinically. Do not wait for swab results. Always culture for gonorrhea and chlamydia. If gonorrhea is likely use ceftriaxone regimen (28% of gonorrhea isolates are now resistant to quinolones) or refer to GUM clinic.	Provide pain relief with ibuprofen or paracetamol. Advise of the need to use a barrier method of contraception (such as a condom) until both the woman and her partner(s) have completed treatment.	**First line: Ciprofloxacin** ☹ *500mg BD for 14 days* ***PLUS*** **Metronidazole** *400mg BD for 14 days* Or **Ofloxacin** ☹ *400mg BD for 14 days* ***PLUS*** **Metronidazole** *400mg BD for 14 days* **Alternative: Ceftriaxone** ☹ **IM** *500mg IM stat* ***PLUS*** **Metronidazole** *400mg BD for 14 days* ***PLUS*** **Doxycycline** *100mg BD for 14 days*	NICE Clinical Knowledge Summaries: Pelvic inflammatory disease
Genital herpes	Refer to Sexual Health Service for confirmation of diagnosis or (if first episode) send viral swab to lab. Consider the need for full STI screening in all cases. Commence treatment within 5 days of the start of the episode. Extend course if new lesions appear during treatment or healing incomplete.	Advise abstinence until lesions have cleared. Patient information leaflets are available from the Herpes Viruses Association or the Family Planning Association.	**First line: Aciclovir** *400mg TDS for 5 days* Or **Aciclovir** *200mg five times a day for 5 days* **Immunocompromised/ HIV patients: Aciclovir** *400mg five times a day for 7-10 days*	NICE Clinical Knowledge Summaries: Herpes simplex – genital
Acute prostatitis	Start antibiotic treatment immediately, while waiting for MSU culture results. Reassess after 24-28 hours. Review the culture results and ensure that an appropriate antibiotic is being used. Refer to urology urgently if the infection is not responding adequately to treatment.	Provide pain relief with paracetamol and/or ibuprofen (taken regularly) For severe pain, offer codeine with paracetamol. If defecation is painful, offer a stool softener such as docusate or lactulose.	**First line: Ciprofloxacin** ☹ *500mg BD for 28 days* (Quinolones achieve higher prostate levels.) **Second line: Trimethoprim** *200mg BD for 28 days*	NICE Clinical Knowledge Summaries: Prostatitis – acute

	When to treat	Prescribing notes and general advice	When antibiotics are needed	References and further information
Conjunctivitis	Most bacterial cases of conjunctivitis are self-limiting. 65% resolve on placebo by day five. If symptoms persist for longer than 2 weeks they should reconsult for investigation of the cause. People should **urgently seek medical attention** if they develop marked eye pain or photophobia, loss of visual acuity, or marked redness of the eye. Treat with antibiotics if red eye with mucopurulent (not watery) discharge. Starts in one eye but may spread to both.	Remove contact lenses, if worn, until all symptoms and signs of infection have completely resolved and any treatment has been completed for 24 hours. Clean away infected secretions from eyelids and lashes with cotton wool soaked in water. Wash hands regularly, particularly after touching infected secretions, and to avoid sharing pillows and towels to avoid spreading infection.	**First line (only if severe): Chloramphenicol 0.5% drops*** *Apply 1 drop every 2 hours for 2 days, then 4 hourly. Continue for 48 hours after healing.* Or **Chloramphenicol 1% eye ointment*** *Apply **either** at night (if eye drops used during the day) or 3-4 times daily (if eye ointment used alone). Continue for 48 hours after healing.* *For patients who pay for prescriptions Chloramphenicol 0.5% eye drops (in max. pack size 10 mL) and 1% eye ointment (in max. pack size 4 g) can be purchased from pharmacies for treatment of acute bacterial conjunctivitis in adults and children over 2 years; max. duration of treatment 5 days. This is often less than a prescription charge. **Alternative: Fusidic acid 1% gel** apply *BD, continue for 48 hours after healing.*	RCGP fact sheet: Management of infective conjunctivitis in primary care NICE Clinical Knowledge Summaries: Conjunctivitis – infective
Impetigo Also boils, carbuncles, folliculitis, staphylococcal paronychia and staphylococcal whitlow	For extensive, severe or bullous impetigo, use oral antibiotics. Reserve topical antibiotics for very localized lesions to reduce the risk of resistance. Soak and remove excess crust prior to application of topical therapy. Reserve mupirocin for MRSA.	Hygiene measures are important to aid healing and stop the infection spreading to other sites on the body and to other people. Children and adults should stay away from school or work until the lesions are dry and scabbed over, or, if the lesions are still crusted or weeping, for 48 hours after antibiotic treatment has started.	**First line: Flucloxacillin PO** *500mg-1g QDS for 7 days* For patients <18 years *see latest BNF for children for accurate dosing information* **Alternatives:** If penicillin allergic: **Clarithromycin** *500mg BD for 7 days* Children <12 years of age if liquid formulations are required: **Erythromycin** *See latest BNF for children for accurate dosing information* **For localized lesions: Fusidic acid 1% topical** *apply TDS for 5 days* MRSA only: **Mupirocin** *TDS for 5 days*	NICE Clinical Knowledge Summaries: Impetigo British Association of Dermatologists: Patient Information Leaflets

Scabies	Treat whole body including scalp, face, neck, ears, under nails. Reapply to hands if washed within 8 hours of application. Simultaneously (within 24 hours) treat all household contacts, close contacts and sexual contacts (even in the absence of symptoms). Treat scabies that has become infected with an antibiotic.	Encourage the family not to delay treatment. Consider symptomatic treatment for itching (crotamiton). Advise the person that itching may take several weeks to resolve. Consider an oral sedating antihistamine (e.g. chlorphenamine) at night if the itch is interfering with sleep.	First line: **Permethrin** 5% dermal cream *Repeat application after 7 days* Alternative: **Malathion** 0.5% aqueous liquid *Repeat application after 7 days*	**NICE Clinical Knowledge Summaries: Scabies**
Eczema	Using topical antibiotics or adding them to steroids in eczema management encourages resistance and does not improve healing.		In infected eczema, use antiseptic bath additives (e.g. Oilatum Plus) and treat with systemic antibiotics as for impetigo if clinically indicated.	NICE Clinical Knowledge Summaries: Eczema – atopic
Cellulitis and wound infection	Treat with oral antibiotics in the community if the person is well with no systemic symptoms and has no uncontrolled comorbidities that may complicate treatment. If water exposure, discuss with microbiologist. If febrile and ill, admit for IV treatment.	Advice should be given on: • The use of paracetamol or ibuprofen • Seeking immediate advice if antibiotics are not tolerated, skin signs worsen or systemic symptoms develop or worsen • Adequate fluid intake • Elevating the leg for comfort and to relieve oedema (where applicable)	**First line: Flucloxacillin** *500mg – 1g* QDS for 7 days (if slow response continue for another 7 days)* *1g flucloxacillin dose is unlicensed **Alternative (penicillin allergy): Clarithromycin** *500mg BD for 7 days (if slow response continue for another 7 days)* OR **Clindamycin** ☹ *300 – 450mg QDS for 7 days (if slow response continue for another 7 days)*	NHS Clinical Knowledge Summaries: Cellulitis – acute
Leg ulcers	Antibiotics should only be prescribed in cases of active clinical infection, not for bacterial colonization, as bacteria will always be present. Signs of active infection include cellulitis, increased pain, pyrexia, purulent exudate and odour. If the person has an active infection, send pre-treatment swab. Review antibiotics after culture results.		**First line: Flucloxacillin** *500mg – 1g* QDS for 7 days (if slow response continue for another 7 days)* *1g flucloxacillin dose is unlicensed **Alternative: Clarithromycin** *500mg BD for 7 days (if slow response continue for another 7 days)*	NICE Clinical Knowledge Summaries: Leg ulcer – venous
MRSA	If active infection i.e. MRSA confirmed by lab results, and admission not warranted use sensitivities to guide treatment. If no response seek advice from microbiologist. Do not routinely treat with oral or topical antibiotics unless directed by microbiology.	Reassure the person that infection with meticillin-resistant *Staphylococcus aureus* (MRSA) does not present a risk to healthy people in the community.	**Doxycycline** *200mg stat, then 100mg BD for 7 days* **Alternative:** Consult local microbiologist	NICE Clinical Knowledge Summaries: MRSA in primary care

Bites (human and animal)	Determine whether the person is at increased risk of the wound becoming infected, either due to the nature of the bite or due to a medical condition (e.g. diabetes, immunosuppressed status). Human bites: prescribe prophylactic antibiotics for all human bite wounds under 72 hours old, even if there is no sign of infection. Animal bites: prescribe prophylactic antibiotics if the wound is less than 48 hours old and the risk of infection is high.	Thorough irrigation is important. Assess whether the wound is infected. The following may be present: redness, swelling, serosanguinous or purulent discharge, pain, localized cellulitis, lymphadenopathy, or fever. Assess risk of tetanus and rabies.	**Prophylaxis or treatment of human, cat or dog bite:** **Co-amoxiclav** ⊗ *625mg TDS for 7 days* **Alternative (penicillin allergy): Metronidazole** *400mg TDS for 7 days* ***PLUS*** **Doxycycline** PO *100mg BD for 7 days* OR **Metronidazole** *400mg TDS for 7 days* ***PLUS*** **Clarithromycin** *500mg BD for 7 days* ***AND*** review at 24 and 48 hours	NICE Clinical Knowledge Summaries: Bites – human and animal
Fungal skin infection	If intractable send skin scrapings. Scalp: discuss with specialist.		**First line: Terbinafine topical** *BD for 1-2 weeks* **Alternative: Miconazole 2% cream** *BD continuing for 1-2 weeks after healing* OR (athlete's foot only) **Undecanoate topical (Mycota®)** *BD continuing for 1-2 weeks after healing*	NICE CKS: Fungal skin infection – body and groin NICE CKS: Fungal skin infection – foot NICE CKS: Fungal skin infection – scalp
Fungal proximal fingernail or toenail infection	Self-care alone may be appropriate for people who are not bothered by the infected nail or who wish to avoid the possible adverse effects of drug treatment. Consider drug treatment if: • Walking is uncomfortable. • Abnormal-looking nails are causing significant psychological distress. • The person has diabetes, vascular disease, or a connective tissue disorder (because of a higher risk for secondary bacterial infections and cellulitis). • The nail infection is thought to be the source of fungal skin infection. • The person is, or is likely to become, severely immunocompromised (for example with haematological malignancy or its treatment). Take nail clippings: start therapy only if infection is confirmed by laboratory. For children seek specialist advice.	Discuss the likely benefits and adverse effects of treatment so the person can make a fully informed choice. • Treatment does not always cure the infection. Cure rates range between approximately 60–80%. • Treatment that eradicates the infection sometimes does not restore the nail's appearance to normal. • The drugs need to be taken for several months, or longer for resistant nails. • Unpleasant adverse effects can occur. These include headache, itching, loss of the sense of taste, gastrointestinal symptoms, rash, and fatigue. Although abnormal liver function tests are not uncommon, liver failure and other serious adverse effects are rare.	**Superficial only: Amorolfine topical** *5% nail lacquer* *Apply once to twice weekly:* • *Fingers: 6 months* • *Toes: 3-6 months* **First line: Terbinafine tablets** *250mg OD:* • *Fingers: 6-12 weeks* • *Toes: 3-6 months* Terbinafine is fungicidal, so treatment time is shorter than with fungistatic imidazoles. **Alternative: Itraconazole tablets** *200mg BD for 7 days in each month:* • *Fingers: 2 courses* • *Toes: 3 courses*	NICE Clinical Knowledge Summaries: Fungal nail infection

Pityriasis versicolor	Initial treatment for pityriasis versicolor is with a topical antifungal. Ketoconazole shampoo for 5-7 days is recommended. Topical azole creams may be used, but large quantities may be needed. If pityriasis versicolor is extensive, or if topical treatment is ineffective, an oral antifungal drug (e.g. itraconazole) may be used for adults and children older than 12 years. Changes in skin pigmentation usually fully resolve within 2–3 months of starting antifungal treatment (but may persist for longer periods).		**First line:** **Ketoconazole topical** *2% shampoo applied to the affected area once daily for 5 days; leave on for 3-5 minutes before rinsing* **For resistant/ widespread infection:** **Itraconazole** *200mg OD for 7 days*	NICE Clinical Knowledge Summaries: Pityriasis versicolor
Acne	Treatment depends on the type and severity of acne. Patients with severe disease (e.g. nodulocystic acne) should be referred. Treat with oral antibiotics for at least 3 months if clinical improvement continues for a further 3 months. If no improvement try an alternative antibiotic before referral.	Lymecycline – lower risk of photosensitivity (once daily dosage), but 2½ times more expensive than doxycycline. Avoid in pregnancy, breastfeeding and patients younger than 12 years. **AVOID MINOCYCLINE** due to risk of liver damage.	**Mild disease (comedonal):** **Benzoyl peroxide topical** *5-10% gel applied 1-2 times daily after washing; start with lower strength preps* **Mild disease (inflammatory):** **Lymecycline** *408mg OD for up to 6 months* Or **Oxytetracycline PO** *500mg BD for up to 6 months* **In combination with benzoyl peroxide** **If tetracyclines contraindicated:** **Clarithromycin** *500mg BD*	NICE Clinical Knowledge Summaries: Acne vulgaris
Varicella zoster (chickenpox) and Herpes zoster (shingles)	Pregnant/ immunocompromised/ neonate: seek urgent specialist advice. Chickenpox: if adult or severe pain/ secondary household case/ on steroids AND can start within 24 hours of rash, consider aciclovir. Shingles: treat if >50 years of age and within 72 hours of rash (PHN rare if <50 years); or if active ophthalmic or Ramsey Hunt or eczema.		**If treatment indicated:** **Aciclovir dispersible tablets** *800mg five times a day for 7 days* **Second line for shingles if compliance a problem as ten times cost** (please refer to local formulary for status)**:** **Valaciclovir** *1g TDS* Or **Famciclovir** *500mg TDS or 750mg BD*	NICE Clinical Knowledge Summaries: Chickenpox NICE Clinical Knowledge Summaries: Shingles
Cold sores	Cold sores resolve after 7-10 days without treatment. Topical antivirals applied prodromally reduce duration by approximately 12-24 hours.			

Tick bites	Prophylaxis not indicated if the bite occurred more than 72 hours ago, or if the patient is continually exposed to ticks. For treatment of localized erythema migrans see below. Treatment of later stages of Lyme disease – discuss with microbiologist.	**Treatment of localized erythema migrans:** **Doxycycline** *100mg BD for 14 days* **Or** **Amoxicillin** *500mg TDS for 14 days* **Alternative treatment of localized erythema migrans (penicillin allergy):** **Clarithromycin** *500mg BD for 14 days* for adults and children >12 years Erythromycin for children <12 years. See BNF for children for dosing information.	**NICE Clinical Knowledge Summaries: Insect bites and stings**

	When to treat	Prescribing notes and general advice	When antibiotics are needed	References and further information
Dental infections – emergency treatment	**Dental infections are always best treated by a dentist.** GPs should not routinely be involved in dental treatment and, if possible, advice should be sought from the patient's dentist. Antibiotics are recommended if there are signs of severe infection, systemic symptoms or high risk of complications. Severe odontogenic infections; defined as cellulitis plus signs of sepsis, difficulty in swallowing, impending airway obstruction, Ludwig's angina. **Refer urgently for admission** to protect airway, achieve surgical drainage and IV antibiotics. The empirical use of cephalosporins, co-amoxiclav, clarithromycin and clindamycin do not offer any advantage for most dental patients and should only be used if no response to first line drugs when referral is the preferred option.	Regular analgesia should be first option until a dentist can be seen for urgent drainage, as repeated courses of antibiotics for abscess are not appropriate; **repeated antibiotics alone, without drainage are ineffective in preventing spread of infection**.	*If pus* drain by incision, tooth extraction or via root canal. Send pus for microbiology. *If spreading infection* (lymph node involvement or systemic signs i.e. fever and malaise) consider concomitant metronidazole. **First line: Amoxicillin** *500mg TDS for up to 5 days (review at 3 days)* (+/- **metronidazole** if spreading infection) Or **Phenoxymethylpenicillin** *500mg – 1g QDS for up to 5 days (review at 3 days)* (+/- **metronidazole** if spreading infection) **In severe infection: Clindamycin** ☹ *300mg QDS for 5 days* **Or (penicillin allergy): Clarithromycin** *500mg BD for up to 5 days (review at 3 days)* (+/- **metronidazole** if spreading infection)	NICE Clinical Knowledge Summaries: Dental abscess
Suspected meningitis	Transfer all patients to hospital immediately. Administer benzylpenicillin prior to admission, unless hypersensitive i.e. history of difficulty breathing, collapse, loss of consciousness, or rash.	**Prevention of secondary cases:** Only prescribe following advice from the Public Health England Health Protection Team. **North East:** telephone 0300 303 8596 (option 1) **Cumbria:** telephone 0344 225 0602	**IV benzylpenicillin** (give IM if vein cannot be found) Adults and children ≥10 years of age: 1200mg Children 1 – 9 years of age: *600mg* Children <1 year of age: *300mg* Or (penicillin allergy) **IV/IM cefotaxime** Adults and children ≥12 years of age: *1g* Children <12 years of age: *50mg/kg*	NICE Clinical Knowledge Summaries: Meningitis

Clostridium difficile infection

Clostridium difficile (CDI) can be present in the gut without causing illness. It is estimated to be present in the lower bowel of around 5% of the population.

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

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

Prudent antimicrobial prescribing[1]

Only prescribe antimicrobials when indicated by the clinical condition of the patient or the results of microbiological investigation.

Do not prescribe antimicrobials for sore throat, coughs and colds in patients at low risk of complications.

Consider delayed prescriptions (see page 18) in case symptoms worsen or become prolonged.

If an antimicrobial is required, follow the treatment recommendations in this guide, choosing a narrow spectrum agent where possible.

Broad spectrum antibiotics should be reserved for the treatment of serious infections when the pathogen is not known.

Which patients are most at risk of CDI?

Patients are more at risk of CDI if they are:

High risk patient

- Older patients >65 years
- Long term conditions requiring frequent antibiotics
- Recent antibiotic exposure within previous 2 months

High risk environment

- Contact with *C.diff* patients
- Recent hospital admission
- Institutionalised

High risk antibiotics (the 4Cs)?

- Clindamycin
- Ciprofloxacin and other quinolones
- Cephalosporins
- Co-amoxiclav

The use of proton pump inhibitors (PPIs) might increase the risk of CDI. Only prescribe PPIs when indicated and review.

Antibiotics and *C.diff* infection[2]

Antibiotic exposure is associated with a significantly higher risk of *C.diff* infection than no antibiotics.

Risk of infection is greatest with:

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

When can broad spectrum antibiotics be recommended?

There are few indications for broad spectrum cephalosporins or quinolones in primary care.

When using broad spectrum antibiotics counsel patients at risk to be alert for signs of CDI and to stop their antibiotic and seek medical help if diarrhoea develops.

If prescribing antimicrobials to patients with a history of CDI seek microbiology advice.

Bottom line

Ciprofloxacin, **c**ephalosporins, **c**lindamycin, **c**o-amoxiclav and other broad spectrum antimicrobials are associated with CDI.

Don't prescribe antimicrobials when they're not needed.

If an antimicrobial is indicated, prescribe a short course of a narrow-spectrum agent at the appropriate dose, as outlined in this guidance.

[1] UKMi Medicine Q&As (2012) Clostridium difficile infection – which antimicrobials are indicated?

[2] Deshpande et. al. (2013) Community-associated *Clostridium difficile* infection and antibiotics: a meta-analysis. J.Antimicrob. Chemother. 68 (9): 1951-1961.

Treating penicillin allergic patients

Penicillins are among the most useful and frequently prescribed antibiotics, however as with all medicines they can cause adverse reactions. These include allergic reactions ranging from mild rash to life threatening anaphylaxis.

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

Allergy is one of the most common and important adverse effects of penicillin and related drugs such as amoxicillin (including co-amoxiclav), flucloxacillin and piperacillin.

Anaphylaxis is rare, with an estimated frequency of 1-5 per 10,000 courses administered, but can be fatal. Furthermore the chemical structure of cephalosporins (cefalexin, cefuroxime etc) is similar to that of penicillins and cross-sensitivity can occur in up to 10% of patients.

Any patient describing anaphylaxis following penicillin exposure must not be prescribed any penicillin again, nor any cephalosporin.

More commonly penicillin hypersensitivity manifests as a rash, the typical presentation being a maculopapular, erythematous rash symmetrically disposed over the legs, buttocks and trunk.

In these patients penicillins should be avoided in future, but cephalosporins are generally not withheld since the consequences of cross-sensitivity are less serious.

Very rarely penicillins can cause pemphigus vulgaris or pemphigoid-like reactions. Penicillins and cephalosporins should not be prescribed to these patients.

Patients often describe side effects such as diarrhoea or nausea as 'allergies', so careful history taking is extremely important to distinguish between true allergy and manageable side effects. Similarly patients reporting minor rashes restricted to small areas of the body, or who develop rashes more than 72 hours after exposure, probably do not have genuine hypersensitivity. For serious infections for which penicillins are the preferred treatment, vague histories of such reactions do not contra-indicate penicillin use. Discuss with microbiology if necessary.

It is also worth noting that maculo-papular rashes can also occur in patients treated with either ampicillin or amoxicillin who have concomitant viral infections such as glandular fever. Such reactions are not allergic phenomena and do not contra-indicate future use of these or related drugs.

Antibiotic choices

Contra-indicated in penicillin allergy

- Amoxicillin
- Ampicillin
- Co-amoxiclav
- Flucloxacillin
- Penicillin V
- Pivmecillinam

Caution in penicillin allergy

Avoid if serious type 1 penicillin allergy (e.g. anaphylaxis/ angioedema)

Use with caution if non-severe allergy (e.g. minor rash only)

- Cefaclor
- Cefalexin
- Cefotaxime
- Ceftriaxone

N.B. risk of allergic reaction is greater in ß-lactams most similar to penicillins in underlying structure.

Delayed prescribing and patient information leaflets

Delayed prescription strategies

A delayed prescription strategy aims to reduce the usage of antibiotics while providing a safety net for people who genuinely need antibiotics.

Usually the person should be advised to use the antibiotic prescription only if their condition has deteriorated *within* 3 days or not improved *after* 3 days.

The strategy can be implemented in a number of ways including:

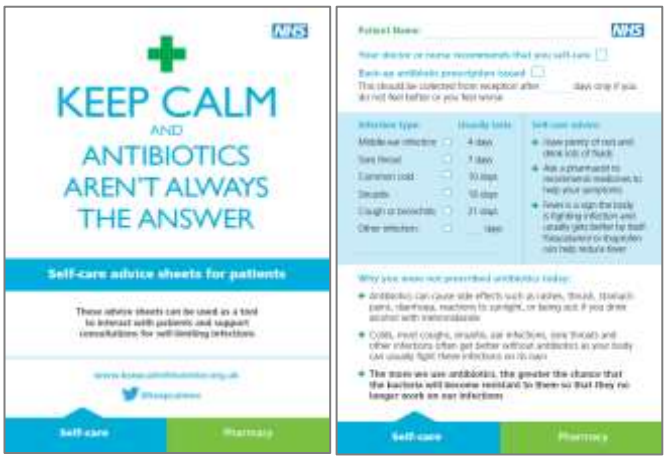
- People may be issued a script and advised not to redeem it unless it is required. If necessary, the prescription can be post-dated.
- People can be asked to re-attend the GP surgery reception after 3 days to collect the prescription (if required). If symptoms significantly deteriorate before this time, a telephone consultation can be considered.
- Always give advice and reassure the patient as well as giving the prescription. Consider giving written advice (such as a patient information leaflet).

Patient information leaflets

There is evidence that the use of leaflets or booklets outlining the natural history of respiratory tract infections (and information about when to reconsult) can result in reduced antibiotic prescribing[3]. Reductions in antibiotic prescribing have been shown to result in reductions in future demand for consultations.

Self-care advice sheets for patients

These have been designed for prescribers to use with patients presenting with self-limiting respiratory tract infections for whom no prescription, or a delayed antibiotic prescription is appropriate.

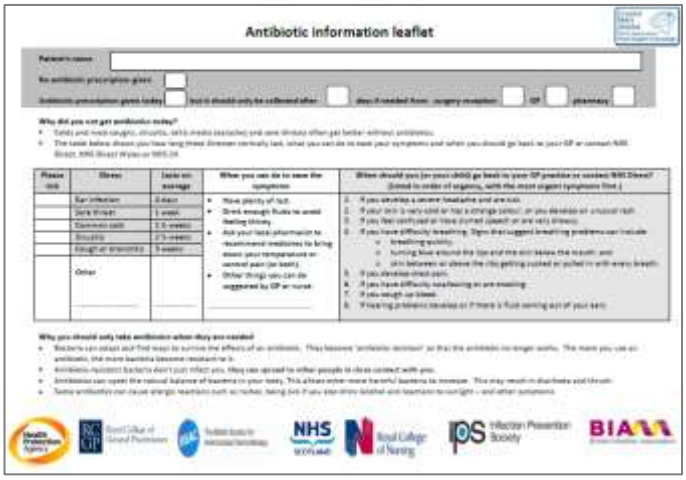


The advice sheets have been designed to be used as a tool for prescribers to interact with patients during the consultation, rather than as a 'parting gift'.

Copies of the advice sheets can be downloaded from the NECS Medicines Optimisation website http://medicines.necsu.nhs.uk/resources/antibiotics/.

TARGET patient information leaflet

The TARGET Antibiotics toolkit, produced by the Royal College of General Practitioners, provides patient information leaflets for clinicans to use within consultations.



The TARGET Patient Antibiotic Information Leaflet is also available to download in Polish, Mandarin, Gujarati, Hindi and Bengali.

[3] TARGET Antibiotics toolkit: Patient Information Leaflet Training Document

Fosfomycin information for primary care

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

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

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

Indications for use

Fosfomycin is indicated for use in lower UTIs due to ESBL producing bacteria. Fosfomycin is not indicated for the treatment of ESBL pyelonephritis or peri-nephric abscess.

Fosfomycin should only be considered for symptomatic patients where there are no other oral options suitable for the patient.

ESBLs

ESBL (Extended-Spectrum Beta-Lactamase) producing *E.coli* are antibiotic resistant strains of *E.coli*.

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

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

Licensing

The use of fosfomycin is licensed in the UK; however it is not available commercially in the UK and must be imported from abroad, making the product unlicensed.

Use of fosfomycin abroad

Fosfomycin is currently licensed and available commercially in most western European countries (Monuril®) and the USA (Monurol®).

Dosing

If fosfomycin is used, a single 3g dose is recommended in women. In men, a second 3g dose should be taken after 3 days.

Prescribing fosfomycin in primary care

Different arrangements are currently in place in different CCGs for the prescribing of fosfomycin. In some CCGs all prescribing of fosfomycin will take place in secondary care, however in other CCGs, prescribing may take place in primary care.

Please refer to your local formulary for information on the status of fosfomycin in your CCG.

Obtaining fosfomycin

As there is no commercially available product in the UK, currently the only means of ordering fosfomycin is via a 'specials' supplier by community pharmacists or dispensing doctors. There will be a delay in obtaining the product in the community setting and careful consideration needs to be given when prescribing and supplying to patients who may require treatment more urgently.

Antibiotic prescribing and antimicrobial stewardship in primary care e-learning programme

This e-learning programme, developed by the NECS Medicines Optimisation Team to support North East and Cumbria clinicians, has been designed to assist primary care prescribers understand why optimising antibiotic prescribing is important, and to suggest strategies which can help prescribers with antibiotic stewardship.

The e-learning focuses on primary care scenarios and can be run as a group or individual session. There is a lot to be gained from the discussions which arise in the group sessions.

Modules include:

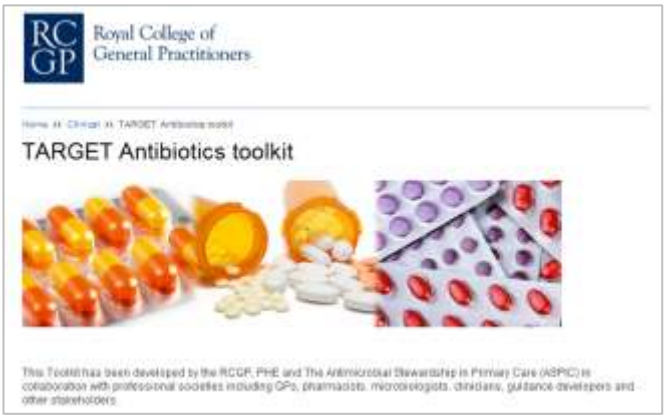
- Introduction and background to antimicrobial stewardship
- Patient scenarios
- Strategies
- Concerns and dilemmas
- Antimicrobial stewardship
- Healthcare associated infections

Clinicians must register to access the e-learning. This can be done through visiting http://medicines.necsu.nhs.uk.

TARGET antibiotics toolkit

http://www.rcgp.org.uk/clinical-and-research/target-antibiotics-toolkit.aspx

The TARGET toolkit has been developed by the RCGP, PHE and The Antimicrobial Stewardship in Primary Care (ASPIC) in collaboration with professional societies including GPs, pharmacists, microbiologists, clinicians, guidance developers and other stakeholders.



The toolkit provides a wealth of information about antibiotic prescribing including:

- Patient information leaflets
- Resources for clinicians
- Training resources to help fulfil CPD and revalidation requirements
- Audit toolkits
- Self-assessment checklist providing strategies to help optimize antibiotic prescribing in primary care

STAR educational program

http://www.stemmingthetide.org/

The STAR educational program was developed in response to concern about the rise in antibiotic resistance and the pressures to use antibiotics in everyday clinical practice.

Linked to the STAR study – can the inappropriate use of antibiotics in general medical practice be reduced across a whole practice population without either increasing hospitalisations or re-consultation rates?

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The guidelines replace previous PCT management of infection guidelines, and are based on the Public Health England Management of Infection Guidance for Primary Care.

Produced in collaboration with:

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Cumbria Area Prescribing Committee

Cumbria Clinical Commissioning Group

County Durham and Darlington NHS Foundation Trust

Darlington Clinical Commissioning Group

Durham and Darlington Area Prescribing Committee

Durham Dales, Easington and Sedgefield Clinical Commissioning Group

Gateshead Clinical Commissioning Group

Gateshead Health NHS Foundation Trust

Gateshead Medicines Management Committee

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Newcastle West Clinical Commissioning Group

North Cumbria University Hospitals NHS Trust

North Durham Clinical Commissioning Group

North East Antimicrobial Pharmacists Group

North East Microbiologists Group

Northern CCG Forum and Clinical Senate

North of England Commissioning Support Medicines Optimisation Team

North of Tyne Area Prescribing Committee and Antimicrobial Subgroup

North Tees and Hartlepool NHS Foundation Trust

North Tyneside Clinical Commissioning Group

Northumberland Clinical Commissioning Group

Northumbria Healthcare NHS Foundation Trust

South Tees Clinical Commissioning Group

South Tees Hospitals NHS Foundation Trust

South Tyneside Clinical Commissioning Group

South Tyneside NHS Foundation Trust

South Tyneside Medicines Management Committee

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Sunderland Drug and Therapeutics Committee

Tees Medicines Governance Group